Embracing the Machines: Rationalist War and New Weapons Technologies

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Dramatic advances in weapons technology over the past two decades have led to a revolution in military affairs. Robotics and cyber weapons have used real-time information and communications to produce precision that has reduced casualties and blurred the line between war and peace. Critics fear that these developments will encourage nations to resort to force more often; they call for international agreements to ban the new technologies. This Essay argues that efforts to limit the use of such weapons are both misguided and counterproductive. New military technologies will advance humanitarian aims by reducing civilian casualties and the overall destructiveness of war. A rationalist approach to war even suggests that these weapons will create more opportunities for the settlement of international disputes with less use of force.

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INTRODUCTION

Unmanned Predator and Reaper drones rove the skies above the Middle East and Africa. They hover over a target for days and launch Hellfire missiles on a moment’s notice. Robots on the battlefield below breach doors in house-to-house searches and explode improvised explosive devices common in wars with terrorists or resistance fighters. Future advances will bring armed sentry robots, autonomous armored vehicles, and automatic missile and artillery fire. On the sea, X-47 aerial drones take off and land on aircraft carriers while others already perform strike and reconnaissance missions. Soon, unmanned surface combat vessels may deploy close to shore, and others may track enemy submarines beneath the waves.

Combat is not just moving toward the robotic; it is also becoming ethereal. During its 2008 Georgia incursion, Russia became the first nation to deploy cyberattacks on enemy command, control, and communication systems to augment a ground invasion. To delay the Iranian nuclear program, the United States and Israel allegedly deployed the Stuxnet virus to damage centrifuges engaged in uranium enrichment. China has stolen large databases of U.S. government personnel information in addition to penetrating the networks of U.S. defense contractors, airlines, and technology companies. Russia, meanwhile, has allegedly hacked into databases and email systems of

1. See generally TALLINN MANUAL ON THE INTERNATIONAL LAW APPLICABLE TO CYBER WARFARE 95–202 (Michael N. Schmitt ed., 2013) (discussing the role of cyberwarfare in armed conflict).
the U.S. Departments of Defense and State, along with those of the Democratic National Committee and the campaign of presidential candidate Hillary Clinton.\(^5\)

These examples illustrate the dramatic advances in weapon technology over the last two decades, which observers sometimes refer to as the “revolution in military affairs.”\(^6\) The United States now fields thousands of unmanned aerial vehicles (UAVs) for both reconnaissance and armed attacks. Combined with stealth technology, these drones allow the United States and other nations to gather intelligence around the clock and launch immediate attacks in trouble spots around the world. In the future, the most advanced ground and sea-based armed forces will employ remote-controlled units, such as sentries, light armor, and littoral naval vessels. Advances in missile technology and precision targeting will allow the United States to field a conventional global-strike capability that can hit any target in the world within an hour. Some experts even anticipate autonomous weapons systems that militaries can program for action independent of direct human controllers.

The revolution in military affairs may reduce the destruction of war. A nation will place fewer soldiers in harm’s way when remote-controlled combatants are available. Precision-guided weapons and clearer real-time intelligence will inflect less death and destruction on soldiers and military assets. With drones available, for example, nations will no longer need to resort to World War II or Vietnam-era bombing runs to destroy arms factories or oil installations. Precision-strike technology may also shorten war by targeting an opponent’s leadership and strategic vulnerabilities, as it did with the one hundred-hour Persian Gulf War of 1991 and the lightning-quick invasion of Iraq in 2003. Future technology could also reduce harm to civilians—one of the central principles of the laws of war—by tightly concentrating the use of force on military targets.

Technology will contribute to changes in tactics that are already blurring our understanding of what constitutes “war.” While modern war has concentrated highly destructive forces on discrete battlefields, new technology

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may disperse less destructive forces across the globe. For one, technology has played a central role in the rise of nonstate actors. The September 11, 2001, attacks and the evolving sophistication of terrorist groups like the Islamic State of Iraq and Syria (ISIS) show that states no longer have a monopoly on international violence that can rise to the level of armed conflict. Nations have responded to unconventional attacks by nonstate actors with a mixture of armed force, economic sanctions, and criminal prosecution, leaving unclear where law enforcement ends and armed conflict begins. Technology allows nations to gain better intelligence on these groups and attack them without deploying large conventional forces. Moreover, high-tech surveillance and strike systems allow nations to identify enemy groups that hide among civilians, follow a decentralized command structure, and attack civilian targets as often as military targets. While technology has contributed to the effective reach of nonstate terrorist groups, it has also assisted nations in responding to them both domestically and abroad.

Critics, however, worry that advances in weapons could increase conflict by making war easier to initiate. If a nation can simply press a button and destroy a target or cripple enemy infrastructure without risking its own personnel, it will choose a military response more often than it should. United Nations officials give voice to these growing worries. “The expansive use of armed drones by the first States to acquire them, if not challenged, can do structural damage to the cornerstones of international security and set precedents that undermine the protection of life across the globe in the longer term,” declares Christof Heyns, the UN’s Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions. States can use drones and other technology, such as cyberweapons, to launch attacks far from conventional battlefields in ways that escape immediate detection, and perhaps even responsibility. Ultimately, pinpoint strikes and cyberattacks will continue to blur any clear line between war and peace.

Cyberwarfare further blurs this line. Internet attacks can cause real-world destruction and harm, or they can simply interfere with another nation’s communications, financial, or information networks. A cyberattack, for example, could cause a flood by disabling the control mechanisms for a dam or trigger an explosion by forcing a power plant to malfunction. As Russia demonstrated in its invasions of Georgia in 2008 and Ukraine in 2014, nations can also launch cyberattacks as part of an electronic warfare campaign to support a conventional armed attack. They can use cyberweapons in place of

conventional weapons to commit sabotage, such as the Stuxnet virus. Or governments can use the Internet to steal significant military or intelligence information, such as weapons designs or strategic plans, which appears to be occurring with increasing frequency between the United States and China. “China is using its cyber capabilities to support intelligence collection against the U.S. diplomatic, economic, and defense industrial base sectors that support U.S. national defense programs,” the U.S. Defense Department stated in a 2016 report to Congress.⁹ “The accesses and skills required for these intrusions are similar to those necessary to conduct cyber attacks.”¹⁰ The anonymity of cyberattacks may prevent open armed conflict because targeted nations will not know against whom to retaliate.

Indeed, nations have been uncertain about their responses to robotic and cyberwarfare attacks. They sometimes treat them as a form of espionage or covert action, refusing to consider the resulting damage as an act of war. China’s theft of the U.S. Office of Personnel Management database did not prompt an official use of U.S. force, nor did North Korea’s hacking of Sony’s electronic files. Iran took no overt military response to the Stuxnet virus. American drones execute dozens of strikes in countries, such as Yemen, Somalia, Afghanistan, and Pakistan, without sparking any military reaction.

And yet, use of these weapons in other contexts would likely start an armed conflict. Cyberattacks to disable military units or critical civilian networks, or to augment a broader military offensive, would surely constitute acts of war, as would the use of robots and drones to harm people or real property. Robotics and cyberweapons could also exert force that does not necessarily kill or destroy tangible objects, but fall somewhere in between the line between domestic crime and an act of war.

Governments and scholars are not always clear about when such attacks meet the legal standards for an armed attack or something less. For example, the new United States Law of War Manual, issued by the Department of Defense in 2015, declares that the existing laws of war should apply to what it calls “cyber operations.”¹¹ But it then concedes that the rules here are “not well-settled” and are “likely to continue to develop.”¹² The United States even takes the position that it may not have a position, as the manual declares that it does not “preclude the [Defense] Department from subsequently changing its interpretation of the law.”¹³

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¹⁰. Id.


¹². Id.

¹³. Id. at 1.
This Essay argues that efforts to constrain new military technologies with ex ante per se rules, rather than ex post reasonable regulation, are not only doomed, but dangerous. History is littered with proposals to stop advances in weapons. Medieval leaders tried to ban crossbows, early artillery, and firearms because they violated chivalry and honor. During World War I, nations argued over whether international law prohibited airplanes from bombing targets or submarines from sinking ships without warning. But by the end of World War II, the United States used atomic bombs to end the war against Japan. International agreements, such as the League of Nations and the Kellogg-Briand Pact, failed to stop the Axis. History tells us that restraint arrives through deterrence, not law or morality. In World War II, the Allies and Axis stockpiled ample arsenals of chemical weapons, but did not use them for fear of retaliation. During the Cold War, mutually assured destruction ultimately led both superpowers to agree to limits on, and then reductions of, nuclear weapons.

International law, rightly understood, does not prohibit the use of these new weapons. The United States will not stop China from stealing its government personnel databases by appealing to common values, but by deploying equally effective offensive and defensive cyber weapons. Europeans will not force the United States to limit its drone campaign against terrorist leaders through legal arguments, but they could pressure Washington by refusing to cooperate with intelligence sharing and joint operations. In fact, limiting, and especially prohibiting, the use of robotic and cyber weapons could have perverse effects on the very goals of international law. If nations cannot employ new, more precise weapons, they will have to resort to traditional conventional warfare, using human soldiers and pilots in larger numbers with more destructive weapons. In addition to causing greater destruction, limits on new weapons will discourage nations from using force when the international system needs it most: to stop terrorism, human rights disasters, nuclear proliferation, and aggression. Perversely, banning new weapons out of a vague desire to make war harder to start will make war more destructive and harmful to the innocent—the very antithesis of the laws of war.

This Essay will proceed in three parts. Part I describes the advances in military technology prompted by the information and robotics revolution. It responds to critics of these new weapons and argues that international efforts at regulation are likely to fail. Part II sets out the claim that new weapons

technologies could advance the goals of the laws of war by reducing civilian casualties and the overall destructiveness of war. Part III introduces a rationalist theory of war to explain why robotic and cyber weapons could help nations settle their disputes without resorting to full-scale hostilities.

I. NEW MILITARY TECHNOLOGY AND THE LAWS OF WAR

A. New Military Technology

Robots are spurring not just an evolution, but a revolution, in war. While UAVs have received the most popular attention and sparked the most controversy, nations are developing robots to serve as more than just airborne weapons platforms. The U.S. military is developing a range of new technologies that employ some type of robotics, including infantry weaponry, ground vehicles, aircrafts, and naval vessels. Unmanned vehicles can perform what the military calls “dull, dirty, or dangerous” work—constant monitoring, disposal of toxic materials, or high-risk military attacks—that can save time, effort, or lives.

Robots also perform many tasks better than humans. UAVs do not grow tired, fatigued, or hungry. While they need refueling and maintenance, they do not need sleep or rest. UAVs can hover over an area for hours, long after a human pilot would have returned to base for rest and refueling. Robots do not suffer from emotion, panic, or fear. They can follow the orders of human commanders half the world away without misinterpretation, misunderstanding, or delay. They obey their programming unequivocally, so long as they are free of bugs or viruses.

Of course, unintentional manufacturing and programming error or deliberate hacking by an opponent could cause robots to malfunction. An American stealth drone, for example, allegedly crashed in Iran in December 2011 because of interference with its communication links to base. Future opponents conceivably could use similar methods to take control of robots to destroy them or even turn them against their masters. Though no human or technological system will guarantee a perfect success rate, we should judge the effectiveness of new technologies by comparing their error rates. Admittedly, it


19. For early discussion of some of these types of robotic weapons systems, see RONALD ARKIN, GOVERNING LETHAL BEHAVIOR IN AUTONOMOUS ROBOTS (2009); ARMIN KRISINAN, KILLER ROBOTS: LEGALITY AND ETHICALITY OF AUTONOMOUS WEAPONS (2009). A more colorful journalistic account can be found in PETER W. SINGER, WIRED FOR WAR: THE ROBOTICS REVOLUTION AND CONFLICT IN THE 21ST CENTURY (2009).
is currently unclear whether the probability of machine error will exceed the risk of human error, but experience with machines in other contexts suggests otherwise. Autonomous cars, for example, have scored an impressive accident rate far below that of human drivers. In absolute numbers, UAVs appear to crash more often than human pilots, but perhaps not by hours spent airborne (and drone controllers may press the performance limits of drones because there is zero risk to human pilots). There are no public studies showing that UAVs have less accuracy than human pilots in attacking specific enemy targets, such as al-Qaeda leaders. The criticism has focused on the human decisions to fire, rather than robotic malfunction. If anything, the concern is over the greater precision afforded by drones, not their greater error rate.

1. Air

UAVs have become the most salient example of the spread of revolutionary technology to war. UAVs include reconnaissance and strike aircraft that have no pilots and instead receive remote commands from distant controllers. As the Obama administration’s signature counterterrorism weapon, the UAV charted the way for the development of military robotics. While unmanned air platforms emerged on battlefields as early as the balloon and as recently as reconnaissance aircraft, these earlier systems could not execute real-time commands, operate over great distances, nor carry out effective, lethal operations. Digital command, control, and communications have vested robots with a quantum leap in their military capabilities. They can stream constant reconnaissance of a battlefield, take account of changing environments, and provide an instant strike ability. In the meantime, they remove human pilots from danger. In these deployments, human operators make the ultimate decision to fire missiles at targets that are sometimes thousands of miles away.

These virtues have led the United States to devote large resources to UAVs. From 2015 to 2017, the Pentagon plans to spend between $4.2 and $4.8 billion per year on unmanned air drones and their support systems. As of 2013, it had 126 MQ-9 Reapers and RQ-4 Global Hawks that can operate at high-altitude, loiter over areas for hours, and launch multiple weapons to destroy enemy targets. Entered into service in 2007, the Reaper can fly for more than

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twenty hours, has a range of 1,150 miles, and carry a mixed payload of bombs and missiles. The United States also operates medium-altitude UAVs, including about five hundred drones designed purely for long-range reconnaissance, nine thousand for tactical surveillance, and the MQ-1 Predator, which can fire munitions. Even while U.S. spending will remain constant, industry estimates project that the global market in UAVs will rise to $89 billion over the next ten years.23

Early uses of the drone took the form of solo strikes in locations where ground troops or manned aircraft could not easily deploy. The first reported drone strike, for example, took place in 2002 when a CIA-operated Predator launched a Hellfire missile to kill Abu Ali al-Harithi, the planner of the 2000 bombing of the U.S.S. Cole.24 While the strike occurred outside the Yemen capital of Sanaa, the operator made the decision to fire from a base in Djibouti while overseen by commanders in Saudi Arabia. U.S. drone strikes have concentrated in Pakistan, Afghanistan, as well as parts of Africa and the Middle East. And their use has skyrocketed since the early 2000s. While the Bush administration carried out 46 drone strikes in Pakistan from 2004 to 2008, the Obama administration launched 308 from 2009 to 2013.25 The effectiveness of these attacks has led the U.S. Air Force to place more orders for drones than manned aircraft for future deployment.26 According to the Congressional Research Service, UAVs “are expected to take on every type of mission currently flown by manned aircraft.”27

In this role, UAVs have raised legal questions similar to those prompted by targeted killings or covert assassinations because of their stealthy nature, pinpoint targeting, and remoteness from traditional battlefields.28 National militaries, however, will not limit robots to targeted killings. Aerial drones can eventually replace manned aircraft for most missions, including air supremacy, strategic bombing, and ground support. While greatly removed from the battlefield, operators can effectively deny an enemy force access to an area.

