Strategy Research Project

A NEW ARCHITECTURE FOR IMPROVED HUMAN BEHAVIOR IN MILITARY SIMULATIONS

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USAWC STRATEGY RESEARCH PROJECT

A NEW ARCHITECTURE FOR IMPROVED HUMAN BEHAVIOR IN MILITARY SIMULATIONS

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ABSTRACT

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Warfare has changed for the United States, and with this change has come an increased requirement for military leaders to be able to understand and win wars that are fought in the will of a population more than on the field of mounted warfare. Today's simulations and simulation training environments are insufficient to prepare these leaders for such a complex fight because they do not adequately model the human dimensions of modern warfare. It is imperative that the military improve conventional simulations to credibly model complex human behaviors. This paper investigates the current simulation training environment, and then proposes a specific architecture for improving conventional simulation environments to better reflect the complexity and rich cultural fidelity of the live operational environment. The Department of Defense can significantly enhance the portrayal of adversaries and "target populations" in its training simulations by using live human input harvested from a commercial-type online gaming environment. Increasing the quality of adversaries and simulated populations will create extremely challenging simulation training environments for military leaders and will prepare them for the difficulty of live operations.

A NEW ARCHITECTURE FOR IMPROVED HUMAN BEHAVIOR IN MILITARY SIMULATIONS

> In reviewing the whole array of factors a general must weigh before making his decision, we must remember that he can gauge the direction and value of the most important ones only by considering numerous other possibilities – some immediate, some remote. He must guess, so to speak; guess whether the first shock of battle will steel the enemy's resolve and stiffen his resistance, or whether, like a Bologna flask, it will shatter as soon as its surface is scratched; guess the extent of debilitation and paralysis that the drying up of particular sources of supply and the severing of certain lines of communication will cause in the enemy; guess whether the burning pain of the injury he has been dealt will make the enemy collapse with exhaustion or, like a wounded bull, arouse his rage; guess whether the other powers will be frightened or indignant, and whether and which political alliances will be dissolved or formed. When we realize that he must hit upon all this and much more by means of his discreet judgment, as a marksman hits a target, we must admit that such an accomplishment of the human mind is no small achievement. Thousands of wrong turns running in all directions tempt his perception; and if the range, confusion, and complexity of the issues are not enough to overwhelm him, the dangers and responsibilities may. [1]
>
> —Carl Von Clausewitz

The Need for a Change

Preparing commanders and leaders to understand, anticipate, and train for operations opposing a thinking, flexible, and committed opponent is extremely difficult. Yet, it is vitally important for the welfare of our military forces in both the current and future conflicts. Clausewitz's comments above reflect upon the difficulty that confronts our commanders as they struggle to understand (or "guess") the intentions of the enemy and how he will react to events on the battlefield. One need look no further back than 2003 to see that the generals of this era struggle to understand the enemy and his culture just as the generals of Clausewitz's time. LTG William S. Wallace, V Corps

Commander, was clearly experiencing some of these challenges when he made his oft-quoted remarks about the enemy forces V Corps faced in the opening days of Operation Iraqi Freedom.

> The enemy we're fighting is a bit different than the one we war-gamed against, because of these paramilitary forces. We knew they were here, but we did not know how they would fight. ... I'm appalled by the inhumanity of the Sadaamists -- Baath Party militia or officials -- have shown ... giving out weapons and forcing people to fight and threatening their families. It's very disturbing to understand that someone could be that brutal. [2]

American and Coalition forces were winning the tactical battles in their march toward Baghdad, but the leaders of those forces did not understand or anticipate their enemy or his actions -- in spite of a series of war games designed to give them that understanding.

The Department of Defense (DoD) has relied extensively upon modeling, simulations, and war-gaming to prepare for combat for the past thirty years. DoD models and simulations, fed by exponential hardware improvements in computing power, graphic representation, memory, and storage, have become an important component of preparation for combat from the tactical through operational levels of warfare. Six years into the struggle for a stable Iraq and Afghanistan, DoD forces rely heavily on the use of simulations to prepare for troop rotations. These simulations range from individual level weapons practice to corps level certification exercises. Yet for all of the money, time, and effort poured into simulation-based training it is not difficult to discern that these simulations provide very little benefit in preparing commanders for the degree of complexity involved in the real world of multi-factional Iraq or multi-ethnic Afghanistan. This gap in capability is recognized in the current working draft of the Army

Models and Simulations (M&S) Strategic Plan which quite clearly states the problems of our current simulations:

> Among the most urgent Army M&S capability gaps is the inability across the Army to accurately represent the current operational environment. Aspects of the current operational environment not well represented in Army M&S include rapidly developing networks (as well as potential network vulnerabilities), Battle Command systems, irregular warfare, counter-insurgency operations, dynamics of human behavior, social networks, non-lethal technologies, and other enabling capabilities. These aspects of the operational environment have rapidly become a critical component of our ability to plan and conduct successful operations and will be increasingly vital to success in the Net-centric environment of the future.[3]

Current Simulation Environments

Conventional military simulations are intended to provide a realistic approximation of military movements, maneuver, and battlefield effects. These simulations are largely based upon estimated effects of direct and indirect fires from one force upon another. Probabilities of detection, hit, and kill provide the mathematical basis for generating simulated effects of one force's fires upon another. Entity-based simulations provide a simulated environment down to the individual vehicle or platform level, while aggregate simulations provide a simulated environment whereby a single computer entity may represent the combined effects of a larger formation. Simulations for training are normally run in "real time" where events in the simulation occur at approximately the speeds they would occur in during a live event. Analytical simulations are largely run much faster than real time, giving analysts the ability to examine longer periods of combat, movement, or operations involving multiple forces over the course of hours or days. The strengths of these simulations are their ability to consider many variables very quickly and provide a credible result. Thousands of vehicles operating along

different routes, each with physical characteristics and in different locations, in the simulations are able to provide a reasonable estimate of which vehicles can “see” other vehicles, engage in firefights, and adjudicate a reasonable amount of damage to each effected vehicle. Mathematically, these simulations perform at an amazing level, limited more by hardware limits of CPU cycles, memory, and graphics than by the ability of the software to understand, categorize, and retrieve the millions of data elements required for a large simulation. Distributed simulations, taking advantage of high-speed connections, shared computing resources, and efficient methods of filtered data transmission, give trainers the ability to create virtual environments which are shared by participants around the world.

From a technical perspective, today’s simulations are truly fantastic. Their ability to model the physical aspects of warfare in a credible manner is superior now to any other time in military history. Less than three decades ago, training simulations were based upon tabletop exercises where technicians physically rolled dice to compute percentages of loss for opposing forces. Today’s simulation environments are so good at depicting warfare in its physical forms and allow such intensely realistic visual images of this warfare that it is easy to overlook the glaring weaknesses of every one of these simulation environments: they do not provide much value in modeling the human dimensions of warfare and conflict. For all of its elegant algorithms, today’s computer-based simulation training does a poor job of representing the most challenging part of the battlefield environment: human cognitive behavior. Values, motivation, ideas, relationships, trust, religion, sympathy, loyalty, culture, and identity are largely ignored in

conventional military simulations, but it is exactly those things that comprise the most challenging aspect of the current conflict.

