INTERSECTION:

The Rules of War and the Use of Unarmed, Remotely Operated, and Autonomous Robotics Systems, Platforms and Weapons…Some Cautions

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> There are limits to how far we can go in changing our human nature without changing our humanity and our basic human values. Because it is the meaning of humanness (our distinctness from other animals) that has given birth to our concepts of both human dignity and human rights, altering our nature necessarily threatens to undermine both human dignity and human rights. With their loss, the fundamental belief in human equality would also be lost…If history is a guide, either the normal humans will view the 'better' humans as 'the other' and seek to control or destroy them, or visa-versa. The better humans will become, at least in the absence of a universal concept of human dignity, either the oppressor or the oppressed.-George Annas

> If it saves American lives on the battlefield, do it! - Anonymous U.S. Joint Planning Officer at Department of Defense.

> I have set before you life and death, blessing and cursing: therefore choose life, that both thou and thy seed may live- Deuteronomy 30:19

THE NATURE OF THE PROBLEM:

The scope of contemporary technological innovation is both impressive and staggering. Indeed, for the average consumer of these technologies, whether on the battlefield or in daily

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life- the general who orders this technology, the politician who pays for it, the user whose life is changed by it, even the Luddite who rails against it- these technologies are magic. They are incomprehensible in the manner of their creation, the details of their inner workings, the shear minutiae of their possibilities. They are like the *genie* out of the bottle and clamoring to grant three wishes; guess right and the world is at your fingertips, guess wrong and there may well be catastrophe. And you have to guess quickly for the *genie* is busy and has to move on. There are, of course, shamans who know the *genie's* rules, who created the *genie* or at least discovered how to get it out of the bottle. You go to them and beg for advice regarding your wishes. What should I take from the *genie*? How should I use my wishes? Quickly tell me before I lose my chance and the *genie* makes the choices for me. And you find that the shaman is busy with new *genies* and new bottles and hasn't given your choices much thought at all. He may stop to help you ponder your questions, but most probably he goes back into his tent and continues his work. 'You're on your own kid…Don't screw up!'

Discussions regarding the scope of emerging technologies are often difficult due to the breadth and sophistication of the information about them. They often descend into ramblings about gadgets and gizmos and reflect the short answer to Peter Singer's question, "why spend four years researching and writing a book on new technologies? Because robots are frakin' cool."[2] Because innovation is and has always been catalytic, feeding off itself, reacting to its intended and unintended consequences, influenced by the environment in which it is created and creating new environments as it goes, the discussion must, of course, be much longer and more nuanced. Of equal importance is the fact that demands for emerging technologies are coming faster and faster, and failure to keep up can have disastrous effects on the battlefield.

Whatever the analysis, it can be argued with a fair degree of certainty that the innovation of emerging technologies, and robotics specifically, has been and will continue to be pervasive, and that their use has considerable impact on the ways humankind operates. Their use on the battlefield, moreover, often defines the ability of human organizations to survive and prosper.

Of considerable interest and concern is the increasing availability of these

[2] P. W. Singer*, Wired for War: The Robotics Revolution and Conflict in the 21st Century*. (New York: Penguin Group, 2009), 1.

technologies in the 21st century and their governance. Some have taken the position that political control has wrested from the innovators the ability to develop and proliferate new and damaging technologies. William McNeil, for example, in 1982, was able to conclude:

> [O]nce the feasible became actual, planning that took full account of collateral costs quickly brought a halt to breakneck technical change. Deliberate adjustment of population numbers to available resources presently achieved sufficient accuracy to cushion human hurts arising from systematic discrepancies between economic expectation and actual experience. Peace and order improved. Life settled down towards routine. The era of upheaval had come to a close. Political management, having monopolized the overt organization of armed force, resumed its primacy over human behavior. Self-interest and the pursuit of private profit through buying and selling sank towards the margins of daily life, operating within limits and according to rules laid down by the holders of political-military power. Human society, in short, returned to normal. Social change reverted to the leisurely pace of preindustrial, pre-commercial times. Adaption between means and ends, between human activity and the natural environment and among interacting human groups achieved such precision that further changes became both unnecessary and undesirable. Besides, they were not allowed.[3]

Others are not so sure.

