

# **Workshop on Emerging Technologies, Military Operations, and National Security**

**9 October 2009 – Day 1: Location Cleveland, OH**

**Introduction by Drs Shannon French, George Lucas and Peter French**

**Dr Brad Allenby, ASU**

Two levels: Applied (expected to provide advice on short-term issues), Long-term movement of fundamental technology (happens very quickly in this arena)

Self-deception makes us more comfortable...impact of technologies on civil society

Change from being able to afford blindness to not being able to happened in 1945 at the invention of the atomic bomb...we can destroy the world at the touch of a button now, and can no longer afford to be complacent about that technology

Desires: Create a community of experts, identify case studies for funding, and establish a consortium

Example of previous technology that changed society: Railroad

Implications of radical technological change: unpredictability of local/systemic effects, need for real-time assessment, need for plan to assure operational capability and long-term national security

Long-term cultural competition is generally dominated by societal acceptance of emerging technology

Question: How do new technologies impact the assumption of democracy? If the FBI/CIA/NSA/Blackwater/Joe Schmo can have access to cybersects that can kill very specifically and accurately, does this mean that the notion of the sovereignty of the individual will be engineered out of society?

Follow up: If public doesn't care, doesn't know or doesn't pay for the commission of wars, does this further undermine the principles of democracy?

Systemic changes can occur in small steps as players make decisions in day-to-day activities, when we often focus on the big meetings or treaties that may or may not fail that have less of an impact than the slow, steady pace of the undercurrents.

Democratizing weapons of mass destruction: bad? Negative/positives need to be considered and balanced.

**Joel Garreau, Washington Post**

"I am a civilian in every sense of the word. Not only am I not military, I am not a big nerd."

Technologies aimed inward at human enhancement instead of outward to control our environment...this is new in human history and puts us in a position to control the future of our species.

iPhone has more computing power than NORAD in 1965 when Moore penned his law...technology increases very quickly and is not a linear relationship to be used to forecast the future.

Divisions of future humans: The Enhanced (those who have access to technologies and take advantage), The Natural (those who have access to technologies and abstain) and The Rest (those who have no access and are mad about it)

Niche technologies (nanotechnology, robotics, etc) do not tend to know very much about each other and remain independent of each other.

Technodeterminism is understandable because of the prevalence of technology, but neglects to take into account the humanistic factor that may impact the way technology is developed and implemented, and this is not something that is easily quantified or predicted. Example: Flight 93...trajectory of technology changed in under an hour by the actions of a couple people.

DARPA/Duke monkey...world's first telekinetic monkey. "Belle"

### **Karl Hasslinger, CAPT (Ret), General Dynamics**

Trends in warfare: asymmetric approach to warfare in long-range missiles to overpower Aegis network China, electronic warfare on satellites, growing cost due to complexity of systems and crews, growth of risk aversion.

If satellites go down and unmanned undersea vehicles (such as towed payload modules) have pre-programmed attack options, does the unselectivity make the use of weapons on such attack missions unethical?

"Suicide gene" would be required for an unmanned, undersea vehicle in the event of tampering or capture by enemy forces.

### **Patrick Lin, PhD, CalPoly**

[http://ethics.calpoly.edu/ONR\\_report.pdf](http://ethics.calpoly.edu/ONR_report.pdf)

How to program robots with knowledge of LOAC and ROEs: top-down, bottom-up, hybrid?

### **Ron Arkin, PhD, Georgia Tech**

Assuming war continues, what is the appropriate role for autonomous lethal robotic technology?

Robots allow commanders to use fewer soldiers, increase the size of the battle area and the warfighter's reach.

Robots may be used to make more ethical decisions more faithfully than human soldiers under stress of war, and it is the job of science to design robots that can be more humane than humans in the conduct of war, thereby reducing collateral damage and non-combatant fatalities.

Robots can take more risk because they have no inherent right to self-defense, be equipped with sensors that make battlefield observations better than soldiers, are not weighed down by emotion, integrate information very quickly.

Problems: If a war crime is committed, who is responsible?

Risk-free warfare = video games

If the robots can make autonomous decisions, will they overthrow human creators?

If people are comfortable with robots covering them under fire, will this erode unit cohesion by making them trust squadmates less?

If the robot can encourage surrender by enemy combatants, what does the robot then do with the POWs?

<http://www.cc.gatech.edu/ai/robot-lab/>

### **Jason Robert, PhD, ASU**

History of implantable devices (brain-machine interfaces) that allow people to hear and see, DBS, and remote-controlled rats led people to be concerned about the possibility of remote-controlled humans and the pursuit of “cognitive enhancement”

The presences of ethics officials on defense committees who review programs is likely viewed with suspicion because the military complex will feel threatened by a naysayer from the get-go and the use of a JAG officer is not sufficient to cover ethics, only legalities.

### **Gary Marchant, PhD, JD, ASU**

DARPA projects for micro- and nano-air vehicles that can fly, provide surveillance and maneuver on a lightweight airframe have existed for about ten years (‘Splodin’ Sparrow realized and even smaller)

Israel is developing a microrobot with lethal capacity that looks like a hornet to mobilize against terrorists instead of sending a multi-million dollar plane or tank to engage the target.

Perspective seems to be that technology developed for military use is desirable but if and when it gets into civilian hands, that would be unacceptable. Where does this come from?

Environmental concerns arise from small technology; if a dog eats a bug robot, if a person swallows a microrobot, if a robot dies and decomposes and pollutes, etc; who is responsible?

### **Tony Jack, PhD, CWRU**

Behavior of the prefrontal cortex is culturally-dependent with Eastern societies being more social and Western ones being more individualistic. Ethical thought can be related to whether the outsider is viewed as an equal or if they have been dehumanized.

If robots are only ever classified as “The Other,” the goal of integrating them into warfighting is lost. Technology can be used to an advantage over the long term if we can accept that the machine is an ally.

Questions of whether a cultural ceremony like a funeral for a robot after it’s been involved in a person’s life are empirical. We have cultural ceremonies for machines like the christening of boats.

### **Joel Garreau, Washington Post**

Should we cure fear? If you do so, do you thereby also erase courage?

The concept that you can buy a bioethicist to back up any corporate opinion is one for debate, but is used as an assumption in this case.

“Use our powers for the good of all mankind...” Sweeping statements like this assume agreement on what the good of all mankind is. Starting point is too vague to be meaningful.

### **Max Mehlman, JD, CWRU (Biomedical Enhancement)**

Biomedical enhancement is becoming more ubiquitous in society in cosmetic surgery, body building, steroids, etc; public reaction to these are becoming less pointed and questions about the military using enhancement techniques to keep the soldier awake, stronger, etc. for longer.

Informed consent with soldiers?

**Tony Jack, PhD, CWRU (Cognitive Science)**

**Elizabeth Corley, PhD, ASU (Nanotechnology)**

**Patrick Lin, PhD, CalPoly (Robotics)**