There is a pressing need for the U.S. military to improve its ability to represent the true nature of today's complex, asymmetric battlefield during simulated training events. If military simulations are to play an effective role in training commanders for the current conflict, then it is imperative that those simulations improve their ability to model human behaviors across many cultures. The U.S. military must develop simulations that provide deploying leaders the most realistic training environment possible before they face a very real, highly motivated set of adversaries that do not fight according to the kinetic and physical symmetry of current simulations.

Asymmetric Warfare

In his foreword to the new U.S. Army and U.S. Marine Corps Counterinsurgency Field Manual, Lieutenant Colonel John Nagl aptly describes the challenges facing the United States in the current fight.

> Although there were lonely voices arguing that the Army needed to focus on counterinsurgency in the wake of the Cold War – Dan Bolger, Eliot Cohen, and Steve Metz chief among them – the sad fact is that when an insurgency began in Iraq in the summer of 2003, the Army was unprepared to fight it. The American Army of 2003 was organized, designed, trained, and equipped to defeat another conventional army; indeed, it had no peer in that arena. It was, however, unprepared for an enemy who understood that it could not hope to defeat the U.S. Army on a conventional battlefield, and who therefore chose to wage war against America from the shadows.[4]

In today's fight, U.S. soldiers face uncertain environments populated by multiple groups of tribal, religious, social, philosophical, and ethnic diversity, each with different goals, desires, and intentions. It is in this environment that they must make daily decisions, balancing the short- and long-term needs of the U.S. against the anticipated

effects of each action upon the mental state of multiple competing sources of power within the local population.

Asymmetric warfare has become a common term within the U.S. military to describe conflict outside the scope of traditional, large-scale, heavy armored combat between similarly equipped (or symmetric) forces.[5] Asymmetric warfare for the U.S. therefore describes environments where conventional military forces are opposed by a wide range of disproportionate foes applying a variety of unconventional methods to achieve their goals.

In this environment, there is no longer the symmetry of one known adversary and an uninvolved civil population. Every ethnic group, religious organization, news network, and politician has an objective which may or may not be in concert with U.S. goals. Potential adversaries range from terrorist organizations to angry civilian mobs; from politically motivated ex-patriots to profit motivated entrepreneurs; and from left-wing press to hostile religious clergy. Their methods include ambushes, terrorism, improvised explosive devices (IEDs), kidnappings, assassinations, web-publicized beheadings, crowds, demonstrations, religious upheaval, biased reporting, work stoppages, riots, bombs, ambushes, beatings, and extortion.

Winning Strategic Victories in Wars Among the People

Some of the clearest writing about modern warfare comes from British theorist General Rupert Smith, who postulates that the future of war is a war among the people, and that victory comes when we have changed the will of those people through a variety of tools (military, economic, diplomatic, legal, etc.).[6] Smith maintains that military leaders must change their way of thinking if they wish to remain relevant in the future,

as future wars will continue to be what he calls wars among the people. He is adamant that the use of military force, while quite valuable, cannot be the singular method of obtaining victory. Rather, he said, force must be used as *one* of the tools to accomplish a strategic purpose: influencing the will of the people to stop or modify those actions which we find objectionable. [7]

Dr. Michael Vlahos took the discussion of the changed nature of warfare even deeper in his excellent monographs on Iraq where he postulated that U.S. tactical success in conventional war has made that kind of war obsolete:

> No one can hope to win fighting our kind of war, so they will make war they can win. Ironically, we have destroyed the war we do best, and we will come to ponder this recognition as we struggle to adapt to and defeat the new. [8]

In order to train our leaders properly, it is important that we to build simulation environments that give leaders and commanders an understanding of the strategic objective. This is no small task, for military operations in an asymmetric or "messy" environment are characterized by largely tactical-level actions among a confusing mix of non-combatants, combatants, partial allies, enemies of the moment, and friends of the moment. The strategic objective is still to win, but, as LtGen Smith makes clear above, the means of obtaining that victory can only be reached if the commander understands that winning today's campaigns requires him to change the will of the people.

For an American, the challenge of winning the strategic victory is complicated by the competing desire for an overwhelming tactical victory followed by an immediate return to our own shores. Colin Powell stands as a good example of this dichotomy. As Chairman, Joint Chief of Staff in Operation Desert Storm he formulated the "Powell Doctrine" which required a specific objective and then overwhelming use of force to

accomplish that objective. More recently, Powell is remembered for advising President Bush before Operation Iraqi Freedom of the high cost of invading Iraq – what he referred to privately as "the Pottery Barn rule – you break it, you buy it." [9]

The Chinese theorist Sun Tzu observed that "What is essential in war is victory, not prolonged operations."[10] Later in his writings, Tzu berates those generals who would sacrifice their toops out of ignorance or anger, wasting the assets of the state. Not afraid of war, Tzu nonetheless highlights an element of contemporary American thought when he discusses methods of achieving desired results with minimal casualties. Similarly, B.H. Liddell Hart advocates an indirect approach to battle which is tied to achieving political objectives for the minimum cost. Hart decries the need for total victory and asserts "the need for a well-calculated compromise as a means to reconciliation."[11]

Challenges in Modeling

For a simulation developer, the discussion above poses some daunting challenges. How should the DoD build training environments that enable commanders and leaders to learn how to make decisions leading to long-term strategic victory? What particular combination of models and simulations can provide an accurate representation of this complex, messy, asymmetric environment among the people? The corrollary to these questions are those of credible results and response to decisions by the target training audience. How does one provide a rich suite of multiple actors with the right set of cultural identities and appropriate biases to accurately represent the effects? If we are to train military leaders and organizations how to think, we must

establish a clear linkage between those thought patterns which lead to positive results and those which are ineffective or counterproductive.

Perhaps this is the bigger challenge, not just building a complex environment, but building a complex, thinking, responsive suite of simulated adversaries and actors who each respond in ways that are similar to the real people they represent.

In order to understand this environment, we must understand the identity of our opponents and the identity of the local populace. It is not sufficient to model "an Iraqi," rather, we must be able to model the responses and attitudes of a moderate, middle-aged Iraqi Shiite whose life story has been one of survival and repression and now feels the power of a chance to rule but still the anger against those who would destroy or those who would corrupt. That man, defined by his identity, does not fit within the parameters of an agent-based model, and he cannot be effectively represented by an American role player who does not understand that identity. [12]

Human Behaviors

The difficult part of modeling asymmetric environments is that the decisions are made by humans within a different set of defining rules and guidelines than those which describe conventional military maneuvers. Rather than considering the tactical or operational benefits to be gained by moving or striking at a particular piece of ground through some form of deliberate analysis (such as an analysis of Mission, Enemy, Troops, Terrain, and Time, or METT-T),[13] actors in the messy worlds described above tend to operate by a much wider set of methods to achieve much more loosely defined objectives.

In an asymmetric environment the important modeling considerations are not the physical or kinetic factors but the human, psychological and ideological factors. The physical factors are factors like optimal attack routes, fastest movement rates, or gaps in air defense coverage. These factors are not nearly as relevant as the human questions (What are the long-term goals of the group? Does this action support that long-term goal? How does this influence public opinion?).[14] In order to build simulations or simulation environments which meet today's needs, the simulation must provide a realistic set of responses as well as give insight to the military training audience about the human factors involved in that response.