There are those in the robotics community who sense that these emerging technologies may foreshadow something different than the traditional intersection between technology and the way humankind operates, both on the battlefield and in society generally. The stakes, according to this argument, are extremely high and, in the language of history, *axial.* Peter Singer, for example, notes:

> [H]umans have long been distinguished from other animals by our ability to create. Our distant ancestors learned how to tame the wild, reach the top of the food chain, and build civilization. Our more recent forebears figured out how to crack the codes of science, and even escape the bonds of gravity, taking our species beyond our home planet. Through our art, literature, poetry,

[3] William H. McNeill, *The Pursuit of Power, Technologies, Armed Force, and Society Since A.D. 1000 (Chicago:* The University of Chicago Press, 1982), vii.

> music, architecture, and culture, we have fashioned awe-inspiring ways to express ourselves and our love of one another.
>
> And now we are creating something exciting and new, a technology that might just transform human's role in their world, perhaps even create a *new species* [emphasis added]. But this revolution is mainly driven by our inability to move beyond the conflicts that have shaped human history from the very start. Sadly, our machines may not be the only thing wired for war.[4]

And, finally, there are those who believe they see clearly to the bottom of the abyss and find no solace in the idea that humankind has always found a way to master emerging technologies. Bill Joy, for example, a self-styled *generalist*, notes:

> [A]ccustomed to living with almost routine scientific breakthroughs, we have yet to come to terms with the fact that the most compelling twenty-first century technologies-robotics, genetic engineering, and nanotechnology-pose a different threat than the technologies that have come before. Specifically robots, engineered organisms, and nanobots share a dangerous amplifying factor: they can self-replicate…Each of these technologies also offers untold promise: The vision of near immortality that Kurzweil sees in his robot dreams drives us forward: genetic engineering may provide treatments, if not outright cures, for most diseases; and nanotechnology and nanomedicine can address yet more ills. Together they can significantly extend our average life span and improve the quality of our lives. Yet, with each of these technologies, a sequence of small, individually sensible advances leads to an accumulation of great power, and, concomitantly, great danger…The twenty-first century technologies…are so powerful that they can spawn whole new classes of accidents and abuses. Most dangerously, for the first time, these accidents and abuses are widely within the reach of individuals and small groups. They will not require large facilities or rare raw materials. Knowledge alone will enable the use of them.
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> Thus, we have the possibility not just of WMDs but of knowledge-enabled mass destruction (KMD), this destructiveness hugely amplified by the power of self-replication.
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> I think it is no exaggeration to say we are on the cusp of the further perfection of extreme evil, an evil whose possibility spreads well beyond that which WMDs bequeathed to the nation-

[4] Singer, *Wired For War*, ibid. 436.

states, on to a surprising and terrible empowerment of extreme individuals.[5]

If innovation of these emerging technologies is indeed d*emocratized,* that is available to anyone with minimal constraints; if innovation is best encouraged in *fragmented* and competitive environments; and finally, if innovation flourishes best in unregulated spaces, the room for the creation of Joy's *extreme evil* would appear to be great, with no hope of putting the *genie* back in the bottle. Finding the balance between the freedom to *innovate* and the identification of places where innovation *should not go* would appear to be not only rational, but, necessary.

ROBOTICS GENERALLY:

Robotics enjoy preeminence in the discussion of military technologies, perhaps, because popular culture has served to inform the public of their possibilities and, further, it may be said that their applications are easier to comprehend. *The Terminator*, *Matrix* and *Star Trek* all employ robots as central characters and extol their virtues in multiple ways. A recent movie *The Hurt Locker* chronicles the relationship between an Army explosives expert and his robot as he goes about the business of dismantling Improvised Explosive Devises (IEDs) in Iraq. Predator Drones appear in the news daily as they go about the business of identifying and engaging Taliban and Al Qaida targets in Afghanistan and Pakistan. Indeed, robots have been the subject of science fiction literature for decades.[6] Robots are defined as

> …[M]achines that are built upon what researchers call the 'sense-think-act' paradigm. That is, they are man-made devices with three key components: 'sensors' that monitor the environment and detect changes in it, 'processors' or 'artificial intelligence' that decides how to respond, and 'effectors' that act on

[5] Bill Joy, "Why the Future Doesn't Need Us" in Allhoff, et. al. eds, *Nanoethics*, ibid. 21-22.

