

***“New Warriors and New Weapons:  
The Ethical Ramifications of Emerging Military Technologies”***

10<sup>th</sup> Annual McCain Conference on Military Ethics and Leadership

U.S. Naval Academy

22-23 April 2010

**Executive Summary and Command Brief**

Prepared for:

Chief of Naval Operations

Commandant, U.S. Marine Corps

# **Table of Contents**

## **Executive Summary**

## **Selected List of Speakers**

### **I. Summary of Ethical Advantages**

### **II. Summary of Ethical Concerns**

- a. Unmanned Systems
- b. Soldier Enhancements
- c. Nonlethal Weapons
- d. Cyberwarfare

### **III. Strategic Leadership Recommendations**

- a. Unmanned Systems
- b. Soldier Enhancements
- c. Nonlethal Weapons
- d. Cyberwarfare

### **IV. Recommendations for Professional Military Education (PME)**

## **Executive Summary**

Ethical considerations seldom keep pace with the operational deployment of advanced technology systems. In light of this pervasive historical trend and the aggressive introduction of these technologies on today's battlefield, the Stockdale Center for Ethical Leadership at the U.S. Naval Academy devoted its FY 2010 research fellows program to the topic, "Ethics and Emerging Military Technologies." The Center's Director of Strategy & Research and its Distinguished Chair of Ethics were joined by five senior fellows, from the Australian Defence Academy as well as Rutgers, Case-Western Reserve, Cal Poly-San Luis Obispo, and Arizona State universities. Their weekly research seminars constituted the core activity of the "Consortium on Emerging Technologies, Military Operations, and National Security" (CETMONS), a multi-university effort aimed at providing strategic and operational guidance on the development, deployment, and governance of these novel military weapons and systems.

This year-long Stockdale Center research project culminated in the 2010 McCain Conference at the U.S. Naval Academy, convened to address the potential ethical issues associated with four technologies: unmanned systems, soldier enhancements, non-lethal weapons and cyberwarfare. Military and civilian educators from the nation's service academies and war colleges were joined by many of the world's leading experts in robotics, nanotechnology, cyberwar tactics, and other emerging military technologies to discuss the ethical and leadership challenges these developments portend. What follows are a list of principal speakers and a summary of key findings and recommendations for action in each of several critical areas of military technology.

## Selected List of Speakers

VADM Bernard McCullough, III

*Commander, US Fleet Cyber Command and Commander, US 10<sup>th</sup> Fleet*

MajGen James Poss

*Director, ISR Strategy, Plans, Doctrine, and Force Development, US Air Force*

MajGen Charles Dunlap

*Deputy JAG, US Air Force*

Dr. P.W. Singer

*Senior Fellow, Foreign Policy, Brookings Institution*

Dr. Ron Arkin

*Georgia Institute of Technology Regents' Professor and Director of the Mobile Robot Laboratory*

Dr. Andrew May

*Special Assistant, OSD-Net Assessment*

Dr. Martin Libicki

*Senior Management Scientist, RAND Corporation*

Douglas Jerothe

*Deputy Director, Joint Non-Lethal Weapons Directorate*

Susan Levine

*Principal Deputy Director for Policy & Strategy, Joint Non-Lethal Weapons Directorate*

Robert Bell

*Executive Director, Governmental & Industrial Strategic Alliances, iRobot*

CAPT Paul Seigrist

*Director, Unmanned Maritime Vehicles, US Navy*

David Koplou

*Georgetown Law and OSD-Policy Special Consul for Arms Control*

## **I. Summary of Ethical Advantages**

As our nation's joint military forces confront complex, volatile, and sometimes ambiguous operating environments amidst severe resource restraints, advanced technologies have the potential to enhance the efficiency and effectiveness of U.S. national security efforts. Specifically:

- Present unmanned systems reduce the risk to our warfighters by providing a sophisticated stand-off capability that supports intelligence, command and control, targeting, and weapons delivery. These systems also improve situational awareness and reduce many of the emotional hazards inherent in air and ground combat, thus decreasing the likelihood of causing civilian noncombatant casualties. Autonomous versions of these unmanned systems would sense, decide, and act more quickly than humans, bolster conventional deterrence in anti-access environments, and further reduce personnel costs.
- Soldier enhancements, through biological or technological augmentation of human capabilities, reduce warfighter risk by providing tactical advantages over the enemy.
- Non-lethal weapons offer warfighters viable options for addressing challenging scenarios in counterinsurgency and stability operations where the objective is to accomplish the mission and protect the force when lethal force is either unnecessary or even detrimental.
- Cyber weapons—with their non-kinetic standoff capabilities—have the potential to reduce harm to both civilians and U.S. forces, while accomplishing important operational aims.