Existing Solutions, or Progress in the Wrong Direction?

There are hundreds of military simulations and simulation environments which represent some portion of the battlefield, but none of them provide the depth of credible adversary or complexity of local population similar to that encountered in Iraq or Afghanistan. The reasons for this are that most simulations were not intended to represent human cognition and the interactions of human beings but instead to represent the physical interactions of human-operated machinery. The few simulations which do attempt to model the asymmetric environment are constrained by the level of abstraction required to develop the program.

The National Simulation Center (NSC) at Fort Leavenworth, Kansas, has recognized this shortfall and begun a program to add asymmetric events to kinetic simulations.[15] The Joint Nonkinetic Effects Model (JNEM) provides training units with effects of their actions based on levels of satisfaction for population groups. As relayed by the NSC Commander, one of the most significant challenges was obtaining subject

matter expertise. JNEM is based on the opinions of subject matter experts (SMEs) "...from the ambassadorial level at the State Department and behavioral scientists. They were joined by computer scientists and engineers who transitioned their sociological expertise into simulation."[16] While this is a laudable first step at introducing the right type of effects into previously kinetic simulation environments, the very process of taking subject matter expertise from Western-educated bureaucrats and academics in order to properly encode levels of satisfaction and appropriate responses to military actions is flawed. First, this author remains unconvinced that Western-educated State Department personnel and behavioral scientists will provide nearly the "right" response when they try to describe motivation, ideals, and comfort levels of a multicultural populace or the guile and adaptability of an insurgent force in regions as complicated as Iraq, Sudan, Nigeria, Morocco, Afghanistan, Pakistan, or Somalia. Second, the fault of this approach is that even if the SMEs are able provide culturally appropriate responses or suitably crafty tactics, the feedback to the participating military training audience comes from the result of computer-based interactions developed by the simulation experts. The process of encoding SME input to mathematical or rule-based computer interactions that generate credible responses is highly subjective and a ripe target for inaccurate or predictable (or which the predictable is most grievous!) responses.

It is incredibly difficult to represent human interactions on a large scale (say, the scope of a multicultural country or region) because we do not model a sufficient level of complexity in the computers. In order to create a simulation model the unnecessary details are abstracted away, leaving only the relevant interactions. For a physical process, this works fine. We can approximate the physics of a bullets flight with a

straight line and completely ignore the effects of wind, trajectory, and rotation upon that bullet for most simulations without any appreciable cost. For human interactions, however, it is very difficult to know which details to abstract away and which ones are important. Having decided which details are important, the next challenge is to define those interactions mathematically. If a person is happy, does that equate to a 7 on a scale of 1 to 10? How about if that person finds a hundred dollar bill? Does he then become an 8 or a 9? What's the scale? These are subjective questions which seem insignificant at the individual level (what's the difference between an 8 and a 9? Not much!), but these details can lead to vastly different outcomes after multiple interactions in a computer that may be completely unwarranted. Following our example, if a group of three people each find money is their satisfaction level a 27 (9+9+9) or 729 (9*9*9)? If the latter, is this group of wealthy friends really twice as happy as three people who didn't find money (7*7*7 = 343), or just a little bit happier (7+7+7= 21)? Perhaps this is an insignificant example, but its purpose is to point out that human interactions with other humans do not mix well with the linear world of mathematical algorithms.

Within academia, there have been many attempts to tackle this difficulty. Lofti Zadeh's work on Fuzzy Logic has led to tremendous advances in control mechanisms and adapting intelligent software agents.[17] Zadeh's ideas about using variable scales to describe human ideas and words (such as "warm") are helpful within discrete domains (for example in regulating the temperature of a room), but have not demonstrated an ability to adequately capture human interactions at a deep or complex level.

Scholars at the University of Purdue have taken a variation of this fuzzy logic and a massive application of agent-based modeling of complex adaptive systems to produce

a product called the Synthetic Environment for Analysis and Simulation (SEAS).[18] In the case of SEAS, this product has been expanded to include scenarios of thousands of agents representing thousands of people and their interests. Joint Forces Command and others have invested millions of dollars into experiments using SEAS, some of which have produced worthwhile training output and demonstrated potential for use on a larger scale. The problem with SEAS is the same problem highlighted at the beginning of this discussion: it is, by nature, highly subjective at the basic level of programming and thus susceptible to skewed results. With careful attention to development, this product can produce credible output, but the output is not likely to challenge a talented military commander. Given the amount of time required to program each SEAS scenario for the level of result obtained in this authors' opinion SEAS and other rule-based systems yield precision without accuracy, and information without insight.

In both the case of JNEM and SEAS, the proponents of these products will point to their level of SME qualification as basis for the strength of the model, but this is a dangerous path to follow, for it ignores the most subjective portion of the process, incorporating the input into a programmed rule-set or algorithm to produce an output. The best SME cannot validate any model if his role is to provide input for an interaction. Rather, the only way to make sure that an SME provides true value is for the interaction to occur inside his head, and for the SME to provide the output! For example, if military A does action X, then our SMEs might appropriately state that this action will irritate populace B a little but greatly offend populace C. In a simulation such as JNEM or SEAS, however, this SME input is encoded as slightly lowered satisfaction values for populace B and greatly lowered satisfaction values for populace C. Responses are

generated by the simulation based on a set of rules that govern interactions between populace B and C, and based on a set of satisfaction thresholds for each populace. These calculations are based on the computer programmers' understanding of the relationships, and are thus ultimately limited by the subtlety of mathematical algorithm selected. At the development level, this subjective process can have the effect of producing either extreme swings in output (unwarranted by actual events) or, more likely, of a dampened set of outputs that follow predictable rules and inputs. This is a natural tendency among simulation developers to dampen the outputs so as to create a bell curve set of responses. The result of this process is that even the most elegant coding, based on perhaps the most brilliant SME input, can still produce simulation output that is unrealistic or that is too predictable to be much of a challenge to the military training audience.

The art of producing credible opposition has stymied the science of computer-based simulations due to imperfect understanding of how humans think, decide, and interact. In spite of the many advances in artificial intelligence (AI), fuzzy logic, and complex adaptive systems described above, the Army G3's bleak assessment of the state of M&S[19] still rings true. While understanding the reasons for this lack of progress may be enlightening, it ultimately doesn't solve the problem of developing truly challenging adversaries and multicultural populations to enhance military training events. For this, the solutions will require a different architecture.

The inventor of the Palm Pilot®, Mr. Jeff Hawkins, has written an excellent book which describes some of the difficulties that have hampered the ability of computer scientists to produce truly intelligent machines which function as well as human beings.