> the environment in a manner that reflects the decisions, creating some sort of change in the world around a robot. When these three parts act together, a robot gains the functionality of an artificial organism.[7]

Robots are deployed to perform a wide range of tasks on and off the battlefield and Congress has mandated that their use expand radically in the next decade. The Department of Defense reports:

> In today's military, unmanned systems are highly desired by combatant commanders (COGOMs) for their versatility and persistence. By performing tasks such as surveillance; signals intelligence (SIGNIT), precision target designation, mine detection; and chemical, biological, radiological, nuclear (CBRN) reconnaissance, unmanned systems have made key contributions to the Global War on Terror (GWOT). As of October 2008, coalition unmanned aircraft systems (UAS) (exclusive of hand-launched systems) have flown almost 500,000 flight hours in support of Operations Enduring Freedom and Iraqi Freedom, unmanned ground vehicles (UGVs) have conducted over 30,000 missions, detecting and/or neutralizing over 15,000 improvised explosive devices (IEDs), and unmanned maritime systems (UMSs) have provided security to ports.[8]

It has been a longstanding goal of Congress to increase the use of robots in the military for some time. The Defense Authorization Act of 2000, for example, states that "[I]t shall be the goal of the Armed Forces to achieve the fielding of unmanned, remotely controlled technology such that-(1) by 2010, one-third of the aircraft in the operational deep strike force aircraft fleet are

[7] Singer, *Wired For War*, id. 167

[8] Department of Defense, FY2009-2034 Unmanned Systems Integrated Roadmap, xiii.

unmanned; and (2) by 2015, on-third of the operational ground combat vehicles are unmanned."[9]

Further, their development has increased as the needs have been identified. The Department of Defense reports that its investment in the technology has seen "…unmanned systems transformed from being primarily remote-operated, single-mission platforms into increasingly autonomous, multi-purpose systems. The fielding of increasingly sophisticated reconnaissance, targeting, and weapons delivery technology has not only allowed unmanned systems to participate in shortening the 'sensor to shooter' kill chain, but it has also allowed them to complete the chain by delivering precision weapons on target."[10] In other words semi-autonomous robots are being used to kill enemies on the battlefield, based on information received by their sensors and decisions made in their processors.

Robots have multiple benefits. For one thing they permit militaries to operate with fewer soldiers. As manpower pools for military recruitment shrink, it is expedient to substitute machines for soldiers in order to maintain military advantage. Second, robots are politically convenient. The 21st century, especially in liberal democracies like the United States, exhibits a distaste for large standing armies and causalities. Robots, like private contractors, are not counted in national casualty reports nor are their wounds the subject of debate or scrutiny. Third, Robots cost a good deal less than human combatants. Armin Krishner reports that the average soldier costs the nation approximately $4 million over his lifetime while the average

[9] Ronald O'Roarke, "Unmanned Vehicles for U.S. Naval Forces: Background and Issues for Congress," CRS Report for Congress, updated April 12, 2007, 1.

[10] Department of Defense, FY*2009-2034 Unmanned Systems Integrated Roadmap*, ibid, xiii.

robot might cost 10% of that figure.[11] In many ways they are simply more efficient than humans. Their sensors, for example, can gather infinitely more information than humans; their processors can make sense of that information by tapping into multiple information streams and databanks at a faster rate than humans; and their effectors can unleash appropriate responses to that information more efficiently than humans. Further, they don't carry with them the baggage of human frailty. As a member of the Pentagon's Joint Forces Command and its Alpha group studying future war summarizes, "[T]hey don't get hungry. They're not afraid. They don't forget their orders. They don't care if the guy next to them has just been shot. Will they do a better job than humans? Yes."[12]Finally, they will be able to self-replicate and maintain themselves.

In the future, robotists tell us that it is probable that robots, with the addition of artificial intelligence (AI), will be capable of acting independently, that is without human supervision-called *humans in the loop*-in the accomplishment of most tasks presently performed by soldiers. One definition defines AI as "the science of making machines do things that would require intelligence if done by men."[13]AI, although not available today except in the experimental stage, will have the ability to remove humans from the battlefield altogether, both in the operational and decision-making sense. Ravi Mohan describes the innovation-to-use process:

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[11] Armin Krishnan, *Killer Robots, Legality and Ethicality of Autonomous Weapons (Burlington, Vt: Ashgate Pub.Co,2009.) 2.*

[12] Gordon Johnson as cited in Krishnan, *Killer Robots*, ibid., 2.

[13] Marvin Minsky, *Semantic Information Processing*. (Cambridge Mass.: MIT Press, 1968), V.