While critics have attacked the use of drone strikes to hit discrete terrorist targets that lay off a conventional battlefield, attention has yet to focus on the drone support of other military units. Defense planners have raised the idea of deploying multiple drones that provide near-constant, ubiquitous air support, especially when integrated with mortars, artillery, helicopters, and manned aircraft. The Persistent Close Air Support program would give ground troops the ability to select a target, and then rely on computer algorithms to make the optimal choice of weapon system, munition, and flight pattern to destroy the target.\(^{29}\) Networked systems already gather intelligence from ground troops, airborne vehicles, and space platforms to build the situational awareness necessary for such rapid target selection and weapon launch. After more development of these systems, ground troops would essentially point-and-shoot, without the delays of communication and calculation with weapons systems.

2. **Land**

UAVs only begin to suggest the even greater effect that robotics could have on ground operations. Presently the bulk of military personnel are devoted to ground combat, which still generates the greatest share of military and civilian deaths. Thus, the use of unmanned ground weapons could significantly reduce battle casualties among combatants, while their precision could limit harm to civilians.

A mundane weapon like a land mine may illustrate the potential of future weapon development. Land mines are just a primitive version of robotic warfare. Mines automatically detonate their explosives when their sensors detect the presence of certain conditions, most commonly a weight compressing the surface above the mine.\(^{30}\) They perform a valuable military function by denying an area to enemy forces. They deter an opponent’s offensive operations, slow the speed of advance, and inflict casualties on its ground forces. Along disputed and heavily militarized borders, such as those between North and South Korea or India and Pakistan, mines may play an important role in deterring attacks and providing stability in volatile political environments. But their primitive, automatic nature creates a threat of harm to civilians from mines left on battlefields long after the end of a conflict.

Newer technologies offer the possibility of reducing these harms. Even though the United States along with several other countries, including Russia,
China, and India, refused to join the Ottawa Convention banning landmines, it has worked on improving the devices. The U.S. Army’s XM-7 Spider and XM-1100 Scorpion mines deploy munitions in the field, but ones that do not continue to pose a threat after hostilities end. An operator up to 2.4 miles away monitors the mine’s sensors and decides whether to trigger the device, which allows for greater discrimination between combatants and civilian targets. The user can even decide not to detonate the payload if he concludes that attacking the enemy at that moment would not serve a tactical mission. The mines can hold both lethal and nonlethal munitions and run on an internal battery that deactivates the device a certain period of days.

Enhanced by greater communications, sensors, and remote control, newer mines can inflict the same lethal force, but with greater concentration on combatants and less risk to civilians.

Nations and corporations have already begun researching and developing new ground devices. Samsung, for example, has developed sentry robots that can detect a target in the Korean demilitarized zone in day or night at a distance of over one mile. They can determine if the target has surrendered, consult with remote commanders, and fire anything from a machine gun to a missile. Israel has deployed a similar, but mobile, ground vehicle—the Guardium—that can patrol a ground area, conduct surveillance, and employ force either by remote control or autonomously.

Unmanned systems will play an increasingly important role in ground combat. Militaries already rely on computer-controlled radars and munitions for counterbattery weapons, which respond quickly to intercept enemy fire or destroy its source. Current Defense Department programs have developed small, ultralight ground robots playing significant roles in intelligence and surveillance using small, ultralight robots. The Roomba vacuum cleaner, for example, employs technology on a small scale that will find its way into military robots. Planners envision small unmanned vehicles that will support and transport ground troops and their equipment. Other models will clear minefields and toxic contaminants, breach the entrances of buildings, and open up routes in cities for safe passage. Defense contractors are working on control systems that could transform any ground vehicle, including armored tanks, self-propelled guns, and personnel carriers, into unmanned drones.

33. **Croottof, supra note 30, at 1869.**
34. **Id.**
35. **UNMANNED SYSTEMS INTEGRATED ROADMAP, supra note 23, at 6–7.**
3. Sea

Unlike ground units, unmanned naval systems will enjoy some of the advantages that UAVs enjoy from the air, so much so that they will be the drones of the seas. Like the air, the ocean’s vast spaces provide drones with much greater room to maneuver. And like their early airborne counterparts, unmanned naval vessels could serve in a wide variety of unarmed missions including surveillance, intelligence, and reconnaissance, both on the high seas and in littoral operations. Without crews, unmanned naval vessels could be smaller, and hence stealthier and faster. By being able to survive extensive damage, they would be more “persistent” and could operate in a wider variety of difficult conditions. Unmanned naval vessels would also cost less, allowing naval forces to deploy them in higher numbers in situations that would otherwise seriously threaten human life. Robotic ships could also be large. Remote controllers could command military convoys across the oceans, with weapons serving in a defensive capacity only. Indeed, Rolls Royce predicts that civilian cargo vessels will become autonomous within ten years.

Armed unmanned naval vessels could take many other forms. The most immediate and obvious role would be minelaying and sweeping, which poses severe dangers to human sailors but could be more easily automated. Littoral Combat Ships (LCSs)—small ships that operate close to shore—could deploy twelve-meter long, unmanned surface vehicles capable of reaching speeds up to sixty-five kilometers per hour and surviving for two days away from the mother ship. The U.S. Navy is also conducting research and development on technology that automates the role of surface warfare vessels. In 2012, for example, the U.S. Navy launched six missiles from an unmanned, remote-controlled weapons platform that also defended itself with machine guns. Further, the U.S. Navy has also tested the X-47B, an aerial drone designed for takeoff and landing on aircraft carriers. Naval observers speculate that the growing automation of today’s large surface warships, including the largest Ford-class aircraft carriers, may lead to fully autonomous destroyers and frigates.


38. See U.S. NAVY, supra note 36, at 11–12.

4. **Cyber**

In the decades ahead, robotic warriors should replace humans for more and more combat missions. UAVs only appeared before ground and water robots because they could operate with more freedom in the skies and with less chance of effective countermeasures. Their early deployment as tactical ground strike units should expand to include air supremacy and strategic attack missions. As robotic technology and their supporting information systems advance, drones could also replace manned armored vehicles and artillery on the ground, and surface warships and submarines on the seas. They will have qualitative advantages over their human counterparts, such as farther mobility, longer endurance, faster response, and greater accuracy. These qualities should reduce the harm to attackers, defenders, and civilians. But drones may also weaken moral barriers to killing by geographically and psychologically distancing human decision makers from the consequences of their actions.

Cyber represents a fourth dimension of potential conflict, one that carries enough significance that the U.S. Department of Defense created a new Cyber Command in 2010.40 Nations have become dependent on information and control systems that communicate through the Internet and store and manipulate vast amounts of data through powerful computer processing. We see everyday examples in the speed of information storage and retrieval by search engines and cloud computing, the rapid communication of information by instant messaging and email, and the increased speed and efficiency of operations in online retailers. Military operations have also lowered costs and enhanced effectiveness by using the private sector’s new information technology. They also have become subject to the same vulnerabilities.

Digital computing and communication, combined with robotics, can produce what we can call information-enhanced military operations.41 These operations use high-tech sensors, computing resources, and communications to coordinate troops and weapons more effectively, and take advantage of information faster. Such integration will multiply combat effectiveness on battlefields. Unmanned aerial weapons platforms, precision missiles, and joint forces cooperation allow the United States, for example, to strike targets farther behind the battlefield. Dominating the information “space” allows nations to coordinate multiple weapons over great distances while simultaneously receiving constant updates on targets, threats, costs, and benefits.42 Information-enhanced operations create the capability for coordinated strikes in

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41. See generally *Drones and the Future of Armed Conflict*, supra note 18 (surveying various advancements in military robotics); *Robot Ethics*, supra note 18, at 109–45 (same); *Shah*, supra note 18 (focusing on drones).

all dimensions that can cripple an enemy and lead to shortened conflicts—the ultimate force multiplier.

While information technology enhances the effectiveness of both military and civilian operations, it also creates new vulnerabilities. Nations have long included information operations in their contests for supremacy. Our earliest records of warfare in the ancient world recount significant spying and deception—it is no coincidence that a popular hacking tactic is known as a Trojan Horse. As technology provided more immediate means of communication, such as the telegraph, radio, and the telephone, nations entered the field of signals intelligence so they could interfere and eavesdrop. The widespread use of the Internet to control infrastructure and resources, communicate and store information, and coordinate operations makes nations even more vulnerable to cyberattacks. Several high profile cases have emerged, such as China’s alleged theft of millions of personnel files from the U.S. Office of Personnel Management, Russia’s alleged hacking into the Democratic Party’s computer systems, and North Korea’s theft and vandalism of Sony’s computer systems.

These attacks use a variety of cyberweapons. They include spyware to monitor or damage computers and networks, Trojan Horses to infect networks with malicious code, viruses to take control of computers, worms to self-replicate and spread more malware on their own, logic bombs to trigger malicious computer instructions, and distributed denial of service attacks to overload websites and crash computers. Cyberweapons have both the lower costs, and the greater effectiveness of robotic weapons. Professor Scott Shackelford observes, “the internet is global, access is widespread, and the benefits to attackers are concentrated while costs are diffuse.” The decentralized nature of the Internet makes it difficult both to defend vital facilities and to attribute attacks to state actors.

As the Internet becomes a key enabler of military operations and civilian governance, nations will struggle to maintain open access for their civilians, while denying it to rivals. This has been the goal of American strategy toward other global commons—the sea, airspace, and outer space. As U.S. cybersecurity officials have observed, the Internet’s openness and access favor offensive strategies and increase the costs of defense. According to the U.S. Department of Defense, the United States seeks to cover the “full spectrum of military operations,” using “computer network operations,” to “attack, deceive,
These new weapons technologies are a “not if, but when” question. This Part has described U.S. programs not because they are unique, but because the United States has deployed them more than any other country and it has publicly released its plans for further development. According to one estimate, at least seven nations have used drones in combat and nineteen have or are acquiring armed drones. Use of cyberweapons may be even more widespread. Nations without drones, such as North Korea, have used cyberweapons to steal data or hack into military and civilian networks. These weapons reduce the risk to a nation’s soldiers, reduce the cost of arms, and allow for greater precision in targeting. Their combination of greater military effectiveness and lower costs is proving irresistible to nations.

B. Controversy over New Weapons and the Drive for Regulation

Prominent international officials and lawyers believe that deployment of these new weapons may violate the law. The Obama administration’s heavy reliance on drone warfare has prompted these criticisms. UAVs have afforded the United States the ability to strike terrorist groups far beyond any conventional battlefield without the need to send ground troops or hold territory. “By his third year in office, Obama has approved the killings of twice as many suspected terrorists as had ever been imprisoned at Guantánamo Bay,” observes one journalist. Outside groups estimate that American UAV strikes have killed approximately two thousand suspected militants in the Middle East and East Africa, and several more thousand civilians.

Criticism of the “drone wars” takes different forms. Some believe that robotic weapons will make war too easy to start and too cheap to stop. In the hopes that law and morality can reduce the amount of conflict, these officials and scholars believe that war should represent a difficult hurdle to overcome. Others charge that robotic weapons will spread combat beyond traditional battlefields to civilian locales that should be governed by domestic legal systems, not laws of war. Critics also argue that the accuracy and speed of drones allow nations to target specific individuals for death, in violation of the ban on assassinations. Security analyst Lawrence Korb claims, for example,

that robots “will make people think, ‘Gee, warfare is easy.’”  

He worries that leaders will hold the impression that they can win a war with just “three men and a satellite phone.” Noted writer Peter Singer agrees: “as unmanned systems become more prevalent, we’ll become more likely to use force.”

1. **Nation v. Nonstate Actors Conflict**

States no longer have a monopoly on international violence that can rise to the level of armed conflict. On September 11, 2001, al-Qaeda agents disguised as civilians hijacked civilian airliners and crashed them into civilian and military targets in Washington, D.C. and New York City. The September 11 attacks started a conflict between the United States and the al-Qaeda terrorist organization, a nonstate actor. By expanding the area of conflict and employing asymmetric, unconventional tactics and weapons, al-Qaeda showed that nonstate actors could wield the destructive power once held only by national militaries. More recently, terrorist groups such as ISIS have evolved beyond covert groups using disguise and infiltration to launch surprise attacks on civilians. In swaths of Syria and Iraq, ISIS has deployed significant forces capable of waging both covert and conventional attacks, holding cities and territory, and managing public services and resources. The evolution of nonstate actors into organized, military operatives contributes a more general uncertainty of what constitutes “war” in the modern era.

Consistent with this confusion, nations have responded to terrorist attacks with both their military and their domestic law enforcement mechanisms, employing a mixture of armed force, economic sanctions, and criminal investigations. Military technology has played a key role in the way that nations formulate and execute these responses. For example, technology has allowed nations to gain better intelligence on nonstate groups and attack them without deploying large conventional forces in the region. High-tech surveillance and strike systems allow nations to identify enemy groups that hide among civilians, follow a decentralized command structure, and fire on civilian targets as often as military targets. Robotic and cyberweapons have become the weapons of choice against nonstate actors because they allow for attack at a distance with reduced civilian casualties. This allows nations like the United States to strike at decentralized terrorist networks without having to hold territory with troops near the enemy, thus reducing combatant deaths too.

Because it is unclear whether these tactics amount to war, as conventionally understood, the use of this technology is merely following the aforementioned

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51. Id.

52. Id.
evolution in armed conflict that is already blurring the line between peace and war.

Much of the controversy surrounding the use of new weapons technologies has arisen over their use against nonstate actors. The United States began using drones to launch precision attacks against suspected al-Qaeda terrorists as early as November 2001, and their use sharply increased during the Obama administration. While the use of these weapons has drawn much criticism, these objections often confuse the question of whether fighting terrorism qualifies as war with the question of the legality of the means used to fight the war.

When the United States has defended the use of drones, it has not provided a comprehensive explanation for their use. As the legal advisor of the U.S. State Department, Harold Koh declared in 2010 that “it is the considered view of this Administration—and it has certainly been my experience during my time as Legal Adviser—that U.S. targeting practices, including lethal operations conducted with the use of unmanned aerial vehicles, comply with all applicable law, including the laws of war.” Koh did not provide a legal analysis, but instead briefly cited the United States’ right to self-defense as undergirding the legality of UAV targeting. “As a matter of international law, the United States is in an armed conflict with al-Qaeda, as well as the Taliban and associated forces, in response to the horrific 9/11 attacks, and may use force consistent with its inherent right to self-defense under international law,” Koh said.