> AI scientists tried to program computers to act like humans without first answering what intelligence is and what it means to understand. They left out the most important part of building intelligent machines, the intelligence! “Real intelligence” makes the point that before we attempt to build intelligent machines, we have to first understand how the brain works....the biggest mistake is the belief that intelligence is defined by intelligent behavior....The brain uses vast amounts of memory to create a model of the world. Everything you know and have learned is stored in this model. The brain uses this memory-based model to make continuous prediction of future events. It is the ability to make predictions about the future that is the crux of intelligence.[20]

As Hawkins described, many AI scientists have attempted to create artificially intelligent simulations objects using either a series of rule-based algorithms and learning systems (classic artificial intelligence methods) or a complex, belief-desire-intention environment consisting of multiple software “agents” which each have an amount of local knowledge, goals, and desires and the freedom to operate within the environment to create the appearance of a complex, self-organizing system or group. These two simulation methods have each proven successful within limited and constrained environments, but neither has demonstrated the sophistication to respond blow-for-blow in a believable manner on a complex, asynchronous battlefield.

The sad truth is that while the display booths at a military simulations conference will look so real one can imagine “being there,” our current models and simulations are inadequate for the current set of problems. We simply cannot provide a rich, complex training environment such as those that our soldiers face in Iraq and Afghanistan without humans to do the thinking. Our computers are wonderful at doing the math required to calculate movements, fires, and kinetic events, but we need humans to do the real thinking.

The Opposing Force (OPFOR)

So where does this leave us? Must every training event be supported by a small army of human role-players schooled in the nuances of multi-cultural identities? Are we forever consigned to a future of parallel simulation environments which use computer generated forces to create digital images while a cadre of OPFOR provides the thinking enemy? When we consider that LTG Wallace prepared for Operation Iraqi Freedom in just that type of environment it becomes obvious that just having human beings in the simulation environment is not sufficient. The U.S. Army's Battle Command Training Program (BCTP) employs a full time team of mainly retires U.S. officers to staff its self-proclaimed World Class Opposing Force (WCOPFOR). These individuals have been maneuvering "Red" forces in simulations since the Cold War, and are experts at fighting a simulation according to Soviet-style doctrine. In a paper he co-authored in 2004, LTG William Wallace stated that the OPFOR was "a freethinking, capabilities-based opposing force (OPFOR) that is quite different from a predictable Cold War training threat." [21] This statement may well be true, but while the OPFOR doctrine has changed, the actual people have not. Retired U.S. military personnel will have a difficult time thinking and responding like Kurdish tribal leaders because they do not understand the culture, identity, and goals of the Kurdish people beyond an academic level of sophistication, if at all.[22] We cannot expect Americans to respond like anything but what they are: Americans. For many years, installation simulations centers have been able to hire retired military officers and noncommissioned officers to portray the enemy during training exercises because the enemy was a predictable force operating by predictable rules. Given the luxury of an OPFOR doctrine religiously scripted to look like a Soviet-style force, the American OPFOR contractors provided exactly the input that military

commanders expected with correspondingly predictable results. As discussed above, the enemy is complex now, and the environment is even more complex. Winning is no longer defined by destroying numbers of T-80 tanks, and American OPFOR contractors can no longer follow a set of rules and timing in order to accurately portray the threat. Simply having humans “play” the OPFOR and generate responses isn’t enough. The “real” OPFOR, and more importantly, the target population (whose will we have to influence), have to be portrayed by the “right” humans -- people with the understanding and sophistication to respond with the depth of complexity that will confront the military forces in the real world.

Before proceeding to discuss some possible solutions, it is appropriate here to recognize that not all Americans, retired military or not, are the “wrong” people to portray opposing forces and local populations in ways which will stress the ability of current commanders and staffs to function effectively in a simulation environment. Perhaps one of the most famous examples is that of LtGen (Retired) Paul Van Riper, the OPFOR Commander for Joint Forces Command’s futuristic simulation Millennium Challenge ’02 (MC02). LtGen Van Riper pushed against conventional wisdom and restrictions throughout MC02, launching small boats with high explosives to sink the U.S. Navy fleet, using motorcycle couriers for communications, and largely frustrating the efforts of the blue force commanders before being reined in by his active duty employers.[23] LtGen Van Riper’s subsequent resignation from the exercise and leaked private email explaining his desire not to be associated with the results of an exercise where his initiative was constrained were widely reported in the press, much to the chagrin of the active duty leadership responsible for the exercise.

This is not to suggest that unconventional military thinkers cannot provide a robust adversary for a simulation environment. While it was probably no surprise to LtGen Van Riper to hear that Iraqi forces were using motorcycle couriers to avoid U.S. intelligence capabilities in the early days of Operation Iraqi Freedom (OIF), there were certainly other OPFOR commanders who accurately portrayed elements of the events that occurred in Iraq during the war games which preceded the invasion. The point of this paper is to suggest that simulations themselves can be improved to provide a better representation of the same "out of the box" military thinking that LtGen Van Riper displayed while at the same time providing culturally sophisticated and relevant information and responses to a wide variety of inputs.

The following paragraphs will discuss some alternative methods of obtaining the required complexity, depth, and cultural intelligence in DoD simulation environments. This method will allow the DoD to model complex human interactions at low cost without the limitations of artificial intelligence or complex multi-agent systems.

Potential Help from Commercial Gaming Sector

Online interaction, collaboration, and gaming are some of the fastest growing sectors of the internet in terms of gross revenue and number of participants worldwide.[24] Online environments, blogs, billboards, and live chat services such as Second Life®, AOL's Instant Messenger®, Skype®, Windows Live Messenger®, Facebook®, MySpace®, Orkut®, and Google Chat® are just a few of the more prevalent software services bringing together millions of people live and online for purposes ranging from simple phone calls to instant teenage communication to exotic fantasy and role-playing games. Similarly, Massive Multiplayer Online Role Playing

Games (MMORPG) engage millions of game players in near-real-time computing environments. Games such as World of Warcraft® attract players to participate in live online collaborative environments where participants have roles, specific functions, and specific skills which are employed for the good of the group (or Guild).

Recognizing the potential power of the online gaming and online human intellect, some researchers have had success building games for serious purposes. Professor Luis von Ahn, a recent PhD in the Computer Science department of Carnegie Mellon, developed a fascinating game which pairs two anonymous partners in an online game to provide tags to pictures throughout the internet.[25] Players earn points for agreeing on words to describe a picture without using a certain set of prohibited words. As players remain online they score more points and the high scores are posted on the game site. This simple game provides thousands of appropriately tagged and named pictures for use by text readers and other blind or limited-access computer users. Similar efforts by Professor Ahn are also ongoing to use the power of humans (and a shared language) to describe the relationships of objects within a picture.

Jeff Orkin at the Massachusetts Institute of Technology (MIT) has built a similar game (though considerably less well traveled) called The Restaurant Game to examine the interactions among human beings played in the game by rough three dimensional virtual people, or avatars.[26] In each case, the judgments of the computerized forces in the games are made by humans. These judgments are stored and recorded for future use in providing human-level responses without live humans.

The common theme in both Dr. Ahn's and Mr. Orkin's work is that both rely upon the human to do the computing and the computer to do the recording. This approach

takes advantage of the strengths of each system (human and computer) in a complementary manner to improve the ultimate capability of an extremely data-rich computer which is able to provide human-like responses based completely upon a simple search of a vast database for the best answer. This approach can be of extreme value to the U.S. military if DoD is willing to take the steps to develop the environments which will produce the data.