## II. Summary of Ethical Concerns

### a) Unmanned Systems

- The reduced costs and reduced transparency associated with unmanned systems inadvertently lower the threshold for resorting to war, and could facilitate illegitimate operations. These technologies thus threaten to undermine compliance with the traditional “just war” requirements that war only be declared as a last resort and by the legitimate political authority.
- During counterinsurgency and stability operations (in which perceptions and relationships are crucial), local citizens may perceive these weapons as indiscriminate, indicative of cowardice, or evidence of the tepid commitments of allies. Additionally, ground robots are incapable of cultivating the personal relationships required to build trust and commitment necessary for mission success.
- For all scenarios, remotely-controlled systems expand opportunities for private military contractors to employ deadly force without adequate oversight and accountability.
- Finally, even if adequate accountability measures could be developed to deter careless or criminally negligent use of autonomous strike systems, doubts would remain about the abilities of autonomous systems, both to discern between legitimate and illegitimate targets (such as civilian bystanders, or injured or surrendering enemy combatants), and to subsequently apply the requisite legal and moral principles of military necessity and proportionality.

### b) Soldier Enhancements

- Especially when irreversible, some forms of physiological, cognitive, or psychological combat enhancements, regardless of immediate benefits, may ultimately violate the basic rights of our combat personnel by inhibiting their prospects for leading a normal life following their service.
- Altering soldiers’ levels of fear and aggression may contribute to mission failure or expose soldiers and members of society in general to increased risk of injury or death.
- Otherwise beneficial physical and mental enhancements attained artificially, through means that excessively reduce the importance of one’s efforts and/or innate capacities, may have adverse effects on individual character and ultimately undermine overall human fulfillment.
- A wider and unregulated civilian market for such technologies (“spillover” or “blowback”) would pose additional risks of widespread harm, and likely exacerbate socioeconomic inequalities.
- State regulation aimed at avoiding the risks of civilian spillover or blowback, however, threatens to introduce unprecedented governmental intervention and erosion of personal freedom.

### c) **Nonlethal Weapons**

- As with unmanned systems, reduced war costs could encourage unnecessary and inappropriate resort to war.
- Reduced lethality could embolden adversaries to initiate and continue conflict—especially if “military necessity” should come to be interpreted under international law as requiring possessors to use non-lethal before lethal weapons.
- If such weapons are proven relatively ineffective (due to range, stopping power, and countermeasure limitations), non-lethal weapons could embolden the enemy and subject our soldiers to increased risk of death or injury.
- The reputation of nonlethal weapons as “merely incapacitating” has occasionally encouraged lax and even negligent resort to (presumably nonlethal) force among domestic law enforcement personnel, and could do likewise on the part of combat troops.
- The possibility of delivering undetectable harm to prisoners could encourage the use of these weapons as inappropriate forms of punishment, or as tools for illegal interrogation.
- Finally, the use of chemically or biologically-based non-lethal weapons may violate important treaties and conventions that are otherwise essential to America’s security.

### d) **Cyberwarfare**

- Traditional means of espionage are functionally distinct from sabotage, and therefore constitute neither *casus belli* nor war crimes, while intentions alone are often the only means to distinguish cyberexploitation (the functional equivalent of espionage) from cyberattack for purposes of sabotage (the functional equivalent of war). Given the perils of discerning intentions, disputes over just cause and misperception-fueled wars are likely.
- Actual harm from cyberattack—both direct and indirect—may be continuous and costly, without rising to a level traditionally construed as a just cause for war.
- *Casus belli*-level kinetic attacks have been historically attributable to legitimate authorities (nation-state governments and their militaries), but cyberwar capabilities generate ethically-challenging scenarios, including the prospect of private actors embroiling their own state or third-party states in conflict.
- Inherent difficulties with attribution may result in mistaken retaliation against innocent parties – including those incriminated by third-party adversaries.
- Even if cyberattacks are properly attributed, the unpredictable effects of such attacks may evoke retaliations in kind that are indiscriminate or disproportionate.