Criticism of the use of drones against nonstate actors has come from established international organizations, most visibly the United Nations. In May 2010, the United Nations Human Rights Council appointed a special rapporteur to investigate “targeted killings.” Philip Alston, the United Nations (UN) expert, argued that U.S. drone practice may violate international law because it targeted the leaders of terrorist groups off any recognized battlefield, which he believed tantamount to killing civilians in peacetime. He also criticized the use of drones because “they make it easier to kill without risk to a State’s forces.” Alston’s UN report rejected claims that nations could use drones in anticipatory self-defense to pre-empt terrorists because such use

53. Harold Koh, Legal Adviser, Dep’t of State, The Obama Administration and International Law, Keynote Address at the Annual Meeting of the American Society of International Law (Mar. 25, 2010), http://www.state.gov/s/l/releases/remarks/139119.htm [https://perma.cc/Q2BB-38LW]. As dean of Yale Law School, Koh had vociferously criticized the administration of President George W. Bush for its detention, interrogation, and use of force policies against terrorists. Once in the Obama administration, however, he built the legality of drone strikes on the same legal foundations as the Bush administration.


55. Id. at 24–25.

56. Id. at 24.
“threatens to eviscerate the human rights law prohibition against the arbitrary deprivation of life.”

Some legal scholars have expanded upon this argument. They argue that the use of drones in Pakistan, for example, violates the laws of war because they do not take place within an international armed conflict. In their view, private groups and individuals, as opposed to nations, cannot wage war. War concentrates hostilities in a unified place and time, while terrorists launch attacks sporadically, covertly, and without state support. In the view of some scholars, therefore, terrorists do not meet the standard of an “armed attack” under Article 51 of the UN Charter, which recognizes a state’s right to use force in self-defense. “An armed response to a terrorist attack will almost never meet these parameters for the lawful exercise of self-defense,” argues Notre Dame Professor Mary Ellen O’Connell.

Under this view, terrorist attacks should only trigger a law enforcement response. Terrorist attacks, because of their sporadic nature, low casualties, and lack of state support, are really crimes, not acts of war. “Terrorist attacks are generally treated as criminal acts because they have all the hallmarks of crimes,” O’Connell declares. Using drones to kill terrorists off a conventional battlefield would qualify as extrajudicial killing, or, in domestic law terms, murder. The Swedish foreign minister, for example, criticized a U.S. drone strike in Yemen as “a summary execution that violates human rights,” a view shared by Amnesty International. Instead of sending drones to kill, these critics argue, nations have a legal obligation to use law enforcement personnel to arrest terrorists and try them in court. Under this logic, the United States’ drone campaign to strike al-Qaeda in Pakistan violates the laws of war because it uses force away from any defined battlefield and against targets that are not part of any state’s armed forces.

These criticisms confuse the legality of an armed conflict—its *jus ad bellum*—with the how it is waged—its *jus in bello*. Justifications for going to war are separate from those for using certain tactics or weapons. Similarly, even if a nation goes to war for illegitimate reasons, soldiers who participate in the conflict do not violate *jus in bello*. German soldiers during World War II

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57. *Id.* at 25.
59. *Id.*
62. On this point, see Michael Walzer, *JUST AND UNJUST WARS* 21 (3d ed. 2000). Walzer’s view, which defends the common understanding of the laws of war, has come under recent challenge from Jeff McMahan. *JEFF McMahan, KILLING IN WAR* 15–16 (2009).
did not automatically become war criminals simply because they participated in a war of aggression; only those who violated limits on the means of war (such as deliberately killing civilians) violated the laws of war.

The same legal separation between *jus ad bellum* and *jus in bello* applies to drones. A nation’s decision to wage war cannot automatically rule in or out any types of weapons. Once a conflict has begun, the laws of war switch from the lawfulness of going to war to the narrower, repeated question whether the choice of weapon in a particular context is reasonable. Whether to use a drone, or a ballistic missile, or a commando team to kill an enemy commander has no bearing on whether the United States legitimately could use force in Pakistan or against al-Qaeda.

These mistaken criticisms of drones draw on broader criticisms made against the Bush administration that the September 11 attacks did not trigger a state of war that would justify military detention. “The U.S. Constitution contains no wartime or emergency exception to the scope of the President’s powers,” advised Professors Louis Henkin of Columbia Law School and Harold Koh then of Yale Law School. “Indeed, the word ‘war’ appears nowhere in Article II of the Constitution,” they argued in urging the U.S. Supreme Court to free Jose Padilla, a U.S. citizen and suspected al-Qaeda operative, from military detention.63 No war, no detention. If the law requires the United States to use the police to arrest terrorists and civilian courts to try them, it must also require the United States to use force only in a manner consistent with domestic law enforcement rules. Police cannot use force unless reasonably necessary to prevent a serious imminent harm to the officer or a third party. Under the critics’ logic, terrorists off the battlefield do not pose the required imminent threat. No war, no drone strikes.

These arguments, however, do not uniquely apply to drone warfare. Instead, they attack the very concept of a war against terrorist groups. Nations, of course, have long struggled with enemies that employ terrorist tactics. During post-World War II decolonization, national liberation movements used irregular, guerrilla tactics and attacked civilians. In the 1970s and 1980s, radical Marxist groups in Europe—Action Direct in France, the Baader-Meinhof Group in Germany, and the Red Brigades in Italy—sought to overthrow capitalism using terrorist tactics. Today, groups such as Shining Path in Peru and the Moro National Liberation Front in the Philippines continue attacks against government and civilian targets.

Groups fighting internal civil wars or challenging the legitimacy of their governments are not the only practitioners of terrorist tactics. Perhaps the most severe fighting has occurred between nations and foreign nonstate opponents. As previously noted, the United States responded to the September 11 attacks

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with an invasion of Afghanistan that overthrew Taliban control and routed the terrorist groups from its bases in the country. In early 2014, ISIS wrested control over parts of Syria and Iraq from their governments and imposed its version of Islamic law on a population of between two and seven million people. It fields an irregular armed force against government troops in Syria and Iraq, sends out agents who have launched suicide attacks against civilians in Baghdad, Paris, Nice, and Brussels, and inspires homegrown killers in Boston, San Bernardino, and Orlando. For decades, the Palestine Liberation Organization conducted terrorist attacks against Israeli civilian targets, even after the Oslo Accords gave it control of the West Bank. Hamas has attacked Israeli targets from the Gaza Strip and Hezbollah has attacked both civilian and military targets from across Lebanon’s border.

Nations should not limit themselves merely to domestic criminal justice approaches in fighting these types of groups. Admittedly, if governments could not use military methods, the current use of drones would violate U.S. domestic law. In the United States, for example, the Supreme Court has read the Fourth Amendment to bar the use of deadly force unless an officer has “probable cause to believe that the suspect poses a significant threat of death or serious physical injury to the officer or others.”64 The Court continued: “Where the suspect poses no immediate threat to the officer and no threat to others, the harm resulting from failing to apprehend him does not justify the use of deadly force to do so.”65 Under this standard, police cannot use deadly force against terrorists who are merely organizing their group, conducting training or providing logistical support, or even planning an attack. Instead, they must pose an imminent threat of serious harm, which under current understandings of the Garner standard depends on the proximity in time of the attack.66

But if nations were to mistakenly decide that they cannot attack terrorist groups within the framework of war, the use of drones still poses no special problem. If U.S. drone strikes violate international law because they target suspected criminals, not enemy combatants, the weapon system makes no difference. Attacks on terrorists using manned aircraft, guided missiles, or artillery should equally offend the United Nations rapporteurs or scholars. Nor should distance matter. If the United States kills a terrorist from a high altitude with a robotic weapon, or a Navy SEAL strikes the same target with a rifle from a distance of one meter, UN critics should still find a violation of their view of international law. In all of these cases, this argument would have it, the United States has killed a civilian suspected of crimes, whom it should have arrested and brought to trial under its domestic laws. Robots should not change

65. Id. at 11.
66. For an effort to reconstruct the imminence standard in the context of terrorism and weapons of mass destruction, see JOHN YOO, POINT OF ATTACK: PREVENTIVE WAR, INTERNATIONAL LAW, AND GLOBAL WELFARE 97–105 (2014).
the legal equation. They are no more, or no less, worthy of blame than the F-22 Raptor, the artillery shell, the Abrams tank, or the assault rifle that kills a terrorist.

The critics’ arguments are misplaced. The conflict with terrorism is indeed a war, which permits nations in the conflict to use force to kill members of the enemy. In the case of the United States, the September 11 attacks revealed an unprecedented enemy—a covert network of terrorists with no territory to defend, no population to protect, and no uniformed armed forces to fight. Al-Qaeda operates by launching surprise attacks on civilian targets using unconventional weapons and by camouflaging its leaders, operatives, and resources within innocent civilian populations. Despite its nature as a dispersed network, al-Qaeda on September 11 launched coordinated attacks that destroyed the World Trade Center in New York City and seriously damaged the Pentagon in Washington, D.C., killed approximately three thousand, wounded many more, and destroyed billions of dollars in property. It inflicted a level of destruction on the United States that only a few nation-states could have.

If a nation had carried out the September 11 attacks, we would have no difficulty in recognizing a state of war. If the Soviet Union had used KGB agents to crash passenger jets into downtown New York and the Capitol, the United States could have attacked Russia in self-defense under international law. In its response, the United States could have its choice of weapons, including drones, to strike military personnel and resources, civilian leadership, and industries that support the Russian war effort. Indeed, the United States and the Soviet Union amassed huge nuclear arsenals during the Cold War to destroy each other in case of the outbreak of direct hostilities. Claims that the United States cannot use drones reduce to arguments that the United States cannot use force against terrorists, even though it could use the exact same weapons in the exact same way against a nation-state enemy. It is perverse to effectively create an exemption for terrorists from a military response, which are necessary to prevent future attacks, because terrorists choose to target civilians and refuse to fight under the control of a nation. Terrorists will win immunity from war by violating the norms of war.

2. Nation v. Nation Conflict

In the view of the United States, the choice of drones should make no difference for the legality of the use of force. “[T]he rules that govern targeting do not turn on the type of weapon system used,” Koh said, “and there is no prohibition under the laws of war on the use of technologically advanced weapons systems in armed conflict—such as pilotless aircraft or so-called smart bombs—so long as they are employed in conformity with applicable
laws of war.” These laws include the principle of distinction—nations attack only military objectives and not civilians—and the principle of proportionality—military attacks cannot cause damage that is excessive in relation to the military advantage.

Three years after Koh’s statement, however, UN international law officials continued to attack drones. Although admitting that drones “are here to stay,” Christof Heyns worried that robots would tempt states to “increasingly engag[e] in low-intensity but drawn-out applications of force that know few geographic or temporal boundaries.” Their growing availability and falling costs make the weapons a necessary addition to the arsenals of most nations, including the United States, the United Kingdom, France, Russia, China, India, and Israel, among others. States can use drones and other technology, such as cyberweapons, to launch attacks far from conventional battlefields in ways that escape immediate detection or even evade responsibility. The clear line between war and peace will blur as nations use pinpoint strikes and low-level force to coerce each other.

New weapons, such critics worry, will encourage states to use force more often, even if less intensely. Because drones risk less harm to an attacking state’s forces, they will tempt governments to employ force on a more regular basis. Wider use of force for longer periods of time, Heyns concludes, would “run counter to the notion that war—and the transnational use of force in general—must be of limited duration and scope, and that there should be a time of healing and recovery following conflict.” The widespread acceptance and use of drones “can do structural damage to the cornerstones of international security and set precedents that undermine the protection of life across the globe in the longer term.”

Contrary to the overheated claims of UN officials or many international lawyers, the emergence of new weapons does not create an unprecedented dynamic that dramatically encourages nations to go to war. Modern war deepened conflict but also concentrated it on the battlefield. New weapons technologies may have the reverse effect. They may allow warfare to be conducted in ways that kill fewer combatants and civilians than the total wars of the last century. They may also expand hostilities beyond a battlefield unified in one place and time to attack enemies thousands of miles from any “front” and weeks before they might launch an attack. In the twenty-first century, new weapons may spread war farther, but render it shallower in its destructiveness.

68. Id., supra note 7.
69. Id.
70. Id.
At the same time, the U.S.’s assurances that there is little new here may mislead. Robots and cyberweapons are not just like any other weapon, and their use in the twenty-first century will not follow the pathways of the last century’s weapons. In the nineteenth and twentieth centuries, the deployment of new weapons technology exponentially increased death on the battlefield. Industrialization not only made war between mass armies possible, but scientific research eventually developed weapons, such as nuclear bombs, that could kill more people indiscriminately than ever before. After major wars, states naturally sought to limit the most destructive technologies, either through weapon bans or at least through more granular limits on target selection. But by the end of World War II, the Allies engaged in large scale strategic bombing of entire cities in Germany and Japan to destroy their economic capacity, as well as their political will, to continue fighting. Putting aside the debate over whether “bombing to win” has succeeded, World War II air forces had to use inaccurate dumb gravity bombs to increase their chances of striking an individual target.\footnote{Robert Pape argues that coercive air power against economic or political targets has not succeeded, but that it can cripple an opponent’s military operations. See \textit{Robert A. Pape, Bombing to Win: Air Power and Coercion in War} (1996).}

New weapons make the lethality of force more certain, but less destructive. Drones, for example, can gather intelligence that makes a successful attack more likely, and thus reduces the amount of force needed to destroy the target. A Reaper UAV on patrol over Iraq can follow the movements of possible ISIS commanders for weeks, in what intelligence officials call “pattern of life” analysis.\footnote{U.S. \textit{Army, The Targeting Process, Field Manual No. 3-60}, at B-3 (2010), \url{http://www.globalsecurity.org/military/library/policy/army/fm/3-60/fm3-60.pdf} [https://perma.cc/7QSZ-TZBH].} Surveillance allows the United States to decide with greater certainty whether a person is an ISIS commander or a civilian, and how to strike without injuring the latter. Greater intelligence increases the probability of killing the ISIS leader while the longer endurance of drones allows the United States to strike at the most propitious time and place. Precise munitions lower the likelihood of collateral losses. Destroying the Fuhrer’s bunker, in other words, no longer requires leveling downtown Berlin. As a result, nations will err if they press for stricter regulation of new weapons, even as those same weapons reduce death and suffering in combat.