Real World, Real Game

The solution to the U.S. military gap in developing simulations with the depth, fidelity, and credible teaching capability as the real world is to stop trying to develop a computer solution but to use a human solution. Rather than continue to pursue limited solutions due to limited programming capability (or time), the Department of Defense should create a method of presenting live humans with proposed military actions and allow those live humans to develop unscripted responses and counterstrategies to the military actions or policies. These humans should resemble the target population in as many ways as possible (culturally, religiously, generationally, etc...), and be given wide latitude to think and act. This process should be repeated thousands of times for each military action or policy, and the responses of the live humans should be used to produce responses and actions that affect the military training audience. Military leaders will have the realistic challenge of attempting to influence the will of a several thousand person representative populace. At the same time, the adversary force will have the benefit of selecting from thousands of possible actions or strategies. Finally, not only will this opposing force be live and thinking, but they will be viewing the situation through

the lenses of the same cultural identity and demographics as the operational population so their responses will provide educational value as well as training realism.

The method for presenting live humans with military actions is to develop an online, unclassified game specifically for the purpose of collecting this data. Player input will be captured, stored, and catalogued in great detail throughout the game session to inform a culturally sensitive and intellectually rigorous set of responses to categorically described inputs. Figure 1 is a diagram which clarifies the relationship between the military training audience (who provides the proposed military actions) and the civilian game players (who provide the responses).

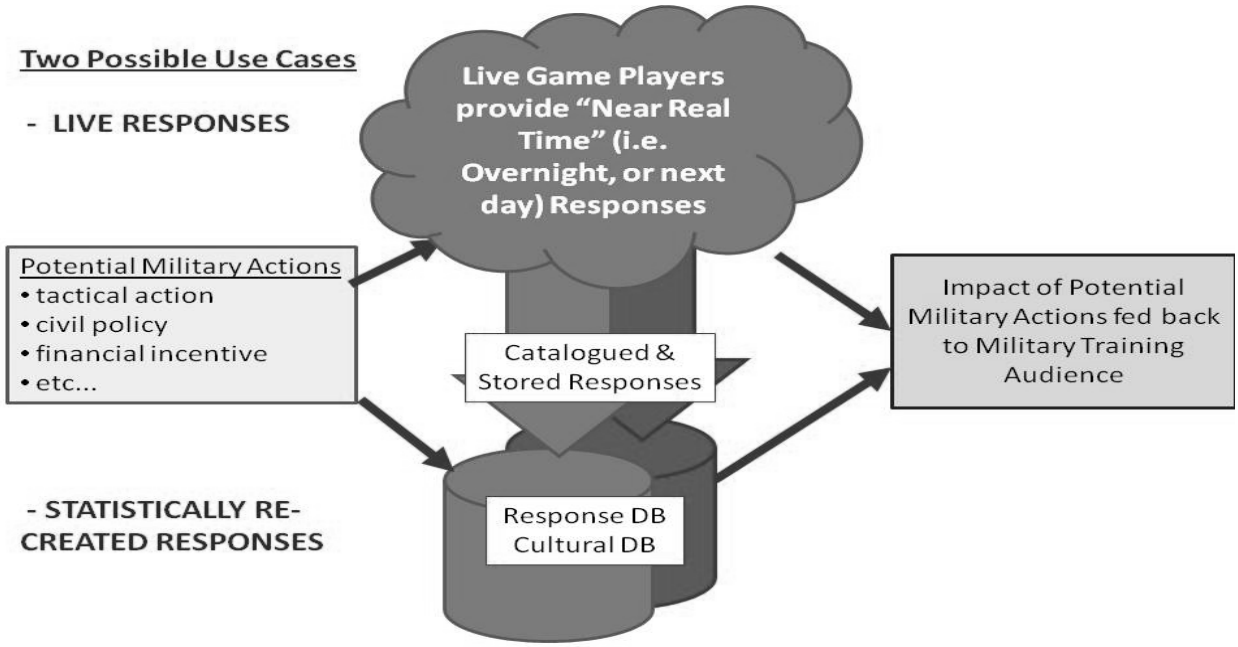

Figure 1. Game Architecture and Two Possible Use Cases

The essence of this proposal is to build an online game for humans of every race, religion, culture, and age to play which stimulates and provokes them to respond to a wide variety of potential actions. Their responses are then stored and form the basis for both an immediate response to a proposed action and, more importantly, for a robust,

type-specified database of “consistent” actions for specific groups, individuals, and situations. All current, ongoing, potential, and future decisions, policies, and activities in a region will be thrown into the paths of the game players in order to measure their responses and to categorize them by the things that remain relatively static: the players’ identity, culture, organizational goals, and relationships.

After obtaining tens of thousands of responses, the online portion of the game will yield a treasure trove of valuable data from which to build understanding within the military and within the modeling and simulation community of how humans think, make decisions, and are driven by events in their worlds; categorized by a wide variety of cultural identifiers. Unlocking the secrets of this database will be an incredible challenge, but the potential to gain truly deep, core-level understanding of a people or an adversary or a culture is enticing. At face value, the military will have the ability to recreate valid responses to certain events, decisions, or policies. After analysis and careful validation, however, these database entries of real human responses should yield tremendous insight into the ways that human beings interact and change. The rich depth of the database will increase cultural learning in a new way for military simulations. Rather than following the previous rubric of SME-described inputs and interactions, researchers now will be able to go straight to human generated output for thousands of situations (input) and seek out credible pathways through the known cultural and cognitive processes that comprise the interactions. Not only will the military training audience receive credible output and decisions in response to their actions, they will also gain understanding of the pathways through each cultural forest.

Some Details

Based on an immersive, three-dimensional environment (such as the America's Army game), game players will be registered by origin, age, beliefs, and identity before "graduating" to the interactive portion of the game. Game players, as described in this section of the paper, are not the primary military training audience, but civilian participants willing to play online for the joy of playing. Just as America's Army® and other online communities develop huge followings of players who devote hours of time for no ulterior benefit other than having fun, this game will be able to attract a wide range of participants without cost simply by offering the game online and free of charge. Players will identify goals, loyalty to organizations, and depth of identification through a series of intensity meters which they are able to exercise direct (but limited) control as well as indirect control based on their responses and actions for selected cues.