First, robots will engage in non lethal activities like mine clearing or IED detection (This is happening today). As robotics gets more and more sophisticated, they will take up potentially lethal but non combat operations like patrolling camp perimeters or no fly areas, and open fire only when 'provoked' (This is beginning to happen too.). The final stage will be when robotic weapons are an integral part of the battlefield, just like 'normal' human controlled machines are today and make autonomous or near autonomous decisions.[14]

ROBOTICS AND THE LAW OF WAR:

Turning to military uses of robotics for the projection of force, development and use continue to be constrained by various restrictions regarding the projection of force found in international law, as translated variously into national laws and regulations. There are multiple conventions which purport to deal with specific technologies and practices. Even though the United States is not a party to all of these conventions, nor necessarily bound by all of them, it is nonetheless the case that the U. S. has taken considerable interest in the articulation of standards which purport to regulate conduct generally on the battlefield, including how weapons are used.

There are five principles which run through the language of the various humanitarian law treaties (the rules) which the United States acknowledges and generally honors regarding the conduct of warfare. These are: (i) a general prohibition on the employment of weapons of a nature to cause superfluous injury or unnecessary suffering, (ii) military necessity, (iii)

[14] Ravi Mohan, "Robotics and the Future of Warfare", Ravi Mohan's Blog [online] (13 December 2007), retrieved at http://ravimohan.blogspot.com/2007/12/robotics-and-future-of-warfare.html last retrieved 10/10/2010, 11/25/2009.

proportionality, (iv) discrimination, and (v) command responsibility. These principles, as discussed below, impose ethical and arguably legal restraints on at least some uses of emerging military technologies..

First, some weapons, it is argued, are patently inhumane, no matter how they are used or what the intent of the user is. This principle has been recognized since at least 1907,[15] although consensus over what weapons fall within this category tends to change over time. The concept here is that some weapons are *design-dependent*: that is, their effects are reasonably foreseeable even as they leave the laboratory. In 1996, the International Committee of the Red Cross at Montreux articulated a test to determine if a particular weapon would be the type which would foreseeably cause superfluous injury or unnecessary suffering. The so-called "SIrUS" criteria would ban weapons when their use would result in:

- A specific disease, specific abnormal physiological state, a specific and permanent disability or specific disfigurement; or
- Field mortality of more than 25% or a hospital mortality of more than 5%; or
- Grade 3 wounds as measure by the Red Cross wound classification scale; or
- Effects for which there is no well-recognized and proven treatment.[16]

[15] *See* International Conferences (The Hague), Hague Convention (IV) Respecting the Laws and Customs of War on Land and Its Annex: Regulations Concerning the Laws and Customs of War on Land, 18 October 1907, retrieved at http://www.unhcr.org/refworld/docid/4374cae64.html , 10/9/2010.

[16] International Committee of the Red Cross, "The SIrUS Project: Towards a Determination of Which Weapons Cause "Superfluous Injury or Unnecessary Suffering", ICRC, Geneva, 1997. See also Andrew Kock, "Should War be Hell?" *JANE'S DEFENSE WEEKLY* (May 10, 2000), 23.

The operative term here is *specific*; the criteria speak to technology specifically designed to accomplish more than merely render an adversary *hors de combat*. This test for determining weapons exclusion is a medical test and does not take into consideration the issue of military necessity. For this reason, these SIrUS criteria have been roundly criticized and rejected by the United States specifically, and by the international community generally, notwithstanding support for the general principle against the use of inhumane weapons.[17]

The second principle, *military necessity,* requires a different analysis. This principle "…justifies measures of regulated force not forbidden by international law which are indispensable for securing the prompt submission of the enemy, with the least possible expenditures of economic and human resources."[18] It is justified, according to this principle, to project force in order to secure legitimate military objectives which are generally limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage. *Military necessity* recognizes the benefit to friend and foe alike of a speedy end to hostilities. Protracted warfare, it assumes, creates more rather than less suffering for all sides. In order to determine the necessity for the use of a particular technology, then, one needs to know what the definition of victory is, and how to measure the

[17] Donna Marie Verchio, "Just Say No! The SIrUS Project: Well-intentioned, but Unnecessary and Superfluous," 51 THE AIR FORCE LAW REVIEW 183 (2001).