Robots and cyberweapons accelerate other important developments in warfare. Technology has allowed for combat at greater and greater distances. Ancient and medieval warriors generally fought within eyesight of each other. An English longbow could disable a target as far away as 325 yards.\footnote{Clifford J. Rogers, \textit{The Battle of Agincourt, in The Hundred Years War (Part II): Different Vistas} 37, 74–76 (Andrew Villalon & Donald Kagay eds., 2008).} Twentieth-century rifles can hit targets more than double or triple that distance. Modern artillery gave armies a reach of miles, rather than yards. By World War
II, aircraft enabled attacks hundreds of miles away on targets well behind the battlefield—hence the emergence of the “strategic” bombing of political and economic targets. The United States’ bombing of Hiroshima and Nagasaki introduced a new combination of technology: bombers that could fly across oceans and continents to deliver nuclear weapons capable of destroying entire cities.

Military missile technology, first developed by the Nazis, allows nations to project force across continental distances with stunning speed. Ballistic missiles have ranges from one thousand kilometers for short-range weapons to five thousand kilometers for long-range variants. Intercontinental ballistic missiles (ICBMs) can strike targets virtually anywhere in the world with short flight times and high accuracy, making them difficult to intercept. These missiles, however, lack the real-time decision making to engage targets on the fly. A ballistic missile cannot decide to disarm itself if it learns that too many civilians are nearby. A cruise missile cannot switch targets if it detects a higher value enemy commander off its flight path.

Robots and cyberweapons offer the immediacy of a missile strike but with the real-time decision making of human pilots. Their ability to fire over great distances reduces the chances of casualties for controllers of drones or programmers by removing the operators from the physical battlefield. Under the balancing required by the laws of war, the very replacement of a human pilot by a remote-controlled computer brain should favor the drone as the weapon system of choice. Imagine, for example, that the United States has intelligence on the location of the leader of ISIS in Syria. It can choose between three strike options: (1) a Predator, (2) a manned F-16 fighter-bomber, or (3) Seal Team Six. Suppose that all three choices produce the same benefits of success with the same expected cost to nearby civilians. Options 2 and 3 place American soldiers at risk while option 1 does not, without any corresponding difference in effectiveness. An American commander naturally would choose option 1. But, as overlooked by critics of drones, the laws of war should encourage all commanders of any nation to choose option 1. If all three options have the same expected payoff (the same probability of killing the same enemy leader) but option 1 has a much lower cost, overall social welfare should favor option 1. While this calculation may seem coldhearted because it turns only on the cost to the attacker, keeping the harm to the defender constant, commanders must conduct such balancing under the laws of war. Our conclusion in favor of drones shows, however, the perversity of forcing nations to choose the most dangerous and wasteful methods for fighting war.\footnote{For a similar conclusion, through somewhat different moral logic, see Bradley Jay Strawser, \textit{Moral Predators: The Duty to Employ Uninhabited Aerial Vehicles}, 9 J. MIL. ETHICS 342, 344 (2010). Strawser proposes a “principle of unnecessary risk” which requires nations to reduce unnecessary risks to combatants, all other things being equal, in choosing a weapon.}
Drones and cyberweapons, moreover, bear advantages beyond just reducing the potential costs to their users. They also reduce the potential harm to the defenders. This benefit runs counter to the modern trend of military invention. Progress in arms has removed combatants farther and farther from the battlefield: from the distance of a longbow, to a rifle, to artillery, to aerial bombs, to, ultimately, ICBMs. But as distance has increased, accuracy had decreased. Shooting an enemy with a rifle over five hundred yards will inevitably bear more possibility of error than engaging in hand-to-hand combat. Faced with the reduction in certainty by attacking over longer distances, nations have compensated by fielding warheads that will inflict greater damage. A bomb that lands with less accuracy needs a wider blast radius to destroy the same target.

New military technology breaks this link between distance and error. Predators and Reapers allow U.S. Air Force pilots to conduct warfare at an unprecedented remove, once only available to the missile crews in ICBM silos in the Dakotas. They also offer greater accuracy than missile strikes conducted from the continental United States, even those contemplated by the U.S. Prompt Global Strike system, which will use ICBMs and hypersonic cruise missiles to drop large conventional warheads on any point worldwide in less than an hour. In fact, Predators and Reapers should match the superior accuracy of manned ground attack aircraft because they deploy the same armaments, such as the Hellfire or Maverick missile systems. The only difference is the weapons platform. It is possible for drones to even improve on the error rate of fighter-bombers. Drone pilots will suffer less from fatigue and the heat of combat, and they have the even greater luxury of loitering over the battlefield to select the best time for an attack. Such higher accuracy allows the United States to employ less destructive warheads to effectively eliminate a target.

These advantages should help new military technologies to better approach the ultimate goal of the laws of war, the reduction in harm to civilians. The marriage of constant surveillance (and thus better intelligence) with precision attack should reduce the expected collateral harm to civilians. A missile, for example, once launched cannot change its flight path based on updated intelligence, nor can a bomber recall a gravity bomb once dropped if civilians suddenly appear near the target. Drones, by contrast, allow greater real-time changes to targeting and selection of weapons to better fit the circumstances. Because they do not have human pilots in the cockpit, drones can even take greater risks—such as flying at lower altitudes or braving higher

degrees of anti-aircraft or antipersonnel fire—to attack their targets in a way that reduces harm to those nearby.\textsuperscript{76}

The Kosovo War provides an example. In 1999, the North Atlantic Treaty Organization (NATO) drove Serbian forces under the leadership of President Milosevic out of the province of Kosovo of the former Yugoslavia.\textsuperscript{77} NATO’s intensive air campaign hit not just tactical targets, such as Serbia’s armed forces, but also strategic targets, such as government ministries and transportation, communication, and energy networks. After seventy-eight days, Milosevic withdrew from Kosovo without the need for NATO ground troops. The attacks represented a signal success in air power coercion, with low collateral costs—NATO publicly estimated about five hundred civilian deaths.\textsuperscript{78}

Some international law observers, however, criticized the NATO bombing campaign. They argued that bombers had deliberately chosen civilian targets, such as Serbian television stations, government ministries, and electrical grids, protected by the laws of war. Another criticism targeted NATO’s operating rule that barred its bombers from flying below fifteen thousand feet so as to avoid Serbian anti-aircraft defenses.\textsuperscript{79} Operating at such high altitudes, some claimed, limited the accuracy of the gravity bombs and increased the risks of harm to nearby civilians. These arguments demand a level of perfection unattainable in war and unduly restrict the ways in which nations can use force.\textsuperscript{80} But with UAVs, military planners can alleviate this concern. They can accept higher levels of harm to their drones in order to increase the precision of their attacks.

During the Kosovo War, NATO war planners clearly wanted to prevent Serbian forces from killing or capturing pilots, which was one of the few ways


\textsuperscript{80} We believe that NATO’s choice of targets in the Kosovo air war would meet the traditional targeting criteria used by nations in World War II and the conflicts since. See W. Hays Parks, Air War and the Law of War, 32 Air Force L. Rev. 1 (1990).
that Belgrade could increase the costs of the war for the United States and its allies. An air force armed with UAVs, however, could avoid this problem. It could field drones at lower altitudes to visually confirm a prospective target’s military nature. It could even order drones to expose themselves to air defenses as the price of greater certainty in destroying a target. Such efforts would both reduce mistakes in hitting the wrong targets and presumably cut down on collateral damage, as more precise strikes will have less blast damage in civilian areas.

Air war suggests that we should welcome robotics with open arms. Robots offer greater precision in combat, which should reduce destruction to both military soldiers and civilians alike. They should lead to a de-escalation of the intensity of warfare prompted by the technological developments of the twentieth century. We should understand the traditional rules of war to demand that armies choose the least destructive means to achieve a military objective, just as those who argue in favor of precision-guided munitions do today. If this is so, robots will allow nations at war to comply with the grand humanitarian goals of the laws of war far better than a world where drones are banned. Rather than ethically repulsive, robots may be morally required.

II. THE DANGERS OF OVERREGULATING NEW WEAPONS TECHNOLOGIES

These new types of weapons allow nations to coerce and pressure each other in novel ways. This Part argues that banning these new weapons will prove futile. It will first base its analysis on a realist approach to international relations, which assumes that nations pursue their interest in security above all other interests and that cooperation will prove difficult due to the anarchic nature of the international system. It then shows why nations will not agree on the regulation of new weapons systems. It follows these predictions about international agreements by arguing that these new weapons may actually reduce the harm to both combatants and civilians in armed conflict. Counterintuitively, heavy regulation of drones or cyberweapons may have the unforeseen consequence of making war more dangerous and destructive.

A. Realism and Weapons

Before we can develop a sensible approach to regulation, we first must present a theory about international conflict. Without a theory, the international system might adopt standards without any understanding whether it is making the problems of war better or worse. Excessive regulation of new weapons technologies might unintentionally exacerbate the harms of war by forcing combatants to use more destructive weapons. Unduly lax standards might have the unintended consequence of allowing both sides to inflict grievous harms on each other to no military advantage. Without a theory of war, we do not know
what values our legal rules should maximize and what costs it should minimize.

We are not applying a philosopher’s attitude to war. Some believe that nations have followed laws during armed conflict out of a sense of morality that can trace its origins to Christian and, before that, Roman just war theories. We do not discount the intellectual tradition of just war theory or its recent appearances in the works of Michael Walzer, John Rawls, and others. But the history of war does not reveal a universal morality that imposes consistent restraints on warfare. This should come as no surprise in light of the diversity of the world’s religions and political, economic, and moral belief systems. Nations have often rejected moral appeals when they can achieve military advantage in combat.

Instead, we follow a more instrumental approach. Like realist scholars in the field of international relations, we assume that the international system fundamentally suffers from anarchy. Anarchy does not mean that anything goes. Anarchy does not mean that the world lacks order, but only that no world authority can enforce international rules in the same way that domestic governments maintain law and order. The world is composed of independent sovereign states with no higher sovereign above them.

Under realism, states are obsessed with their own security because they cannot rely upon a supranational body to guarantee it. Nor can nations hold 100 percent certainty about other nations’ motives. As a result, states will fear each other’s military capabilities and political intentions. They will take self-help measures and act strategically to guarantee their own survival, regardless of their internal politics. As Kenneth Waltz famously argued, a state’s place within the anarchical international system, rather than its domestic nature, will dictate national policy.

Realists believe that international organizations and international law can do little to affect the pursuit of power and security. States may sign treaties, but the legal effect of the agreement does not affect their calculations. They will always pursue a course of conduct that maximizes their interests regardless of the presence or absence of a treaty. “Realists maintain that institutions are basically a reflection of the distribution of power in the world,” John Mearsheimer argued during the heady days of the end of the Cold War. “They

81. See, e.g., Walzer, supra note 62, at 34–47.
are based on the self-interested calculations of the great powers, and they have no independent effect on state behavior.™86

Realism does not prevent nations from cooperating for mutual benefit. But the competition of states will make agreements difficult. First, because nations worry about their security from attack by other nations, they will be concerned by the relative gains of cooperation. Two nations might improve their situations in a deal, but if one of the two increases its relative advantage as a result, the balance of power might shift enough to sink the deal. In other words, states may refuse to cooperate, even if they were to enjoy absolute gains, if other nations gain even more. Second, nations may not cooperate even if they were to gain because they will worry that their partners will cheat. Without a world government, no higher authority can force sovereign states to keep their promises.™87

These challenges make it unlikely that nations can commit to end the use of force in their relations. The 1928 Kellogg-Briand Pact, which purported to ban all war, stands as a failed symbol of such utopian efforts.™88 Other forms of international cooperation may employ soaring rhetoric but—by design—produce little real world effect, such as the many resolutions of the UN General Assembly. But nations can cooperate in limited areas, so long that the resulting treaties or laws mirror the existing balance of power. Trade agreements, for example, allow comparative advantage to improve the economies of all signatories. Nations can cooperate to solve problems that cross borders, such as pollution or drug trafficking, or to divide valuable resources, such as underground oil fields or fisheries.

States may even cooperate on matters of war if they can both benefit without either gaining a military or political advantage. State practice in waging armed conflicts produces customary practice that coalesces, over time, into the laws of war. Rules that will come to have the force of law must leave states better off in pursuing their interests. Nations will reject rules—no matter how noble their intent or humanitarian their goal—that leave them worse off. NATO allowed the United States and Western Europe to band together to contain the Soviet Union. NATO, however, did not alter the balance of power between Washington and Moscow. Instead, the institution served as a mechanism for the United States to better organize the forces on its side.™89 NATO did not alter the balance of powers within Europe, but allowed the United States to rebuild Germany without reigniting security fears on the part

86. Mearsheimer, supra note 84, at 7.
87. For leading applications of realist principles to international law, see ANDREW T. GUZMAN, HOW INTERNATIONAL LAW WORKS: A RATIONAL CHOICE THEORY (2008); ERIC A. POSNER & ALAN O. SYKES, ECONOMIC FOUNDATIONS OF INTERNATIONAL LAW 163–224 (2013).
88. For the classic critique of the “moralist-legalistic” approach to American foreign policy symbolized in the Kellogg-Briand Pact, see GEORGE F. KENNAN, AMERICAN DIPLOMACY (1951).
89. Mearsheimer, supra note 84, at 14.
of France and the United Kingdom. International agreements might also regulate wartime tactics, operations, and strategy. Nations at war, for example, might treat prisoners humanely if they can expect that their opponents will behave similarly. They might agree to foreswear chemical weapons if their use inflicts great suffering without giving either side an advantage. War’s high stakes, however, will tempt nations to cheat when battlefield conditions may make reneging harder to detect.

It is also important to recognize that the success of a legal regime on war will depend on the international context. In a certain period of history, for example, a few great powers might protect their own security not just by building defenses, but also by maintaining a rough equality of power with their rivals. War might occur when nations band together to prevent a rising nation from upsetting the balance of power. In 1849, Great Britain and France dispatched troops across Europe to fight the Russian Empire in Crimea. Even though they had few interests there, London and Paris believed that Moscow’s move into Ottoman territory would upset the European balance of power. Using machine guns and trench warfare for the first time, the combatants fought to a stalemate. Under conditions that produced the static defenses of trench warfare, a balanced distribution of power and restrained national goals might make limitations on arms possible. No state would enjoy an advantage either before or after an agreement. It should be no surprise that the first treaties regulating warfare, the Hague Regulations of 1899, hail from the highpoint of Europe’s classic balance of power.