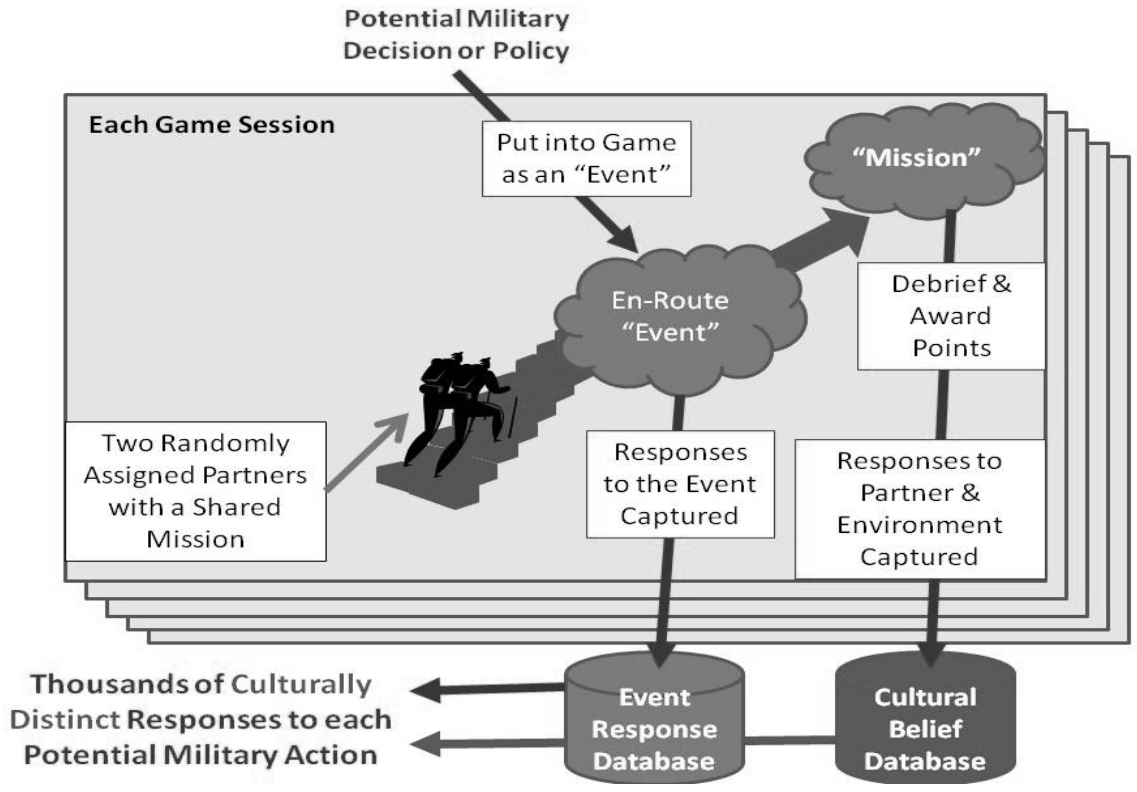

Figure 2. Game Mechanics

As depicted in Figure 2, during the interactive portion of the game, players are paired randomly with partners and given an objective to accomplish jointly. Each two-person team operates independently of all other teams. Although other teams are visible, there is a specific mission for each two-person team. The game players will take actions that modify their health, identification, loyalty, status within the organization, wealth, and status as they interact with each other, interact with their environment, and accomplish objectives.

En route to every objective, the team will encounter at least one event which is directly tied to a potential decision or action by the ultimate training audience, U.S. military commanders. Player responses will be categorized for all media. For example, a player may be walking down the street with his partner when his partner is stopped and searched. During the search, the partner may be placed in the prone position and handcuffed for a brief time. As this occurs in the game, the game player's alter ego is still able to communicate with his partner by talking, typing, or gesturing. All of these communications are recorded and are linked to the event, the players' next set of actions, and the relationship with his partner. Linking actions and responses for the remainder of this session will provide a path down which one could send a simulation signal in the future after a similar set of circumstances and a roll of the dice.

After reaching the objective together, the team has an opportunity to debrief, after which they are disconnected and repaired with another partner for the next phase of the game. During the debrief portion of the game, players will have the ability to do some re-fit activities to become "fully ready" for the next mission. It is during this portion of the

game that players will reveal their thoughts about their partner, their organization, and their goals, both immediate and long term.

The beauty of this approach is that one need not be heavy-handed to capture truly rich data. For example, suppose after each session that the game offers a player the ability to adjust his self-described level of confidence in the honesty of his partner and of a number of different groups such as Shiite, Sunni, Kurd, PKK, Turk, Syrian, Iraqi, American, Muslim, Christian, Mullah, Imam, Soldier, Man, Woman, and Politician. Suppose that after this session, one where he only interacted with his partner, that the player changes his confidence level for Kurds to zero. If he makes no other changes on this screen before proceeding then we know at least two things about this player (and perhaps something about his partner). First, we know that the player no longer trusted his partner by the end of the recent mission. Secondly, and perhaps more importantly, we know that our player chose to identify his partner by tribal affiliation rather than by religion, nationality, or sex. This simplistic example is intended to give the reader an understanding of how much we can learn from a cooperative player by stimulating him, allowing the freedom to engage, and then having the means to record the engagement. At every stage of the game it will be important to include the live, unscripted events and responses just as much as the recognizable game events. Ideally, the game could capture the text chat and live audio throughout the game, but especially in the time immediately before and after a stimulus event. Capturing this data is much more important than capturing the specific physical response of a player body inside the simulation.

Some player “missions” will be combat, some will be intelligence collection, and some will be “clandestine” missions which will not be evident to an observer that the team is even engaged in a mission. In order to create the sense of community it is important that players be able to see and be seen in a large public setting such as a town or village. Harkening back to the strategic purpose of this game (teaching military officers how to think about what is required to win a war among the people and how to influence their will to change), it is important for the game environment not to resemble the vacant streets or sparsely populated areas of some virtual simulations. This game must be among the people, rich with the effect of thousands upon thousands of unscripted actors seeking to accomplish unrelated missions. The majority of these missions will be very simple: for example, go to the store and buy bread. The event along the way to the store may trigger some intense reactions (such as my previous example of the handcuffs) or it may not invoke so much as a passing glance (the bells of a different religion sounding at the wrong time, for example).

From a computer science perspective, one of the elegant features of the game is that each mission will provide a detailed source of data without requiring excessive computational power because the recorded actions are only those of each player as he traverses the world. This data is locally stored for transfer during the debrief, or the points-calculation phase, and thus bandwidth and computation power are dedicated to presenting an appropriately detailed world view. Each player has the ability to interact with any other within his personal area. Just as I could talk to a passerby on a New York sidewalk coming toward me but only watch a pedestrian on the other side of the street, so too will players have a scaled ability to interact and to observe based on rough rules

of physics to be represented in the game. This rough area of interest management will conserve CPU cycles and keep the game progressing in real time for all players.

The game should be developed and used throughout the world in order to develop a rich mixture of culturally diverse game players. Initial implementation could start with contract SMEs or perhaps target country expatriates, but in order to achieve the maximum benefit the military should allow for unrestricted access worldwide. The target player audience is an online force of players who are experts at thinking like themselves -- regional experts by birth and experience rather than by study and contract.

Advantages and Disadvantages

The advantage of this architecture proposal is that it provides the military with a sufficiently complex and demanding training environment that will result in rapid growth in understanding and sophistication of its leaders. This capability puts the onus for learning and understanding squarely upon the training audience instead of the training vehicle. The entire focus of commander and staff training will shift from results to learning, from forces destroyed to knowledge gained. Depth of understanding about cultural issues and methods of influencing humans on both personal and institutional levels will expand tremendously throughout DoD and its interagency and coalition partners. The live portion of the game will serve as a nimble foe during specific exercises, changing the way commanders and staffs approach training forever. The archived database of human responses will serve to inform simulation development, training fidelity, and cultural appreciation for years. This proposal, if widely implemented, could change how the Army trains for the next century.