[18] Roy Gutman & Daoud Kuttab, *Indiscriminant Attack,* in CRIMES OF WAR, THE BOOK, WHAT THE PUBLIC SHOULD KNOW (2007), retrieved at http://www.crimesofwar.org/thebook/indiscriminate-attack.html, 10/9/2010.

submission of the enemy in order to determine whether the technology will be *necessary* in this regard.

The third principle, *proportionality,* is of considerable concern to the developer and user of new technologies. A use of a particular technology is not *proportional* if the loss of life and damage to property incidental to attacks is excessive in relation to the concrete and direct military advantage expected to be gained.[19] In order to make this determination, it can be argued, one must consider the military necessity of a particular use and evaluate the benefits of that use in furtherance of a specific objective against the collateral damage that may be caused.

Discrimination, the fourth principle, goes to the heart of moral judgment. Indiscriminant attacks (uses) are prohibited under the rules. Indiscriminant uses occur whenever such uses are not directed against a specific military objective, or otherwise employ a method or means of combat the effects of which cannot be directed at a specified military target (indiscriminant bombing of cities for example). Indiscriminate usage also encompasses any method or means of combat, the effects of which cannot be limited as required, or that are otherwise of a nature to strike military and civilian targets without distinction.

A final principle is *command responsibility,* that principle which exposes a multiple of superiors to various forms of liability for failure to act in the face of foreseeable illegal activities. This is a time-honored principle, grounded on the contract between soldiers and their

[19]U.S. Army Field Manual 27-10, The Law of Land Warfare, para. 41, change 1 (1976), retrieved at http://www.globalsecurity.org/military/library/policy/army/fm/27-1-/ 11/10/2009.

superiors, which requires soldiers to act and superiors to determine when and how to act. It has a long history reflective of the need for control on the battlefield.[20]

A 1997 Protocol to the Geneva Convention requires that each State Party "determine whether the employment of any new weapon, means or method of warfare that it studies, develops, acquires or adopts would, in some or all circumstance, be prohibited by international law."[21] The legal framework for this review is the international law applicable to the State, including IHL. In particular this consists of the treaty and customary prohibitions and restrictions on specific weapons, as well as the general IHL rules applicable to all weapons, means and methods of warfare. General proscriptions include the principles described above, such as protecting civilians from the indiscriminate effects of weapons and combatants from unnecessary suffering. The assessment of a weapon in light of the relevant rules will require an examination of all relevant empirical information pertinent to the weapon, such as its technical description and actual performance, and its effects on health and the environment. This is the rationale for the involvement of experts of various disciplines in the review process.[22]

Once again, the United States is not a signatory to this Protocol and thus, technically not bound by its requirements. Nonetheless, to the extent that it sets out reasonable requirements

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[20] Brandy Womack, "The Development and Recent Applications of the Doctrine of Command Responsibility: With Particular Reference to the Mens Rea Requirement", in Yee Sienho (ed.), INTERNATIONAL CRIME AND PUNISHMENT, SELECTED ISSUES 117 (2003).

[21] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts, 8 June 1977 Article 36 of 1977.

[22] Kathleen Lewand, "A Guide to the Legal Review of New Weapons, Means and Methods of Warfare, Measure to Implement Article 36 of Additional Protocol 1 of 1977," International Committee of the Red Cross Publication 0902 (2007), retrieved at http://www.icrc.org/web/eng/siteeng0.nsf/html/p0902, l0/10/2010.

and methodologies for use by states fielding new and emerging technologies, this treaty could well set the standard in international law for what may be considered appropriate conduct.

A final constraint worth noting is the emerging trend in international law to hold those responsible for fielding weapons which allegedly contravene the principles enunciated above through the use of litigation based on the concept of *universal jurisdiction*. The concept of universal jurisdiction is a customary international law norm that permits states to regulate certain conduct to which they have no discernible nexus. Generally, it is recognized as a principle of international law that all states have the right to regulate certain conduct regardless of the location of the offense or the nationalities of the offender or the victims. Piracy, slave trade, war crimes and genocide are all generally accepted subjects of universal jurisdiction. Belgium, Germany and Spain have all entertained such prosecutions and a number of U.S. officials including George W. Bush, Colin Powell, and Tommie Franks. Henry Kissinger and Donald Rumsfeld have been named in investigations, although their prosecutions have been without success.