Different circumstances, however, might not yield to noble goals. In the wake of World War I’s carnage, for example, the great powers sought to limit the naval arms race that they thought had caused British-German antagonism. If nations had built great fleets simply to keep up with their neighbors, a common limit on dreadnoughts might have restrained competition, thereby saving resources and reducing conflict. In the Washington Naval Treaty of 1920, the major western powers and Japan agreed to permanent limits on battleships, with the United States and Great Britain permitted to maintain the largest fleets, followed by Japan, France, and Italy. The Treaty of Versailles subjected Germany to far stricter limits on naval building. Wracked by the Great Depression and the rise of fascism, however, the Axis powers embarked

93. See Robert Gordon Kaufman, Arms Control During the Pre-Nuclear Era: The United States and Naval Limitation Between the Two World Wars 205 (1990).
on a campaign of territorial expansion. They circumvented the Washington and Versailles Treaties, either by concealing vessels (such as the *Bismarck*), building weapons that skirted the rules (Germany’s “pocket battleships”), or developing new naval weapons unforeseen by the drafters (aircraft carriers).

As history suggests, changes in the international system and in war will have critical consequences for the nature and success of international rules. Several developments have set the environment that will surround the new military technologies. Perhaps the most important is that the destructiveness of war has rapidly declined since World War II. This seems counterintuitive in light of the deployment of vastly more destructive weapons by the superpowers and their allies. The United States used two fission bombs to destroy Hiroshima and Nagasaki, a level of destructive power that rivaled entire air campaigns of the day. A single modern fusion bomb would exceed the total destructive power of all of the conventional bombs dropped in World War II. Ballistic missile technology allows nations to deliver nuclear weapons anywhere in the world without having to deploy vast naval or air fleets. Throughout the 1980s, the United States and the Soviet Union fielded more than twenty thousand nuclear weapons each and thousands of air, sea, and ground missiles capable of delivering them. During the Cold War, both nations kept their nuclear forces at high levels of alert and could have destroyed the world many times over.

But they did not. Though still present, conventional war has become less harmful. By some counts, the period from the end of World War II to the present day has seen the level of armed conflict between nations fall by an order of magnitude from the Peace of Westphalia to the mid-twentieth century. When corrected for the higher number of nations, wars between states have dropped both in their frequency and destructiveness. War no longer characterized the relations between European states. Indeed, for the first time in centuries, no major war between the great powers broke out in Europe or Asia. Historians now appreciate the Cold War as “the Long Peace.”

But deaths from war have not disappeared. They have not even significantly declined. They have only dropped in wars between the great powers. While the number of conflicts between nations has steeply fallen, it has jumped inside states. Civil wars have replaced and even exceeded the scourge of great power war in terms of their casualties and frequency. By some estimates, post-World War II conflicts have killed forty million, including both combatants and civilians who have died on the battlefield or from related

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95. YOO, supra note 66, at 31–32.
96. JOHN LEWIS GADDIS, THE LONG PEACE: INQUIRIES INTO THE HISTORY OF THE COLD WAR (1987). Though there are various definitions of a great power, based on a mix of military and economic strength, population, and territory, we agree with scholars who include nations capable of a serious conventional war against the other most powerful nations in the world. Mearsheimer, supra note 84, at 25. While European nations dominated the list in the twentieth century, World War II left only the United States and the Soviet Union, with China joining their ranks in the last decade.
97. See YOO, supra note 66, at 32.
starvation and disease. Studies report that between 70 and 80 percent of these casualties occurred in civil wars. Conflict has become less global and more local. Globe-spanning wars between broad alliances of great powers, such as the Allies against the Axis in World War II, have receded. No great power has directly fought a war with another for the last seventy years. Instead, wars have remained limited to specific areas, such as the Balkans or the Middle East, with Africa generating the greatest share of conflicts and deaths.

Realists account for the decline in war in two ways. First, and most important, the postwar world soon divided into a contest between two superpowers. Despite the arms race and proxy wars in Korea, Vietnam, and Afghanistan, this “bipolar” system had the counterintuitive effect of producing global stability. With only two superpowers, calculations of war and peace became simpler, less friction occurred, and the interest in superpower deterrence suppressed national interests that might have once caused war. According to this view, the multipolarity between the seventeenth and twentieth centuries made war more likely because of the heightened opportunities for conflict between more great powers. Second, the emergence of nuclear weapons only reinforced the balancing effect of bipolarity. The great powers could achieve greater security with a nuclear deterrent and the possibility of a nuclear exchange caused them to exercise greater caution in the use of force. The United States and the Soviet Union did not come into direct military conflict, it is argued, because of the fear that conventional war could escalate quickly into a nuclear conflict with devastation for both sides. As Waltz observed near the end of the Cold War, “[t]he probability of major war among states having nuclear weapons approaches zero.”

The decline in interstate wars has accompanied greater international cooperation on nonsecurity areas, such as commerce, trade, and the environment. Nations have increased global welfare by lowering trade barriers within regional free-trade areas, such as the European Union and the North American Free Trade Agreement, and internationally through the World Trade Organization. These developments have encouraged scholars to see greater opportunities for international institutions and law to help build stability and peace. Such benefits usually arise from a hegemonic power, like Great Britain

100. See Kenneth N. Waltz, Nuclear Myths and Political Realities, 84 AM. POL. SCI. REV. 731 (1990).
101. Id. at 740.
in the nineteenth century or the United States in the twentieth century, which can establish an international order built on free navigation and trade. Realist theory, however, would predict disorder when a dominant great power declines. Nevertheless, institutional scholars, as they are sometimes known in political science, argue that self-interested nations can cooperate to create international regimes that can maintain global order in the absence of a hegemon. In *After Hegemony*, for example, Robert Keohane argues, “Realist assumptions about world politics are consistent with the formation of institutionalized arrangements.” In other words, self-interested states that worried only about their security might still cooperate if they can realize benefits that leave them better off than before.

There is little doubt that cooperation has advanced in the world economy even as the absolute and relative power of the United States has declined after the end of the Cold War. International agreements have successfully lowered tariffs and trade barriers and improved coordination in economics, science, environment, and health. Political economists theorize that these regimes help nations escape “the prisoner’s dilemma.” In this stylized game, the optimal outcome for two suspects is to remain silent under police questioning, but because they cannot communicate with each other there is a strong incentive to bargain for a reduced sentence and implicate the other criminal. The prisoner’s dilemma has become a shorthand in the social sciences for situations in which two parties, in pursuit of their rational self-interest, will do themselves short-term harm, when they could have achieved longer-term benefits if they had cooperated. Nations might engage in ruinous trade wars or arms races because of the prisoner’s dilemma. A classic example would be the nuclear arms race between the superpowers during the Cold War. Even though the United States and Russia apparently believe today that they need no more than 2,500 warheads each, during the 1950s and 1960s their nuclear stockpiles reached more than 25,000 weapons. Only decades of negotiation, verification, and trust-building deals on smaller weapons—like the 1988 intermediate-range missile ban—gave the superpowers the confidence to agree to reductions in their strategic arsenals.

Liberal institutionalists argue that international agreements can help overcome the prisoner’s dilemma through repeated interaction. They believe


103. At the end of World War II, with the industrial capacity of Germany and Japan destroyed, and much of China and Russia ruined, the U.S. economy accounted for just about half of world gross domestic product. It is no surprise that Washington dominated the security and economic order build in the war’s wake. See PAUL KENNEDY, *THE RISE AND FALL OF THE GREAT POWERS* (1988). While the United States today is still the world’s largest economy, other nations have caught up—the American economy now represents about 20 percent of world Gross Domestic Product, with the nations of the European Union collectively larger. CIA *World Factbook* 2016, CIA.GOV, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html#us [https://perma.cc/T9M5-GNYH].
that regimes offer states the chance to communicate and learn about each other over time in order to gain information and generate trust. As Andrew Guzman argues, a history of contact allows nations to develop reputations for keeping promises or retaliating against cheaters.\textsuperscript{104} Regimes can also improve the opportunities for cooperation by linking more issues together, which increase the benefits of performance and the tools for tit-for-tat responses to shirking. Permanent institutions can enhance these effects by spreading reliable information on the compliance of states and reducing transaction costs to future negotiations and deal making. Leading political scientists argue that the successful record in trade and finance should set an example to regulate other areas of global concern.

There are several reasons to doubt, however, whether the structure of cooperation in areas such as the international economy will transfer easily to global security. First, and most important, cheating in a security agreement could inflict greater harms on a nation. If a nation suffers a surprise attack, loses a military advantage, or is left without its promised allies, it may encounter a long-term, permanent drop in its territory, population, resources, and ultimately power. Germany’s surprise 1941 invasion of the Soviet Union, and the breaking of their nonaggression pact, led to grievous losses and almost knocked Moscow out of the war. Withdrawal from a trade or financial agreement, by contrast, may cause economic pain, but likely cannot equal the severity and immediacy of a wartime defeat.\textsuperscript{105} Second, nations may have much greater concerns about “relative gains.”\textsuperscript{106} In economic affairs, nations may remain content with gains in their GDP growth, increases in exports, and drops in the cost of imports, even if their trade partners do better. But in security affairs, as Joseph Grieco has argued, nations may refuse to cooperate if doing so would benefit a competitor in a relative sense.\textsuperscript{107} Cooperation is not impossible, but it is most likely in situations where both the use of force is not a serious threat between the nations concerned and they can engage in a long practice of tit-for-tat reciprocity to encourage cooperation.\textsuperscript{108}

Cooperation itself does not disappear during armed conflict, but it is doubtful that formal legalization produces lasting rules of war. Nations have sought to follow some basic norms in combat, such as eliminating weapons that cause unnecessary human suffering. Despite the recent deterioration in practice, nation-states have generally refrained from using chemical weapons since the end of World War I. They have followed the Geneva Conventions on

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\textsuperscript{104} See generally GUZMAN, supra note 87.
\textsuperscript{105} Mearsheimer, supra note 84, at 18–19.
\textsuperscript{108} Many examples are examined in KEOHANE, supra note 102.
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prisoners of war, though not consistently. Nations have observed others norms in the breach, such as the immunity of the civilian population and resources from attack. World War II included the aerial bombing of cities and the nuclear attacks on Japan, while the years since have seen precision targeting of terrorists off the battlefield, attacks on urban infrastructure, and the acceptance of high levels of collateral damage among civilians. International lawyers and diplomats may proclaim that nations follow universal rules on combat, either because of morality or a sense of legal obligations, but the record of practice tells a far different story.

We should also not mistake temporary restraint in combat for a nations’ lack of military capacity. Human rights activists, for example, often hold up as an example of progress the 1998 Ottawa Convention banning land mines. Nongovernmental organizations (NGOs) led a decades-long campaign to persuade nations to give up antipersonnel mines, which can kill large numbers of civilians years after fighting has ended. In 1997, the Nobel Prize committee ultimately awarded the peace prize to Jody Williams, the director of the international campaign. The apparent success of the treaty, which now includes about 80 percent of the world’s nations, led to visions of a new approach to the laws of war in which groups and individuals, rather than states, would mobilize to force states to control war. Ottawa “spawned a new politics, new partnerships, new ways of thinking about the international environment. It was the forerunner of a clear notion of global citizenship,” writes Lloyd Axworthy, a former Canadian foreign minister and current university president. “It challenged conventional notions of sovereignty and set in motion a form of coalition politics at the global level that could be used to shift power and political relationships.” NGOs and international activists have sought to duplicate the perceived success of the Ottawa Convention by extending its scope to regulate cluster munitions and small arms.

Such efforts, however, unintentionally reaffirm the enduring importance of power. While the great majority of the world’s nations foreswear antipersonnel mines, most of them do not field large militaries or fight major conventional wars. Latin American states, for example, signed Ottawa in large numbers, but they have not fought a major war against each other for many decades. Nations with power projection capabilities, such as the United States, Russia, China, and India, did not commit to the agreement. Smaller states, such

110. Lloyd Axworthy, Foreword to LANDMINES AND HUMAN SECURITY: INTERNATIONAL POLITICS AND WAR’S HIDDEN LEGACY, at xvi (Richard A. Matthew et al. eds., 2004).
111. Id. at 8.
as Korea and Israel, faced with aggressive neighbors and local instability, also declined. Eliminating mines would place these nations at a serious disadvantage because they would reduce their ability to deter invasion or maintain a regional status quo. Despite their costs on civilians, mines actually may enhance stability and advance peace—they maintain borders by raising the cost of a ground invasion and have no offensive capability. Nations that live under threat of conflict will have little reason to agree to abandon such a defensive advantage that does not produce a corresponding reduction for offensive weapons.

For similar reasons, the “Ottawa Process” will have little impact on other weapons. Nations with small militaries, peaceful neighbors, or large allies, such as many in Europe and Latin America, may promote new arms control agreements. But because the impact on their military performance is negligible and the chances that they will engage in war are small, these states experience very little loss in expected benefits—such as security gains by deploying these weapons—by signing on. Nations with large militaries and greater possibilities for conflict will not join agreements that could force a significant shift in their ability to prevail. Instead, nations will reach agreements whose reciprocal reductions in arms will leave no nation with an advantage. As James Morrow has observed, the laws of war treaties succeed when they guarantee minimum standards of treatment for captured soldiers that leave both sides to a conflict better off without giving either an advantage. A similar dynamic gives the agreements on chemical and biological weapons their strength: these weapons cause undue suffering and are difficult to control, and eliminating them leaves nations in the same relative power position as before. But if a nation can narrow a large gap in military power with a competitor by developing these weapons, it may violate an agreement banning their possession. Thus, nations at a disadvantage in conventional or nuclear forces have turned to biological and chemical weapons because reciprocity no longer holds.

Nations, of course, will also follow humanitarian treaties even when they do not depend on reciprocity. But they will do so when compliance still advances their national interests. In the Korean and Vietnam Wars, for example, the United States followed the Geneva Conventions even though its opponents had not adopted the agreements. Rather than reciprocate, North Korea and the Viet Cong engaged in the systematic mistreatment of American prisoners of war. The United States, however, could have benefited from following Geneva anyway. Treating prisoners humanely may increase the willingness of enemy fighters to surrender, while a history of cruel treatment might cause opposing soldiers to fight to the death. These objectives may have even greater force if the contending armies are fighting for the support of the

local populations. Extending Geneva protections to local guerrillas might help persuade the local populace to side with the government, for example.

We should not overstate the influence of reputation on the decisions of nations at war. Human rights advocates, for example, might believe that nations should follow the Geneva Conventions to build a track record of compliance that will lead to better treatment for their soldiers in the next war. Under this argument, the United States should extend Geneva protections to al-Qaeda terrorists, even if the latter execute U.S. prisoners and civilians, because its soldiers will benefit in a future conflict with Iran or China. This claim, however, runs counter to the self-interest of nations at war. China would have little interest in punishing U.S. soldiers captured in a United States-China conflict because of American conduct toward terrorists in a separate contest. Such incentives might even cause a nation to conduct itself differently depending on the corresponding policies of its enemies. In World War II, for example, Germany generally followed the Geneva Conventions on the western front, where the United States and the United Kingdom treated prisoners of war well. The eastern front followed completely different rules: Germany and the Soviet Union descended into the barbaric treatment of each other’s troops and civilians.