Some obstacles to implementing this architecture are its cost, willingness of military leaders to accept change, and the risk to strategic communication. As far as cost, it is reasonable to assume that the online game portion of this architecture would ultimately cost approximately the same as the development of America's Army® (AA), in the tens of millions of dollars.[27] While hardly an insignificant amount of money, this cost is a tenth of the cost for developing conventional simulations. Based on the development cost and timelines of AA, an estimate for the initial level capability for this game is that it could be produced within one to two years for approximately ten million dollars. It is also reasonable to expect that if the online portion of this architecture becomes a successful game environment being played around the world, then just like the America's Army game, it would also require additional funding to meet the expanded requirements that come with success.

The second disadvantage is the unwillingness of some senior leaders to accept change. This is significant because the changes resulting from implementing this type of training environment are very likely to result in some commanders and their staffs experiencing great difficulty achieving satisfactory results during a training exercise. As mentioned earlier, the objective is to achieve higher level learning and understanding rather than superior results. Some senior officers may not appreciate the important difference. Just as LtGen Van Riper was asked to rein in his actions during MC '02, so too could the results of this environment cause military commanders to demand a return to a more predictable training environment. BG(Ret) Huba Wass de Czege touched briefly on the willingness of senior officers to accept change in his response to an online discussion about general officer leadership.

> While others have lectured on the responsibility of generals, the rank immediately below them should not be spared. If you want to block reforms, install a “council of colonels” to guard the gates of change. No one is as conservative and arrogant as a staff colonel in the comfort zone of his expertise. During my time on active duty this was the most conservative rank. Had I not gotten around older and more entrenched colonels at Ft. Leavenworth both the AirLand Battle reforms and the creation of SAMS would have been stillborn. And sometimes no one is as hesitant to speak truth to power than an O-6 commander. It's a matter of incentives and risks. The jump from O-6 to O-7 is a huge prize, the cut is so severe, and the process is shrouded in mystery.
>
> We humans are fallible. I have made my share of grave mistakes. Our saving grace is learning from them. Of one thing I'm sure, there are no grand formulas. Progress results from hard work on many fronts. And hard work is only motivated by discomfort with the status quo.[28]

Military leaders and higher level commanders must clearly describe the intentional discomfort that this type of training environment will produce. Understanding the purposeful nature of the discomfort will greatly reduce the natural unwillingness to change among some senior leaders. This approach to training will yield a chance for those leaders to make the “progress from hard work” that Wass de Czege describes.

Finally, the risk of this proposed architecture (specifically, the online game portion) turning into a public relations nightmare is very real unless the military is transparent in its implementation and steadfast in its determination. There is some risk of this initiative being perceived as an intrusive, “Big Brother” activity. The program developers must adopt an attitude of transparency, stating often and publicly that the goals of this game are to help military forces build better relationships with civilians, understand local customs, and provide secure, stable environments for people of all cultures. Concurrent with this attitude of transparency will certainly be a thorough legal review and set of waiver forms that participants will be required to accept before playing the game. There is certainly precedent for this in the commercial sector, but as a government game, it

will be especially important for DoD to protect itself with individual waivers for data collection and use. The stated goals of such an architecture clearly pass "The Washington Post test." [29] Those goals are: 1) developing an improved capability to train our leaders to function in complex domains, 2) educating military officers in the cultural implications of military activities, and 3) promoting better understanding of the human dimension of leadership and good governing throughout the world. These are all noble goals, and worthy of public discourse. The military need not hide the fact that it is concerned with gaining a better understanding of people from all cultures and educating its leaders. If an architecture such as the one described here is implemented, it will be important for the military to stay "on message" and remain transparent, or it risks failure for strategic communication in spite of the actual program benefits. [30]

Conclusion

Warfare in the modern age and the foreseeable future has become a complex, asymmetric struggle for the will of a populace. This type of warfare is being defined as it happens, and the leaders charged with winning the war must learn entirely new ways to defeat entirely new adversaries. Understanding joint fires or combined arms maneuver will no longer be sufficient for leaders in the modern age. In a time when the United States is engaged in a worldwide struggle to defeat a method (the Global War on Terror), it is not an exaggeration to state that we must have leaders with a mastery of human cognition and behavior, not just a mastery of physics. Tactical prowess will be insufficient for the tasks which await current and future military commanders. These commanders must understand how to win conflicts of the mind just as their predecessors had to understand how to win conflicts of the ground.

In order to prepare its leaders to succeed in this complex environment, the military must develop an improved capability to train its leaders to think and win wars. The scope of this task demands that the military greatly improve its training. Specifically, the quality and complexity of adversaries and populations in training environments must be improved to closely match the challenges of operational environments. In simulation environments, the weakest component is the simulation's ability to create worthy opponents or credible populations. Conventional simulations for military leaders must be modified to encompass modeling complex human behaviors. The specific architecture for modifying simulations discussed in this paper is not without risk, but the risk inherent in implementing this architecture pales in comparison to the alternative of failing to develop adequately complex training environments for military leaders of the future.

Whether one chooses to accept this particular new architecture or not, the challenge to provide rich, complex human behavior representation remains unanswered. America demands that we prepare her sons and daughters for the trials which await them. The problem demands a solution, and that solution demands the incorporation of rich human dimension feedback and results in military training environments. Until the U.S. military can directly tie specific actions, decisions, maneuvers, and policies to the strategic objectives of a conflict, it is not likely to succeed. If strategic success relies upon a nation's ability to influence the will of a people to modify behaviors, then developing appropriate tools to train military leaders to accomplish this objective is not a matter of convenience; it is a matter of strategic compulsion.

Endnotes

[1] Carl Von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989), 572-573.

[2] Jim Dwyer, "A Nation at War: In the Field – V Corps Commander; A Gulf Commander Sees A Longer Road," *New York Times*, 28 March 2003 [newspaper on-line]; available from http://query.nytimes.com/gst/fullpage.html?res=9C01E4D81F30F93BA15750C0A9659C8B63; Internet; accessed 20 March 2008.

[3] James D. Thurman, *Army Models and Simulations Strategic Plan, Coordinating Draft, v 2.2,* U.S. Department of the Army, Office of the Deputy Chief of Staff, G-3/5/7, 5 March 2008, 2.

[4] U.S. Department of the Army, *Field Manual 3-24: Counterinsurgency Field Manual* (Chicago: The University of Chicago Press, 2007), xii.

[5] Montgomery C. Meigs, "Unorthodox Thoughts about Asymmetric Warfare," *Parameters – U.S. Army War College Quarterly* (Summer 2003): 4-18. This is a somewhat dated comment based on the author's opinion at time of writing and sensing of current literature and public discourse among military leaders. In the past four years from 2003 to 2007, the uneasy state of combat operations in the midst of rebuilding the country of Iraq have been described as Phase 4 Operations, Asymmetric Warfare, 4th Generation Warfare, SSTR (Stability, Security, Transition, and Reconstruction) Operations, War Amongst The People, and Counterinsurgency Operations. These are not exclusive terms (e.g. one may be fighting a counterinsurgency during SSTR against an enemy employing asymmetric tactics), and no one definition is universally accepted or appropriate.

[6] Rupert Smith, *The Utility of Force* (Peng: Allen Lane, 2005), 383.