The issue of l*awfare* is also of concern. Lawfare is a strategy of using or misusing law as a substitute for traditional military means to achieve military objectives. Each operation conducted by the U.S. military results in new and expanding efforts by groups and countries to use lawfare to respond to military force. American military authorities are still grappling with many of these issues. While litigation to date has revolved primarily around allegations of practices such as genocide, torture, rendition, and illegal interrogation, there is no reason to

believe that future prosecutions may be justified where decisions regarding illegal innovation, adaptation, and use of weapons systems are made.[23]

These various principles and requirements of international humanitarian law and ethical rules of military conduct would clearly impose some limitations on the development and use of emerging robotics technologies. However, given the ambiguous meaning and uncertain legal binding status of these principles, they are unlikely to adequately constrain and shape the development and use of robotics on their own. Additional oversight mechanisms may therefore be warranted.[24]

CONCLUSION:

As has been demonstrated above, technology is nothing new. Indeed, it forms the basis of culture itself, that description of how humankind operates when it forms into social

[23] Council on Foreign Affairs, Transcript, "Lawfare, The Latest in Asymetrics," March 18, 2003, retrieved at http://www.cfr.publications.html?id=5772, 12/10/2009.

[24] See generally Stephen E. White, "Brave New World: Nurowarfare and the Limits of International Humanitarian Law," 41 CORNELL INT'L L.J. 177 (2008); Mark Edward Peterson, "The UAV and the Current and Future Regulatory Construct for Integration into the National Airspace System", 71 J. AIR LAW & COMMERCE 521 (2006); Geoffrey S. Corn, "Unarmed but How Dangerous? Civilian Augmentees, the Law of Armed Conflict, and the Search for a More Effective Test for Permissible Civilian Battlefield Functions," 2 J.NAT'L SECURITY L.& POL'Y 257 (2008); Andrew H. Henderson, "Murky Waters: The Legal Status of Unmanned Undersea Vehicles," 53 NAVAL L. REV. 55 (2006); Jason Borenstein, "The Ethics of Autonomous Military Robots," 2 STUDIES IN ETHICS, LAW & TECH. Issue 1, Article 2 (2008); John J. Klein, "The Problematic Nexus: Where Unmanned Combat Air Vehicles and the Law of Armed Conflict Meet," AIR & SPACE POWER J. CHRONICLES ONLINE J. (2003), retrieved at http://www.airpower.maxwell.af.mil/airchronicles/cc/klein.html, 10/20/2010. Anthony J. Lazarski, "Legal Implications of the Uninhabited Combat Aerial Vehicle—Focus: Unmanned Aerial Vehicles," 16 AEROSPACE POWER J. 74 (2002).

organizations. On the one hand, technology constitutes merely the applied use of scientific knowledge to accomplish goals which occur to humans as they live their lives, competing with nature and other humans to survive, reproduce, and better their condition. It is then, as Bain schools, the "…tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devises and the skills by which we produce and use them."[25]On the other hand it is a good deal more as Steigler proposes,"…the pursuit of life by means other than life."[26]

Mankind has a good deal of experience with technology and the most perceptive among us are aware of its game changing abilities. Attempts have been made in some cultures, like the Chinese and the Japanese, to regulate certain technologies, especially when used for military purposes. Closing down commercial maritime industries, banning the use of gunpowder, and outlawing specific classes of weapons like the crossbow are but three examples. They all reflect attempts at the political and cultural level to direct resources and energies in directions that discredit or at least deemphasize military competitiveness. They also appear to be attempts, in part, to maintain the status quo. Most of these projects, however, appear to have failed, either because the failure to keep up has caused disastrous results when civilizations confronted others who had the advantage of emerging military technologies or because the central governance was unable to stifle grass roots innovation. Innovation, adaption, and especially use of technologies carry with them the prospect of change; change of competitive status, change

[25] Bain, "Technology and State Government," ibid., 860.

[26] Steigler, *Technics and Time*, ibid., 17.

in quality of life, or simply change which is interesting and attractive. Indeed, change would appear to be inevitable. As McNeil concludes, "[P]eople change their ways mainly because some kind of stranger has brought a new thing to their attention. The new thing may be frightening, it may be delightful: but whatever it is, it has the power to convince key persons in the community of the need to do things differently."[27]

Where governance is fragmented as in an increasingly globalized environment, technology appears to thrive as well. Whether it be the military competitiveness of polities, the exuberance of individual accomplishment or simply the inquisitiveness of the human mind, where multiple spaces exist for the project of innovation, new technology emerges. Further, technology has traditionally diffused fairly rapidly from one civilization to another, each adapting it to its own needs and environments. The diffusion of gunpowder from Asia to the West is only one example. The characteristics of globalization, rapid communication and movement of innovators between civilizations only increase this diffusion.