This detour into international humanitarian treaties here underscores the workings of reciprocity. Nations will follow the human rights treaties when they gain a benefit that outweighs the cost. Their captured troops will receive good treatment at the hands of the enemy even though Geneva will require them to bear costs in maintaining security, providing housing, and keeping prisoners in good health. Limitations on the use of weapons will follow a similar logic. Nations will refrain from using new weapons technologies only when they provide little benefit or their use by both sides leaves no one better off. Robots and cyberweapons do not bear the same features as the weapons where the laws of war have succeeded. They do not inflict unnecessary suffering out of proportion to their military advantages, as do poisoned bullets or blinding lasers. Rather, these weapons improve the precision of force such that they reduce human death and destruction in war.

Nor do these new weapons technologies yet engage nations in a useless arms race. Nuclear weapons eventually became opportune for arms control because larger stockpiles provided marginal, if any, benefits due to the destructive potential of each weapon and the deterrence provided by even a modest arsenal. Mutual reductions could leave both sides in the same position as they were before the agreement. Today, the marginal cost of nuclear weapons for the United States and Russia so outweigh their marginal benefit that it is not even clear that a binding international agreement is needed to reduce their arsenals. Russia, for example, reduced its arsenal below New START’s ceilings of 1,550 nuclear warheads and 700 strategic launchers even
before the United States approved the deal.\textsuperscript{114} Some experts estimate that the United States requires less than even those numbers to maintain an adequate deterrent, and it is possible that future presidents may reduce the nuclear arsenal without any international agreement.\textsuperscript{115}

Cyberweapons and drones do not yet appear to bear these characteristics. The marginal gains in deploying these weapons will not be even across nations, but instead may be asymmetric. Some nations will experience much greater gains in military capability by developing cyber and drone technology. Or put differently, prohibition or regulation of these new weapons will not have equal impacts on rival nations. Chinese military doctrine, for example, emphasizes using such technologies to offset U.S. advantages in conventional sea and air power.\textsuperscript{116} Drones might be used to overwhelm the defenses for U.S. carrier groups in the Western Pacific, while cyber weapons could interfere with U.S. command-and-control, communications, or even military readiness. Just as the Germans resorted to submarines to offset British and American naval superiority in World Wars I and II, the Chinese may well turn to robotics and network attacks in a future contest. Reciprocity will not hold because international limitations on new weapons would have the effect of favoring the United States’ existing advantage in conventional arms.

Even if there might be some mutual advantage to a universal limit on these new weapons technologies, it is still doubtful that nations would accept a legal agreement. Nations would still develop these weapons because they improve their military capabilities at lower cost. Aerial drones, for example, can achieve the objective of attacking an enemy target at lower cost. An F-35 Lightning II stealth fighter/bomber costs $85 million under the best estimates, while Predator and Reaper drones cost about $4 million and $16.9 million respectively.\textsuperscript{117} The U.S. Air Force can not only purchase twenty Predators for the cost of a single F-35, but it can operate them at a far lower cost per hour.

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keep them on station for far longer (a predator can fly over a target area for up to fourteen hours) but also not risk the lives of pilots who may be captured or killed. 118 Militaries will have an incentive to replace expensive manned aircraft with fleets of drones, regardless of whether their rivals choose to match them or not.

Cyber and robotic weapons today resemble the emergence of the new weapons borne of the industrial age. At the time of their emergence, the impact of high-capacity firearms, long-range artillery, warplanes, submarines, and motorized vehicles was not well understood. World War I’s carnage can be attributed to the failure of nineteenth century tactics and strategy, still influenced by Napoleonic theories, to adapt to the greater firepower of modern weapons. Although nations and experts proposed the regulation of aerial and submarine warfare, their asymmetric benefits and the uncertainty of their effects on the balance of power precluded any agreement among the combatants. Nations may prove even more reluctant to adopt arms control schemes for weapons that have strong defensive qualities, such as the machine gun and artillery, because upgrading defensive systems may pose little offensive threat to neighbors.

B. New Weapons Technology and the Goals of the Laws of War

Other scholars do not train their criticism on the extensive system of sensors, GPS, and drones currently deployed on the battlefield. Instead, they reserve their fire for the inevitable development of autonomous systems that wage war without direct human decision. As opposed to a weapon system in which automation assists individual human beings in conducting warfare, a truly autonomous weapon would target and make the decision to unleash deadly force without direct human decision. In 2012, for example, the U.S. Department of Defense defined an autonomous weapons system as one that “once activated, [it] can select and engage targets without further intervention by a human operator.”119 The United Nation’s Special Rapporteur on the issue announced an identical definition of lethal autonomous robotics: weapons that “once activated, can select and engage targets without further human intervention.”120

Under this definition, autonomous weapons systems have already arrived. The U.S. Navy’s Phalanx, for example, places artillery with high rates of fire at the command of battle computers to defend vessels against attack from

120. Heyns, supra note 7, at 7.
multiple speed missiles. The U.S. Patriot and Israel’s Iron Dome systems employ computers and missiles to build a similar shield on the ground. But the future promises even more advances. A stationary sentry drone could automatically fire at certain target profiles, especially along disputed borders (such as the Demilitarized Zone between the Koreas) or outside forward bases during armed conflicts. It is easy to foresee a stealth drone that would seek specific target profiles within specific geographic coordinates and then automatically launch its munitions. Other weapons platforms could employ a similar combination of sensors, high-speed computing, and precision munitions to achieve similar effects on land and sea.

These developments have prompted fears of a Terminator future that justifies a ban on all independent robotic weapons. In 2012, for example, Human Rights Watch and the Harvard International Human Rights Clinic issued a public demand for not just a ban on all autonomous weapons, but also a prohibition on any related research and development. In their view, such weapons cannot apply the principles of distinction, proportionality, and military necessity. They “would appear to be incapable of abiding by the key principles of international humanitarian law.” Wendell Wallach, chair of a Yale University committee on technology and ethics, calls on the President of the United States to issue an executive order “declaring that a deliberate attack with legal and nonlethal force by fully autonomous weaponry violates the Law of War.” Wallach sets as his goal “terminating the terminator.” Both the UN Special Rapporteur and the former head of the International Committee of the Red Cross have called for a temporary moratorium on lethal autonomous weapons until the international community can resolve the attending legal and ethical issues.

International and domestic officials question whether international law can even govern such weapons. “What if it is technically impossible to reliably program an autonomous weapon system so as to ensure that it functions in accordance with [international humanitarian law] under battlefield conditions?” asks Jakob Kellenberger, former President of the International Committee of

123. Id.
125. Id.
the Red Cross.\textsuperscript{127} It will be difficult enough, these critics argue, to devise programs that can methodically apply a set of general principles to specific battlefield situations. It will be even harder to give them the capacity to learn and to apply principles to new situations. Even supporters of robotic weapons anticipate difficulties in programming them to both effectively use force and refrain from using force when inappropriate. “Restraints on autonomous weapons to ensure ethical engagements are essential,” writes a Department of Defense official, “but building autonomous weapons that \textit{fail safely} is the harder task.”\textsuperscript{128} Some worry that machine learning may produce new forms of decision making and unpredictable outcomes.\textsuperscript{129}

Critics make a number of arguments against autonomous weapons, even though their deployment may lie several years, if not decades, in the future. The first would preclude even today’s simple, remote-controlled UAVs: they reduce the costs of war so steeply that they will encourage the resort to force. One main attraction of more autonomous weapons is their reduction in the risk of harm to human operators. U.S. drone pilots, for example, sit in an Air Force base one hour from Las Vegas, literally thousands of miles away from the battlefield.\textsuperscript{130} Fully autonomous drones will risk no pilots’ lives nor the possibility of their capture. If robots also produce more precise targeting with lower collateral damage, they introduce a much higher benefit-cost ratio than conventional manned weapons. These features of drones, however, “also reduce the political costs and risks of going to war,” writes Peter Asaro.\textsuperscript{131}

Critics argue in favor of legal codification of a ban on autonomous weapons. Prohibiting such weapons, they argue, will prevent a gradual slippery slope from machine weapons to truly independent robots. The independence of operation of robots, critics also claim, could lead to unintended consequences, not the least of which is the use of force without human decision. “Autonomous weapons systems also have the potential to cause regional or global instability and insecurity, to fuel arms races, to proliferate to non-state actors, or initiate the escalation of conflicts outside of human political intentions,” writes Asaro.\textsuperscript{132} A ban will encourage military research to emphasize “human-centered designs capable of enhancing ethical and legal conduct in armed conflicts.”\textsuperscript{133} It will also prevent broader destabilization of the law of armed conflict, and it will emphasize that killing other humans requires moral

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  \item \textsuperscript{127} Kellenberger, \textit{supra} note 126.
  \item \textsuperscript{128} Paul Scharre, \textit{Why Unmanned?}, 61 JOINT FORCE Q. 92 (2011).
  \item \textsuperscript{131} Asaro, \textit{supra} note 126, at 692; see also Paul W. Kahn, \textit{The Paradox of Riskless Warfare}, 22 PHIL. \\& PUB. POL’Y Q. 2 (2002); Singer, \textit{supra} note 50, at 431–33.
  \item \textsuperscript{132} Asaro, \textit{supra} note 126, at 692.
  \item \textsuperscript{133} \textit{Id.} at 694.
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consideration by other humans. These critics cite Additional Protocol I to the 
Geneva Conventions, which require that a nation must review whether the use 
of any “new weapon, means or method of warfare” would violate the 
Conventions or the laws of war.\footnote{134} Even skeptics of a ban, such as Kenneth 
Anderson, Daniel Reisner, and Matthew Waxman, agree that the United States 
should conduct a thorough review under the Geneva Convention to determine 
whether autonomous weapons violate the laws of war.\footnote{135} Robotics, combined 
with GPS, sensors, autonomous decision making, high-speed computing, and 
precision munitions, represents a new method of warfare that apparently 
demands special scrutiny.

Arms control advocates no doubt could have made similar claims about 
new weapons system at the start of the industrial age. Tanks, for example, 
protect their drivers with armor that makes them virtually invulnerable to small 
arms fire, while mounting a large cannon and machine guns that can wreak far 
more destruction than infantry. Airplanes brought targets into range beyond the 
reach of artillery, and their altitude made air defense more difficult. Aircraft 
carriers allowed naval forces to project power far beyond a nation’s borders, 
without having to fight through vast fleets of battleships, as the United States 
learned to its regret at Pearl Harbor on December 7, 1941. Submarines could 
cripple merchant convoys or attack surface ships without risking a fleet. 
Ballistic missiles can deliver warheads to enemies without having to send out 
any expeditionary forces. While they allow the projection of force over greater 
distances at less cost, nations do not consider these weapons to violate the laws 
of war. In fact, as we have seen, efforts to regulate aerial bombing and 
submarine warfare utterly failed.

Indeed, such arguments do not really attack autonomous weapons 
technology, but rather war itself. In some, but certainly not all, international 
disputes, one nation may hold a wide advantage over its rival. Overwhelming 
superiority may make it easier for the stronger nation to turn to force. For 
example, the ability of U.S. and NATO air forces to bomb Serbian targets, 
without resistance and beyond anti-aircraft missile range, likely made the 
decision to intervene easier. President William Clinton may well have avoided 
a ground invasion and the prospect of high casualties. Other circumstances 
might also prompt a nation to wage war because of its low cost. One nation 
may strike an intelligence coup that allows it to gain a disproportionate 
advantage through low-cost surprise tactics. Or another nation may have far 
more effective weapons, tactics, or strategies that give it a profound advantage 
in efficiency. Superiority in combat, however, does not imply an illegal war.

Such mistaken arguments confuse \textit{jus in bello} and \textit{jus ad bellum}. The 
means of fighting a war do not bear on the justifications for the war. A war that

\footnote{134. Additional Protocol for the Geneva Convention, art. 36, June 8, 1977.}  
\footnote{135. Kenneth Anderson, Daniel Reisner & Matthew Waxman, \textit{Adapting the Law of Armed 
Conflict to Autonomous Weapons Systems}, 90 \textsc{Int’l L. Stud.} 386 (2014).}
rests on just grounds need not be fought in an evenhanded fashion. One might want a war that has a just purpose to come to a quick and rapid conclusion, with the least loss of life as possible, which should be more likely if one side has a great advantage over the other. Again, the Kosovo War provides a good example. If we agree with the goal of stopping Serbia’s ethnic cleansing of the provinces of the former Yugoslavia, we should want NATO to execute the war with the maximum dispatch and effectiveness. A faster war, fought with precision weapons and reduced combat casualties, could end the human rights catastrophe earlier and save more lives. Similarly, if a nation were defending itself, we should want it to have the most advanced weapons possible. Superiority itself may not just deter an attack; it could also inflict such high costs in an actual war that the attacker may give up.

In fact, the critics of autonomous systems support a rule that could just as well produce more death and destruction. Preemptively banning such advanced weapons systems would establish a technological parity among many nations. We could witness wars that grind on for years between nations with similarly matched weaponry and tactics. The world witnessed such a conflict a century ago in the trench warfare of World War I. Even World War II, which favored offensive weaponry and tactics, lasted for six years and killed millions more than the Great War. Technological discoveries, such as the atomic bomb, shortened the war and saved millions of lives. If today’s human rights advocates had persuaded Roosevelt, Truman, and Churchill to preemptively ban nuclear weapons research, the invasion of Japan would have taken an estimated one million Allied lives and eight to nine million Japanese.\(^\text{136}\) Of course, we would not have wanted Nazi Germany or Imperial Japan to develop advanced weapons first, but that merely confirms that whether we want nations to enjoy superiority in war depends on whether we agree with why those nations employ force.

The real-world consequences of military technology point to a rejection of a categorical ban on new weapons. As with drones, autonomous weapons systems no doubt often allow nations at war to wage hostilities with greater lethality for the enemy, but at a lower cost to their soldiers. A weapon’s improved effectiveness in cost-benefit terms should not prompt efforts at bans; rather, they should be welcomed for reducing the destructiveness of war. Technology that makes war more effective by making targeting more precise, reducing combatant and civilian deaths, and ultimately shortening conflicts will improve overall global welfare, a result that any system of rules on war should seek.

A second main avenue of thought attacks autonomous weapons because they remove human decision from the “kill chain.” The dispute continues over

whether robotic engineering can even create a fully independent robotic warrior. Mines, automated sentries, and high-speed defense systems, however, already fire on targets without human intervention. Cruise missiles already follow evasive routes once fired; how difficult would it be to outfit them with computer systems to choose among targets once they reach a selected area? UAVs already automate elements of an attack mission, such as takeoff, landing, and autopilot; a future computer system could provide preprogrammed responses to certain target profiles in a battlespace. A similar system could adapt to sea warfare, which confronts a combat environment also characterized by three dimensions and large volumes for movement. Less complicated robots could even support ground troops in difficult urban and insurgent environments by accepting higher damage rates at the front of assaults.