[7] Rupert Smith, "The Utility of Force: The Art of War in the Modern World," interviewed by Jeffrey D. McCausland, *Carnegie Council: the Voice for Ethics in International Policy*; available from http://www.cceia.org/resources/video/data/000026; Internet; accessed 23 March 2008.

[8] Michael Vlahos, *Culture's Mask: War & Change after Iraq* (Laurel, MD: Johns Hopkins University Applied Physics Laboratory, 2004), 12; available from http://jhuapl.edu/POW/library/culture_mask.pdf; Internet; accessed 20 March 2008.

[9] Bob Woodward, *Plan of Attack* (New York: Simon & Schuster Paperbacks, 2004), 150.

[10] Sun Tzu, *The Art of War,* trans. Samuel B. Griffith (Oxford: Oxford University Press, 1963), 76.

[11] B.H. Liddell Hart, *Strategy,* 2d ed. (London: Faber & Faber Ltd, 1967), 329.

[12] Michael Vlahos, "Fighting Identity: Why We Are Losing Our Wars," *Military Review – The Professional Journal of the U.S. Army* (November-December 2007), 2 [journal on-line]; available from http://usacac.leavenworth.army.mil/CAC/milreview/English/NovDec07/VlahosEngNovDec07.pdf; Internet; accessed 23 March 2008. My understanding of *identity* and its role in understanding our culture and the cultures around us as we wrestle with the changing nature of warfare is largely based on Dr. Vlahos' work on this subject.

[13] U.S. Department of the Army, *Infantry Rifle Platoon and Squad,* Field Manual 7-8 (Washington, D.C.: U.S. Department of the Army, 22 April 1992), chap. 5, 10.

[14] Steven Metz and Douglas V Johnson, II, "Asymmetry and U.S. Military Strategy: Definition, Background, and Strategic Concepts" (Carlisle Barracks, Pa.: U.S. Army War College, Strategic Studies Institute, January 2001), p. 5; available from http://handle.dtic.mil/100.2/ADA387381; Internet; accessed 23 March 2008.

[15] Robert Ackerman, "Iraq, Afghanistan Provide Templates for New Army Simulations," *SIGNAL Magazine Online: AFCEA's International Journal,* February 2008 [journal on-line]; available from http://www.afcea.org/signal/articles/templates/Signal_Article_Template.asp?articleid=1487&zoneid=226; Internet; accessed 28 March 2008.

[16] Ibid.

[17] John Yen and Reza Langari, *Fuzzy Logic: Intelligence, Control, and Information* (Upper Saddle River, NJ: Prentice Hall, 1999), 3-17.

[18] In 2003 the author was part of a team of researchers who received a proprietary briefing from Purdue University's lead SEAS development team as they proposed SEAS to the U.S. Army War College (USAWC). At approximately the same time, the Purdue team took the model to Joint Forces Command (JFCOM), J9 (Experimentation) which invested in SEAS development for at least one major experiment. The JFCOM public affairs description of this event is available online at http://www.mgmt.purdue.edu/centers/perc/html/Media/USJFCOM.htm. Following this exercise, the author discussed the SEAS project with three members of JFCOM, J9, and has recently reviewed a Booz Allen Hamilton briefing to the USAWC on 7 September 2007 which included SEAS as a possible candidate for inclusion into the Strategic Decision Making Exercise (SDME). The details of SEAS development are in these references, but the opinions expressed in this paper about SEAS utility for training environments are those of the author.

[19] Thurman, 2.

[20] Jeff Hawkins and Sandra Blakeslee, *On Intelligence* (New York: Times Books, 2004), 4.

[21] William S. Wallace, Timothy D. Livsey, and Richard A. Totleben, "A Joint Context for Training at the Combat Training Centers," *Military Review (*September-October 2004) [journal on-line]; available from http://usacac.leavenworth.army.mil/cac/milreview/download/English/SepOct04/wallace.pdf; Internet; accessed 23 March 2008.

[22] Based on interview and subsequent discussions between the author and Ms. Emma Sky, an Oxford-trained Arabist who served as Political Advisor in Kirkuk, Iraq from summer of 2003 through the spring of 2004. Ms. Sky spent an entire week describing the culture and background of the various ethnic groups represented in Kirkuk at the invitation of the U.S. Army War College's Strategic Experiential Education Group (SEEG) in September, 2004 while doing background research for a strategic level decision-making game. For additional information about the atmosphere in Kirkuk at this time, PBS Frontline produced a special entitled "Beyond Baghdad" which is available online at http://www.pbs.org/wgbh/pages/frontline/shows/beyond/; Internet; accessed 29 March 2008.

[23] Nicholas D Kristof, "How We Won the War*," New York Times*, 6 September 2002 [newspaper on-line]; available from http://query.nytimes.com/gst/fullpage.html?res= 9E00EED6153EF935A3575AC0A9649C8B63; Internet; accessed 20 March 2008.

[24] David Gibson, Clark Aldrich, and Marc Prensky, *Games and Simulations in Online Learning: Research and Development Frameworks* (Hershey: Information Science Publishing, 2006), 2.

[25] Luis Van Ahn, "Games with a Purpose," *Computer, 39* (June 2006): 92-94; available from http://doi.ieeecomputersociety.org/10.1109/MC.2006.196; Internet; accessed 20 March 2008.

[26] Jeff Orkin and Deb Roy, "The Restaurant Game: Learning Social Behavior and Language from Thousands of Players Online," *Journal of Game Development,* 3, no. 1 (2007) [journal on-line]; available from http://www.media.mit.edu/cogmac/publications/Orkin_JoGD07_inpress.pdf; Internet; accessed 20 March 2008.

[27] Chris Morris, "Your Tax Dollars at Play: U.S. Army Gets into the Gaming Business. You're Paying for It," *CNN Money Online,* 3 June 2002; available from http://money.cnn.com/ 2002/05/31/commentary/game_over/column_gaming/; Internet; accessed 23 March 2008.

[28] Huba Wass de Czege, "Of 'Intellectual and Moral' Failures," *Small Wars Journal,* 24 May 2007, available from http://smallwarsjournal.com/blog/2007/05/of-intellectual-and-moral-fail/; Internet; accessed 23 March 2008.

[29] The "Washington Post test" is a common term used throughout the services to help instill high ethical, moral, and prudent behavior by its leaders. The saying goes as such, "if you wouldn't want to read about it on the front page of the Washington Post, then don't (do it, say it, put it in an e-mail, tolerate it, etc....)." At the 2002 Joint Services Conference on Professional Ethics, Capt Marc Hedhal, U.S. Air Force Academy, presented an interesting paper on this phrase entitled "The Washington Post Test: Integrity's Last Stand." This paper is available from http://www.usafa.edu/isme/JSCOPE02/Hedahl02.html; Internet; accessed 31 March 2008.

[30] Lawrence Di Rita and Norton Schwartz, DoD News Briefing, 29 July 2003, available from http://www.defenselink.mil/transcripts/transcript.aspx?transcriptid=2915; Internet; accessed 22 March 2008. In July, 2003 DARPA cancelled a potentially productive counterterrorism project, FutureMAP, after considerable press coverage of the military conducting a market-based modeling approach to reduce terrorism. This well-intentioned program may have been very useful in accomplishing its objective, but failed because of the "sinister" nature of the program's implementation.