### III. Strategic Leadership Recommendations

Rather than relinquishing or eschewing altogether the development and deployment of the aforementioned technologies in response to the moral challenges they present, McCain Conference participants instead recommend efforts at state regulation of the development, design, and deployment of these technologies, as follows:

#### a) Unmanned Systems

- Increased reliance on unmanned systems—both remote-controlled and autonomous—will require better informed and monitored decision-makers in order to ensure compliance with traditional “just war” requirements, such as “last resort” and “legitimate authority.”
- In counterinsurgency and stability operations, the effects of using these systems on civilian perceptions and relationships should be continuously evaluated with an eye toward necessary adjustments to footprints, public perceptions, and force mixes (such as the use of “impersonal” ground vehicles).
- Consistent with the 2009 McCain Conference recommendations on private military contractors ([http://intranet.usna.edu/Ethics/Publications/USNAMemo-McCainConfCMC\[1\].pdf](http://intranet.usna.edu/Ethics/Publications/USNAMemo-McCainConfCMC[1].pdf)), military members must maintain control of all strike systems.
- Deterring the negligent use of autonomous strike systems will require not only design features that recommend and record user actions, but also clear performance standards, unbiased testing, rigorous training, and well-crafted liability laws.
- Given the technical challenges of identifying illegitimate targets and calculating necessity and proportionality in complex and even novel environments, we recommend an incremental approach to the deployment of *autonomous* strike systems. Unarmed intelligence missions should precede strike missions, and initial strike missions should be restricted to non-lethal weapons and combatant-only areas, and include permission-seeking and override features.
- We strongly advise against incorporating “strong artificial intelligence” in such systems, which would render them capable of learning and even choosing ends, inasmuch as strong AI is highly likely to introduce unpredictability and/or mitigate human responsibility.

#### b) Soldier Enhancements

- Despite the possibility that enhancements to soldiers’ operational capabilities may prove harmful, we still would recommend permitting the prudential resort to such military technologies—within the following four constraints:
  - We recommend prohibiting the alteration of fear or aggression levels, inasmuch as these severely inhibit the exercise of individual free will, and consequently endanger missions, citizens, and the relationship between citizens and their soldiers.

- Any non-biological, implanted devices should be removed upon service completion.
- Additionally, given the uncertain effects of enhancements, unrivalled capabilities of our general-purpose forces, and unique roles of our special forces, we recommend that necessary initial uses be limited to special forces units.
- The possible effects of social spillover and civilian “blowback” will require tight governmental control and severe penalties for unauthorized production and use of combat-related enhancements.

### **c) Nonlethal Weapons**

- In order to promote strict compliance with the laws of armed conflict (LOAC), and to discern and emphasize the inevitable harms and potential lethality of using supposedly “nonlethal” weapons, we recommend improved testing procedures, and modifications to training, rules of engagement, and the UCMJ.
- As per DoD Directive 3000.3, the right to use lethal means should be maintained and declared.
- As with unmanned systems, care must be taken that the lessened threat of harm does not encourage inappropriate or unnecessary resort to war, or otherwise undermine the just-war principle of “last resort.”
- Finally, even if chemically or biologically-based non-lethal weapons are not inherently indiscriminate, disproportionate, or cruel, their use should be preceded by analysis and consultations with co-signers of applicable treaties and conventions.

### **d) Cyberwarfare**

- For the following reasons, we recommend the *defense* of military and critical civilian networks as the most ethically and operationally sound course of action.
  - The unclear intentions demarcating the line between cyberexploitation and cyberattack must be reasonably clarified before invoking self-defensive preemption—a task likely to transcend the capabilities of our intelligence organizations.
  - Defensive measures will greatly alleviate attacks on our networks that are costly but nevertheless do not constitute just cause for going to war.
  - *Casus belli*-level cyberattacks are likely to be matched with inadequate attribution capabilities.
  - While these attribution difficulties undermine deterrence through justifiable retaliation and punishment, defensive measures enable denial-based deterrence.
- Given their unpredictability and the relevance of enemy perceptions, cyberattacks should be conducted only by appropriate military and other governmental agents and should be employed cautiously (whether independently or in conjunction with traditional kinetic means).

#### **IV. Recommendations for Professional Military Education (PME)**

McCain Conference participants from the nation's service academies and war colleges pledged to:

- share course materials—including sources and syllabi—with ethics, law, and leadership colleagues
- collaborate with colleagues in engineering and technology to develop appropriate ethical modules for use in currently offered technical courses focused on military robotics, nonlethal weapons, warrior enhancement, and cyberwarfare within undergraduate and graduate engineering and computer science departments
- incorporate discussion of the latest emerging technological advances within the scope of current required core courses in ethics and military leadership, replete with case studies and concrete scenarios that distinguish competently between present fact, likely future prospects, and science fiction
- increase elective courses in non-technical PME tracks that aide non-specialists in tracing the growth and development of the latest and most provocative military technologies, developing an informed assessment of their promise and prospects, and preparing military leaders to cope with the ethical, legal, and political challenges their deployments will present.

The Stockdale Center is guiding preparations for, and will participate in, next year's International Society of Military Ethics (ISME) conference that will explore these four military technologies.