Assuming such technology will arrive sooner or later, some argue that individual humans must make the decision to take human life. Human Rights Watch, an international NGO, has called for a “ban [on] fully autonomous weapons” which “should apply to robotic weapons that can make the choice to use lethal force without human input or supervision.”137 Remotely piloted drones, vessels, or ground vehicles, in which a human operator still pulls the trigger, do not suffer this problem. But autonomous robots will decide to fire on targets based on decision algorithms without human intervention for an individual shot. Nations will especially seek to deploy such systems in battlefield environments where an enemy can cut off contact with remote controllers or autonomy will enhance the stealth and surprise of an attack. In such situations, no individual human may have made the ultimate decision to kill—rather, the choice results from the programming and construction of the weapon by a number of participants, both military and civilian.

The lack of a human being “in the loop” troubles human rights advocates for several reasons. They argue that robots do not enjoy human consciousness and so lack moral responsibility for their decisions. “Intentionally designing systems that lack responsible and accountable agents is in and of itself unethical, irresponsible, and immoral,” argues Asaro. These critics believe that the decision to take a human life must ultimately be made by a human being. Their arguments, however, seem to assume a uniqueness in human decision making rather than any careful consideration of the moral values at stake. Typically in this vein, O’Connell argues that, “What seems unprogrammable is conscience, common sense, intuition, and other essential human qualities.”138 Without an individual at the trigger, moreover, critics argue that the

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international legal system will have no one to hold accountable for crimes against the laws of war. Robots will not be deterred by the prospect of ex post criminal legal proceedings.

These arguments, however, mistake distance for independence. An autonomous weapon that makes targeting decisions on its own still must receive a command to deploy. It seems reasonable to hold commanders responsible for the foreseeable decisions of the robots that they unleash, while recognizing that the consequences of a robot or cyber weapon’s actions may not be traceable to the weapon’s programming.\textsuperscript{139} Commanders already bear “command responsibility” for some war crimes committed by their troops. Commanders could bear an even closer responsibility for the actions of autonomous weapons, which would have less individual discretion to make decisions that violate the laws of war. Liability might even extend to the programmers or designers of robotic weapons, if they intentionally engineer weapons to violate universal norms of war.\textsuperscript{140}

In any event, it is questionable that accountability to international criminal law should have any weight in the evaluation of weapons systems. War crimes tribunals are relatively recent innovations. Aside from the Nuremberg Trials, international criminal law did not result in actual prosecutions until the 1990s with the establishment of the tribunals for the former Yugoslavia and Rwanda and the 2000s with the creation of the International Criminal Court. These new institutions, however, have brought relatively few defendants to justice—Slobodan Milosevic died a natural death while litigating his own defense. Even if more prosecutions were brought, there seems little if any evidence that the prospect of ex post criminal sanctions has any deterrent effect on illegal behavior. One study, by Jide Nzelibe and Julian Ku, has even found that the prospect of a human rights proceeding causes African dictators to stay in power longer.\textsuperscript{141} Nations have fought according to laws, both customary and written, for centuries without the benefit of criminal tribunals. They have relied on reciprocity, deterrence and reprisals, and shared interests to police their conduct of war, and it is those factors that will guarantee the success or failure of any norm.

The foundational argument about moral agency is equally weak. It is unclear why morals demand that a human being pull every trigger in war. We have not seen such a principle advocated by the leading Kantian works on war,


\textsuperscript{140} See generally \textsc{William H. Boothby, Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors} 146 (2014).

such as John Rawls’s *Law of Peoples* or Michael Walzer’s *Just and Unjust Wars*. If asked, critics might argue that if we want the decision on our lives to be made by other humans, we should adopt the same rule ourselves. Thus, if we do not wish the armies of another nation to use autonomous drones to kill us, we should not use them against others. It is not obvious, however, that our primary interest is in making sure humans make the final decision—making it a but-for cause—of killing in war. We should have a greater interest in making sure that if our lives are taken in combat, they are taken on legitimate grounds.

The laws of war should favor combat methods that reduce harm over any minimum requirement of human participation. It should be morally neutral for an autonomous drone to strike an enemy target on a battlefield if it can employ the same precision in targeting and sensitivity for collateral damage as a human soldier. And if the robot could be programmed to inflict less collateral damage than a human operator, we should choose the robot.

From a cost-and-benefit perspective, such a principle is beside the point. The question should be whether autonomous weapons reduce the overall human cost of war. Human rights advocates too easily dismiss the possible benefits of new weapons. Deployment of robotics could advance the humanitarian goal of reducing the death and suffering of combat, once it begins, far more effectively than a complete ban. Unmanned weapons will reduce if not eliminate the risk to drone operators, who send their commands from hundreds if not thousands of miles away. Their precision can reduce civilian and collateral damage, the main purpose of the laws of war.

III.

**THE INFORMATION REVOLUTION: NEW WEAPONS AND THE REDUCTION OF WAR**

Efforts to regulate new weapons technologies will prove flawed because our chaotic international system renders their costs and benefits too uncertain. Nations will either decline to agree or refuse to cooperate with agreements that may advantage rivals. Moreover, premature regulation can be counterproductive; it can make wars more destructive. Part II discussed the security advantages of autonomous weapons during armed conflict from a realist perspective. Part III analyzes the benefits of autonomous weapons leading up to armed conflict. Once we understand war as part of a bargaining

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142. *See Rawls, supra note 82; Walzer, supra note 62.*

process between two states, we will see that efforts to regulate drones or cyberweapons may impede efforts to settle international disputes without war.

Nations have always pursued contending interests. Ancient Athens and Sparta went to war because of their different state goals—Athens to create a maritime trading empire, Sparta to remain the leading power in Greece. Competing interests related to disputes over many issues, such as security, territory, trade, and political influence generate disputes. Much of modern European history tells the story of the struggles between Great Britain, France, Spain, Russia, later joined by Germany and Italy, over territory and population. The United States fought with Spain and Mexico over the territory to its south and west, and ultimately gained Florida, Texas, California, Arizona, and New Mexico from the wars.

Rational nations should settle these disputes when the benefits of cooperation outweigh those of conflict. The possibility of armed conflict produces high incentives to settle disputes peacefully, to avoid the deadweight losses from going to war. Nations can divide a resource, redraw a border, or end a struggle that gives each side some benefit while foregoing the loss of life and resources due to armed conflict. This approach bears similarities to a law and economics analysis of litigation, where rational and informed parties should prefer settlement to time and resource intensive trials. Similarly, two competing nations that each have full information about their relative military resources and political will should prefer an agreement to a conflict that wastes resources.

As Thomas Schelling argued, “conflict situations are essentially bargaining situations.” Nations will seek to acquire territory, population, or resources. They will wish to stop harms, such as pollution, drugs, terrorism, disease, or excessive migration. Nations may come into conflict when these goals meet the agenda of other nations. They may want to add another country’s territory and population, or stop another country’s pollution. A crisis will arise when the two nations cannot reach an agreement that peacefully divides the benefits at stake.

International agreements serve as a means to resolve disputes. Peace treaties, for example, recognize the end of a war. Arms control agreements, such as the Chemical Weapons Convention, seek to prevent ruinous arms competition or the use of excessively harmful weapons. Treaties can resolve border disputes, formalize the transfer of territory, or promise favored


treatment for citizens and goods and services. Treaties, however, lack the same enforcement mechanisms as domestic contracts. At home, parties can rely on a legal system, backed up by courts and police, to enforce a settlement. Parties may negotiate based on asymmetric information, but once a settlement is reached, the domestic legal system generally accounts for its enforcement.

By contrast, international disputes suffer from both asymmetrical information and weak institutional environments. As we have seen, leading scholars of international relations begin with the fundamental observation that anarchy besets the international system. Anarchy discourages arms control agreements because nations may not accept relative changes in power and they cannot trust each other’s promises. Anarchy has a negative effect not just on the international system, but also in the narrower setting of disputes between individual nations. It interferes with the ability of states to enforce agreements, despite their obvious benefits to both parties. Without international courts or police with effective authority to force compliance, a nation-state can renge on a treaty without consequence other than retaliation from the other states.

This lack of enforcement mechanisms produces a classic prisoner’s dilemma: two suspects could receive the lowest sentences if they could only cooperate on their stories, but they cannot because of a lack of trust. Similarly, nations might not enter into treaties because they do not trust their partners to live up to their promises. This problem will be particularly acute where one party must take a first step that bears high costs before the other party must act. For example, a nation that has strong offensive military capabilities, but weak defensive systems, may be reluctant to withdraw from a disputed territory and lose its tactical advantages without a firm guarantee that the other side will withdraw too. Without institutional mechanisms for enforcement, the first nation cannot be sure that the second nation will exploit its vulnerabilities during its first step.

Political scientists James Fearon and Robert Powell each have formalized this problem with a sophisticated model of the choice between war and peace. Under their approach, rational nations with perfect information should favor a settlement over conflict to resolve a dispute. The primary reason is that states can avoid the deadweight loss of war by reaching an agreement that mirrors the expected outcome of any conflict. In 1848, for example, the heavy American advantage over Mexico in military abilities and economic resources should have led to the peaceful transfer of the disputed land north of the Rio Grande River to the United States, and without having to fight out the Mexican-

147. See generally HANS MORGENTHAU ET AL., POLITICS AMONG NATIONS: THE STRUGGLE FOR POWER AND PEACE (5th ed. 1973); WALTZ, supra note 85; Mearsheimer, supra note 84.
American War. A nation, of course, could choose to gamble in an armed conflict in the hopes of capturing all of a territory, rather than only a part, or beating the odds of defeat. Full information and rational thinking, however, should preclude gambling on war.

Rather than resorting to war, two nations should agree to a deal that divides a resource in proportion to their objective chances of prevailing in a conflict. A rational settlement should mirror the balance of forces between the two sides. Each nation will have an expected value that it places on winning a dispute. Like Learned Hand’s formula for tort liability, the expected value of war equals its expected benefit minus its expected cost. The expected benefit is a nation’s probability of prevailing times the value of winning. The expected costs of the conflict are the likely losses suffered from fighting. If each nation knows the other’s probability of winning, the value of the matter in dispute, and the costs of war, the nations should be able to reach a settlement. If nation A threatens to go to war if it does not receive a disputed territory, but nation B knows that A’s expected costs outweigh the value A places on the land times its chances of winning a conflict, B will not budge. In that case, A should not go to war either and the dispute will be settled. But if A’s chances of winning are good, and it places a high value on the territory in question, and the costs of a war are not too high, then A may choose war. In that case, B should agree to a compromise, which would avoid the costs of war in addition to the possible loss of territory. In either case, no war should occur. As with the Coase Theorem, the territory will end up in the hands of those who value it the most, the costs of war are avoided, and the difference between the time before and after the settlement is the distribution of gains.

A hypothetical struggle between China and the United States over Taiwan illustrates this principle of rational settlement. If China seeks to absorb Taiwan, the expected value of going to war equals the expected benefit of gaining Taiwan minus the expected cost of a conflict with the United States. China’s expected benefit of war is a function of the probability of winning times the value of the territory. The probability of winning depends on factors such as industrial production, military capability, leadership, and political will. The sum of China and the United States’ chances of winning add up to 1.0—in other words, neither side can have a 100 percent odds of prevailing—and the value of the resources will generally (though need not) be the same for both nations.

With full information, these conditions should lead both nations to reach a settlement rather than turn to armed hostilities. If both sides know the expected values of going to war, they can simply divide the resource proportionally to their respective probabilities of winning. They will receive the expected benefit of any conflict but avoid the expected cost. If China and the United States, for

149. See United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947).
example, each had 50 percent odds of prevailing in a conflict, they could simply divide Taiwan much as the United States and Russia split Korea and Germany after World War II. In a conflict, they not only run a 50 percent chance of coming away with nothing, but both nations would suffer the deadweight costs of war. The parties may be unable to reach an agreement, however, if the two countries place greatly different values on the disputed resource. If Beijing, for example, values Taiwan far more highly than Washington because of the symbolic and historical significance of uniting China, the expected values of the two countries might not produce a possible settlement range.

Caveats apply. Successful bargaining requires that the nations act rationally. Leaders, however, may be delusional or motivated by noneconomic incentives, such as a messianic religious vision. There may be less room to compromise with these leaders. A regime may hold little concern for the welfare of its people, but much for its own power and success. Such nations might still risk going to war, even though they have a low probability of winning and a high cost of casualties, because the odds are higher that the regime will remain in power. This may explain why compromise with authoritarian regimes may prove difficult, such as Saddam Hussein’s Iraq during the Persian Gulf Wars. Relatedly, nations may place such different values on the matter in dispute that there is no real overlap in the range of acceptable outcomes. Poland, for example, likely could not have forestalled Germany’s invasion in 1939, regardless of what it offered in a negotiation.

But when nations act rationally, in Powell’s words, war becomes an “inefficiency puzzle.” Nations should almost always reach settlement and avoid the costs of war. But they do not. International anarchy throws up a final stumbling block. Lack of a supranational government inhibits agreement because nations have difficulty overcoming informational asymmetries. If nations do not know important variables, such as the probabilities of winning a conflict, the value that they place on a contested resource, or expected war costs, they will be unable to accurately decide whether to go to war or to settle. As with contracting or litigation, perfect information is necessary for bargaining to reach the optimal outcome.

The most important of these variables is a nation’s probability of winning a conflict. This probability generally depends on a nation’s military capabilities and political determination. Information in the public domain, such as military size, defense budgets, and economic growth, can give some clue about a nation’s chances of prevailing. But even these relevant public facts, such as economic growth and military spending, may prove difficult to collect and analyze. During the 1970s and 1980s, for example, the Central Intelligence Agency badly underestimated the size of the Soviet defense budget and

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150. Powell, War as a Commitment Problem, supra note 144.
overestimated Moscow’s ability to keep pace with U.S. defense capabilities. The Soviet Union’s quick collapse in 1990, therefore, came as a surprise to most of the American national security establishment.\textsuperscript{151} Even if accurate figures are publicly available, economic growth may not directly translate into military effectiveness for some nations because of weakness in military equipment, training, or culture.