Another characteristic of technology is that it carries with it both intended and unanticipated consequences. While innovation is important, most technological change occurs in a free-floating environment where adaption is practiced as a matter of course and unregulated diffusion occurs. Here, the regulators of culture, political, spiritual, economic, and military, cannot know the results of the technology. As J. N. Mathis points out "[W]e will find ourselves caught off guard by changes in the political, economic, technological, strategic, and operational environments…Our goal is not to eliminate surprise-that is impossible. Our goal is, by a careful consideration of the future, to suggest the attributes of a joint force capable of

[27] McNeill, A History of the Human Community, Ibid, xiii.

adjusting with minimum difficulty when the surprise inevitably comes."[28]This is especially true in what Scranton refers to as an *environment of technological uncertainty.* Contemporary military competitiveness requires not merely more, quantitative, weapons but also better and different, qualitative, weapons. The innovation-to-use cycle has begun to move extremely rapidly with no time built in to examine the ramifications of the use, nor is there time to consider the legal, ethical, and moral appropriateness of the use.

Given, the above, it would appear that mankind has demonstrated the ability to accommodate change over the centuries, albeit with disastrous results for many. Civil society has introduced codes of ethics to regulate the conduct of innovators and adaptors, religious entities have promulgated practices and procedures regarding the uses to which technology should be put, and political organizations, both national and international, have entered into governance projects which recognize the worst uses of technologies and, in various forms, restrain those uses. IHL, for example, demonstrates one attempt to regulate the use of violence on the battlefield and the warrior code is a time honored attempt to reign in the worst practices which result from the unrestrained conduct of the strong over the weak.

Yet there seems to be more afoot today than merely the introduction of *the next big thing.* Human enhancement through the use of emerging military technologies like robotics has the ability to turn on their head the assumptions upon which traditional restraints are based. While there is a good deal of discussion and disagreement regarding the exact nature and consequences of these changes, there can be little doubt that they are real, and represent

[28] J.N. Mathis, *The JOE 2010, Joint Operating Environment,* (US Joint Forces Command: February 18, 2010), retrieved at www.jfcom.mil, 10/20/2010.

existential challenges to the political, economic, social, philosophical, and military restraints with which humankind has become comfortable. Perhaps, more important, as discussed above, these changes are occurring in a climate of technological uncertainty and their ramifications - unanticipated consequences-threaten the actual survival of humankind. Concerns exist regarding the enhancement of the human species to the point where it is unrecognizable. Robotists inform us that they will have the ability within the very near future to fill the battle space with autonomous robots capable of lethality; neurobiologists envision a wide array of enhancements through pharmaceuticals and prosthetics which erase the physical and mental parameters which presently define human conduct on the battlefield; and cyber technologists, with their ability to permeate and disrupt every aspect of human life, are redefining the nature of warfare. For the civilian, these technologies represent challenges to the already difficult questions regarding the meaning of life, the distribution of resources and the nature of *humanness*. Governance of these technologies in the 21st Century may well be the most important project of humankind.

For the military, the human agency most likely to project violence with the use of these technologies, the stakes are equally high. Restraint must be made within the framework of a number of conflicting tensions: the responsibility to look to the safety of soldiers, the responsibility to insure competitiveness on the battlefield, and the responsibility to insure that the military is capable of carrying out its various missions as required by the state.

There are available to the military policy-maker a number of models for the creation of restraints regarding emerging military technologies. These include military ethics, traditional IHL, and previous attempts to restrain the innovation, adaption, proliferation and use of

weapons through international treaty regimes. There is also the possibility of creating new international treaties and practices, amending old ones, and forging new ethics for the use of new weapons.

At the end of the day, however, the military discussion is a subset-albeit an extremely important subset-of the discussion which must occur at the national and international level regarding these technologies. It appears that little has been done in this regard to date. This paper argues that failure to act will not stop the use of these technologies. Rather, the use of military robotics will continue to emerge with or without restraint, their unanticipated consequences are a matter of fact. The *genie* is out of the bottle and his supervision is possible but not inevitable.