Moreover, nations actively aim to conceal information about their military capabilities to retain leverage. Other information falls primarily within the knowledge of a single nation. The United States, for example, has private information on the quality of its armed forces and the superiority of its strategies and tactics. Indeed, nations will go to great lengths to conceal military abilities in order to preserve tactical advantages or strategic surprise. The United States keeps performance data on many of its weapons systems classified, which makes it more difficult for the enemy to develop effective countermeasures. Imperial Japan concealed its advances in aircraft carrier operations, which allowed it to project force as far as Hawaii, well beyond American estimates at the time. Nations also have private information on the political willingness of their leadership, elites, and citizens to fight through to the end. One nation may be willing to suffer vastly higher casualties than another, which affects their probability of winning in any conflict. For example, democracies tend to be more responsive to citizens who may be unwilling to tolerate protracted conflicts. While the United States suffered about 58,000 deaths in the Vietnam War, North Vietnam and the Viet Cong suffered an estimated 444,000 combatant deaths.\textsuperscript{152}

These asymmetries produce several problems. First, imperfect information leads to mistakes in bargaining. If nations overestimate their probability of winning a conflict—and correspondingly underestimate their opponent’s odds—they will not realize there is a broader range for agreement and go to war more often than seek peace. If China, for example, underestimates the probability that the United States will prevail in a conflict, it will demand a greater share of Taiwan than it should because it will overestimate its expected benefit from war. Conversely, the United States will reject China’s settlement offers, which underestimate Washington’s expected value from war. The United States will accept war instead.

Second, nations have an incentive to bluff about their true probability of winning a conflict. A nation might seek to conceal its military abilities in order to take advantage of an opponent. China hid its large troop formations in 1950 to launch a surprise attack on American forces that advanced north of the thirty-eighth parallel during the Korean War. Or, a nation might seek to


\textsuperscript{152} G.\textsc{unter} L\textsc{ewy}, America in Vietnam 442–53 (1978).
exaggerate its resources in order to bluff its way to a better deal. Great Britain and France mistook Germany’s capabilities in 1938 and 1939 and allowed it to seize Czechoslovakia and invade Poland without response. Imperfect information creates an incentive to bluff, which makes the outcome of war even more uncertain. Faced with possible bluffs, nations will have few means of gaining credible information about their opponents’ true capabilities. Such uncertainty undermines the ability to reach a deal.

Third, nations have few ways to reveal private information reliably. In order to avoid the costs of war, a nation in a crisis may have an incentive to reveal its true capabilities. This picture will allow the nations to more accurately judge the probabilities of a war’s outcome, which should smooth the way to a settlement. But under conditions of anarchy, nations have difficulty revealing private information in a credible manner. Suppose China, for example, wanted to show the United States that a fifty-fifty division of Taiwan would reflect relative power positions. It could show Washington that it had sufficient military resources within striking distance of Taiwan to fight the U.S. Navy to a draw. But the United States would have serious concerns that China was bluffing. Beijing might misrepresent, exaggerate, or selectively reveal information about its forces in order to win a better deal than it should if the nations went to war. Unlike domestic litigation, the parties to the dispute cannot reveal information through a third party—such as a federal court—that provides credibility.

New weapons technologies can help overcome the obstacles of imperfect information. Coercive measures can signal political will, the value placed on the resources at stake, or military capabilities that could influence the outcome of a broader armed conflict. The more costly the signal, the more credible the information becomes. A nation’s leader can make a threat of war and send military forces near disputed territory or a potential conflict zone. Deployment eats up resources that would go to waste if the nation is bluffing and incurs “audience costs” domestically if the leader backs down.153 Escalating steps of force will provide the opportunity to send more precise signals that gradually consume more resources, reveal more military capability, and edge closer to war. With more avenues to credibly signal capabilities, there are more opportunities to reveal reliable, private information, and the likelihood of bluffing is reduced. While new weapons technology may produce more opportunities for violence, it can signal nations’ capabilities and thereby lead to peace settlements rather than war.

Limiting the ability to deploy new weapons technologies might make war more harmful. A ban could narrow the range of targets and the means of coercion to produce more destructive signaling and ultimately more lethal

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conflicts. One nation may want to send a signal during a crisis that inflicts a precise cost on its opponent. With a broader set of targets and more levels of harm, the nations can send more discrete signals in the bargaining process. If nations limit their signals to conventional attacks on military targets, they will have to employ more destructive levels of force. They might develop even more devastating kinetic weapons to produce the same effects as the precision offered by cyber or robotic weapons. Limits on new weapons technology might even destabilize crises by encouraging nations to use offensive weapons early in a crisis because they might themselves be vulnerable to attack.\(^\text{154}\)

New weapons technologies can more easily send specific signals that advance the bargaining process toward settlement. Cyberweapons, for example, can be used to shut down an opponent’s financial markets or transportation and communication networks for a limited time. During the Kosovo War, the United States Air Force achieved a similar result by dropping graphite on Belgrade’s electrical grid, which temporarily disabled power to Serbia’s capital city. While NATO claimed that the disruption in electricity undermined Serbian military operations, the attack on the electricity grid also sought to pressure Serbian civilians against supporting the Milosevic regime.\(^\text{155}\) While such an attack would violate the ban on targeting civilian objects set out in the Additional Protocol I of 1977 to the Geneva Conventions, it can send a signal that may cause less loss of life and destruction than an attack on a hardened military target using kinetic weapons.

Cyberweapons, in particular, present opportunities to send a more nuanced range of signals during interstate crises.\(^\text{156}\) Nations can use cyberweapons to attack each other’s armed forces more precisely, and hence reduce direct casualties to both military personnel and civilians. In a contest over Taiwan, for example, China could use cyberattacks to disable communications between the Pentagon and the U.S. Seventh Fleet. These cyberattacks can inflict fewer, more directed costs than kinetic attacks. Cyberweapons’ precision can reduce collateral harm to civilians by targeting only military communications. While cyberattacks can cause widespread harm, such as cutting water and electricity services to civilian populations, they still offer more precise and controlled power than kinetic weapons.

One might respond that some type of international regulation could forestall long-term harms from cyber conflict that might outweigh the benefits of credible signaling. Cyberweapons, for example, might also make possible

\(^{154}\) See, e.g., Robert Powell, Crisis Stability in the Nuclear Age, 83 AM. POL. SCI. REV. 61, 67 (1989).


\(^{156}\) For a more limited discussion of using cyberwarfare defensively to curb future attacks, see Jay P. Kesan & Carol M. Hayes, Mitigative Counterstriking: Self-Defense and Deterrence in Cyberspace, 25 HARV. J.L. & TECH. 429 (2012).
new types of harms that did not previously appear in warfare, such as China’s alleged theft of the U.S. personnel management database or North Korea’s entry into Sony’s network. Or cyberwarfare might open up a means for a faster escalation of hostilities. But even if true, these costs have to compare to existing means of signaling, which would depend on the use of conventional, kinetic weapons and their accompanying destruction and loss of life. They would also have to balance against the costs of cutting off a set of communications, which might impede peaceful bargaining.

Even if nations could overcome informational asymmetry, the international system’s anarchy creates a second, more difficult, obstacle to cooperation. While nations may understand that avoiding war is mutually advantageous, they may not trust each other. The enforcement problem is acute in situations where a settlement changes the status quo between states, or where rapid changes are already affecting the balance of power. One nation may find it difficult to trust the other to keep a promise if the latter will become even more powerful as a result of the agreement.

Information problems, for example, do not seem to explain the problems with ending internal armed conflict or long wars. Internal armed conflicts between a government and a rebel group often go on for years—sixteen years, on average. Over the course of the war, both sides acquire information about each other’s goals, resources, and will. Even with far more information than at the war’s outset, the parties often choose to fight rather than reach an agreement. This may well be due to lack of enforcement mechanisms. A settlement may put one of the two parties in a better position than when the fighting continues. A rebel group may gain breathing space where it can regroup, or the government may restore its authority in lost territory. One side cannot be confident that the other will not take advantage of its new position to break the agreement and take even more resources in the following year.

A hypothetical territorial agreement between the United States and China over Taiwan illustrates the difficulties of securing enforcement of a settlement amidst a shifting balance of power. In the first time period, the United States protects an independent Taiwan. The United States has a greater probability of prevailing in any conflict with China because of its larger navy, air force, and forward bases in Korea, Japan, and the Philippines. In the second time period, China’s economy has boomed, which translates into greater military power. China gains a higher probability of winning in a war with the United States. In this period, China and the United States agree to divide Taiwan in the middle because, with full information, they both estimate their chances of winning a war at fifty-fifty. China’s gain of territory on Taiwan, however, gives it a greater than 50 percent chance of prevailing in the next time period because it

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now has a land base on the island itself. China’s prospects will also improve in the third time period because of faster economic growth and military spending rates.

Under these conditions, the United States will have little confidence that China will keep its agreement in the second time period. An agreement will endow Beijing with an even greater advantage in future time periods, which will encourage it to revise the division of Taiwan further in its favor. China’s conduct under its agreement with the United Kingdom over Hong Kong illustrates the problem. In December 1984, China achieved a superior military position relative to the United Kingdom in any conflict over Hong Kong. In 1982, for example, China spent $49.5 billion on defense whereas the United Kingdom spent $27.4 billion (they were the third and fourth largest spenders, respectively, with the Soviet Union first at $257 billion and the United States second at $196.3 billion).\footnote{U.S. ARMS CONTROL & DISARMAMENT AGENCY, WORLD MILITARY EXPENDITURES AND ARMS TRANSFERS 1972–1982, at 5 (1984).} But, much of the British military was deployed in Europe as part of NATO, and China’s proximity to Hong Kong created a strategic advantage. To guarantee a peaceful transfer of power, Beijing promised in an agreement with London that Hong Kong would continue to enjoy an independent political system. Today, it appears that China is reneging on this negotiated agreement; the Communist Party has installed unpopular political leaders in Hong Kong to extend the mainland’s power over the territory. In the twenty-first century, the United Kingdom has little military ability to prevent Beijing’s revision of the deal. The 1984 handover agreement could not withstand a serious shift in the balance of power between China and the United Kingdom.

Cyberwarfare might provide an unexpected way to increase the ability of nations to commit to the terms of an agreement. In order to make a reliable agreement, a nation has to be willing to suffer a serious loss if it fails to perform, much like a borrower putting up property as collateral for a loan. But nations may have difficulty offering territory or resources as a security deposit on their treaty promises. A nation, however, could leave some valuable resource deliberately vulnerable to attack by cyberassault from its treaty partner. It could ensure that the cyber defense of the resource could only be overcome by capabilities in the hands of the other nation. If one state violated its international agreement, the other state could use cyber weapons to destroy the resource. This would be the twenty-first century equivalent of the ancient and medieval practice of sending the children of aristocratic families to foreign nations to serve as hostages, or the more recent concept of mutually assured destruction during the Cold War. Due to the lack of enforcement, however, states could never be certain that a nation would not renge even on these guarantees—a nation could always remove the vulnerabilities or suddenly
deploy new defenses. But these expensive signals of commitment could improve the ability to cooperate beyond matters as they stand now.

A critic might argue that without international regulation of these new technologies, the risk to civilians will increase. Nations at war, however, will have an incentive to distinguish between military and civilian targets to the extent allowed by the capabilities of weapon systems. Rational nations should seek to contain the harms of war in order to maintain the conditions for peace and to preserve the value of the civilian economy in the postwar period.\footnote{160} Defenders in a war do not want to kill their fellow citizens or harm their own territory, although they might destroy civilian property to prevent it from falling into enemy hands. Invaders will have no interest in ruining the object of their aggression. Reducing civilian casualties may also encourage an end to conflict. Targeting civilians and destroying nonmilitary resources may harden nations at war and make a diplomatic compromise more difficult. The unexpected carnage of World War I, for example, made a peace agreement restoring the status quo to pre-August 1914 politically impossible for both the Allied and Central Powers.

Nations, moreover, have long pursued indirect coercion against civilian populations in war. They have often turned to economic sanctions to conduct hostilities short of direct armed conflict, or in conjunction with active hostilities. In World Wars I and II, of course, the Allies conducted economic warfare against Germany and its allies by levying a blockade of both military and civilian shipping.\footnote{161} After the wars, the UN Charter even expressed a preference for such tactics by authorizing the Security Council to impose “complete or partial interruption of economic relations and of rail, sea, air, postal, telegraphic, radio, and other means of communication” in the case of a threat to international peace and security.

While nations such as Great Britain and the United States have argued in the past that embargos blocked only goods that might contribute to the enemy military, this seems difficult to sustain in the case of the complete embargos that prevailed during the World Wars. Instead, economic warfare serves the same objectives as the approach described here for cyber and robotic weapons. First, new cyber and robotic weapons provide nations with a way to send signals in international bargaining through the gradual escalation of coercion short of outright hostilities. Second, embargoes pressure civilian populations to change the policies of their leaders, or even the leaders themselves. Perhaps cyber and robotic weapons, when employed as steps in the escalation of force, will also be understood as more akin to economic than kinetic warfare.

\footnote{161. Charles Hyde, \textit{International Law} 1727–32 (2d ed. 1951).}
A rationalist approach to war also provides an answer to the broader critique of the new weapons technologies as facilitating war. Recall that some UN officials and scholars share the concern that drones and cyberweapons will encourage states to wage war more often. Critics argue that these weapons remove a nation’s soldiers from the battlefield, thereby emboldening leaders to choose force more frequently. But, understanding war as a bargaining failure reveals the importance of signaling to resolving international disputes. New weapons create more opportunities for signaling, which allows nations to communicate their intentions and capabilities more effectively. Greater signaling should allow nations to share more information, which on the margins will lead to more international deals and therefore an overall reduction of major wars. Ironically, an effort to ban new weapons may well produce more war, not less.

CONCLUSION

The rise of robotics and cyberwarfare has blurred our understanding of what constitutes “war.” Indeed, within weeks, both blanketed American news media. First, according to news reports, the Central Intelligence Agency concluded that Russia had attempted to influence the 2016 presidential elections by hacking into the computer systems of the Democratic National Committee and the campaign of candidate Hillary Clinton. Then, China captured a U.S. submersible drone in the South China Sea, in violation of international legal right of free navigation. Perhaps few see these actions as “war,” in the traditional sense. And yet, many would feel differently if Russian spies entered the United States to tamper with election result or if Chinese marines had boarded an American warship. These examples, however, only begin to introduce the complexity of robotics and cyberwarfare, because they involve powerful and identifiable state actors. When nonstate groups adopt these measures, understanding “war” seems less and less feasible.

The technology that has created aerial drones will produce unmanned versions of many other weapon systems, from tanks to submarines to sentries. Criticism of this advance misses the mark. Rather than an unknown to be feared, new weapons technology will bring a greater precision in the use of force that will reduce casualties and destruction. Allowing the use of robotic weapons against a broader range of targets promises to contain the harm of international disputes and help lead to peaceful settlements. Concerns about autonomous weapons are equally mistaken. Such systems promise to increase the precision and decrease the harms of attack. In a world beset by fresh challenges to international security, reducing the costs and increasing the accuracy of force may reduce the obstacles to action to stop weapons of mass destruction proliferation, terrorist groups, humanitarian disasters, or revanchist powers.