The Applications of

Military Simulations

in an Interagency Context

by James Gilmore

The use of simulation has been a long-standing tradition throughout military history. Planning every minute detail of an important operation is something that comes naturally and has subsequently been honed over the course of repeated use. Only recently has the Army's use of computer modeling and simulation started making its way out of the military complex and into the world of private industry. Technological capabilities, once only thought useful for defense purposes are now being used to streamline business best practices and improve a corporation's predictive capabilities.[1] While the use of simulation has slowly started invading the corporate world, other federal agencies are still reluctant to add gaming and modeling to their everyday practices. This reluctance is the focus of this article.

By examining research on cognitive and training implications for simulation use and the results from a series of interviews conducted with experts familiar with the Army's use of simulations, this article will discern whether this particular type of training tool can be used successfully outside the military realm.

Background and Information

Much of the literature on the use of simulations pertains to its utility in training or for technological development. The most agreed upon definition of a modern-day military simulation is a model or simulation whose operation does not involve the use of actual military forces and whose actions undertaken will affect players on the opposing side.[2] In the past, simulations have been used to make crucial decisions with minimal information.[3] Putting together various computer models and war games always seemed to make sense in the military context, as the ability to understand the enemy can make strategic planning much easier. This form of action planning has its roots, not in U. S. policy doctrine, but in ancient military tradition. Modern day simulations have evolved slowly and have changed drastically since their inception, especially with the application of recent technological innovations.

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History of Simulation

The use of simulation started around the time of the Chinese war game *Wei-Hai*, which was originally designed to help grasp the chaotic motivations that can arise during real-world battle scenarios.[4] Simple war games, such as *Wei-Hai*, continued for centuries, changing with the evolution of tactical decision making on the field of battle. While war gaming was used sparingly during the nineteenth and early twentieth centuries, its importance and utilization was accelerated drastically during the onset of the Cold War. The idea that people would start viewing conflict in a game theoretic format and would thus make choices by weighing win-loss conditions broke down preconceived notions regarding strategic planning.[5] Utilizing simulations more frequently in the military soon caused gaming language to permeate other areas of the foreign policy establishment. Soon words such as "body-count" and "war-bargaining" were routinely used to describe situations involving proxy conflicts associated with Cold War politics.[6]

During the Cold War, the efficiency associated with simulation and its particular type of environmental analysis seemed to work effectively. Many of the larger decisions could fit inside the already developed military models. Future direct conflict involving the Soviet Union—most likely involving the exchange of nuclear weapons—were theoretical and thus remained inside the realm of simulation. However, after the collapse of the Soviet Union and the rise of religious extremism, the complexities extremist groups brought to the military situation made future planning immensely difficult. Costs associated with replicating urban warfare conditions in a training scenario also made it difficult to capture the new asymmetric environment on the ground. Military simulations had to evolve, and so new methods were tried and tested in the hopes of changing training dynamics and modernizing not only the equipment being used, but the tactics as well.[7]

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Modern-day Simulation

The use of simulation, the military's conception of how to use it, and what effects it may have on those participating in it had to evolve. Analytical shortcuts, once taken as a natural result of participating in a simulation, were now being examined and intentionally replicated outside the strictures of a game. By allowing participants to role play as a combatant, now more than ever, simulations can help participants gain vital information on the opposing side in a military operation. In many cases, when tasked with playing a particular role, Soldiers have resisted the urge to break character and thus plan more appropriately for an eventual real-world situation.[8] For instance, when participants simulate an ethnic conflict, they tend to develop empathy for the various ethno-national groups in the region. Soldiers begin to think like their opponents in order to win.[9]

During the Cold War, modeling and simulation were viewed solely as tools. Today's games are designed to take advantage of "incidental" learning. This new style of gaming questions conflict mainstays, such as can a smaller army destroy a larger army, how does one guard against unintended consequences, and how many troops are sufficient to intercede between belligerent groups?[10] Simulating military processes by utilizing these modern war games forces people to apply knowledge to

existing problems in novel ways. With advances in computer modeling and the sophistication of new gaming dynamics, it is becoming increasingly difficult to give "programmed" responses to a given scenario.[11] These new competitive formats have led to better games and new innovations that could potentially be utilized to great effect outside the armed forces.

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When designing military operations abroad, the ability to understand the enemy can make planning a particular course of action much easier; there is no reason why this principle is not also important for agencies such as the Department of State (State). Making a tool available to foreign policy planners that allows them to analyze alternatives and weigh win-loss conditions could potentially simplify planning and allow for better communication across different federal agencies. These are some reasons both public and private organizations are increasingly investigating interagency simulation.

Interviews on Interagency Simulation

The U.S. Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC) provides timely analysis on operations and training to help facilitate this organization's overall mission. In addition to the numerous TRAC employees interviewed for the article, I also spoke with the Director of the Analysis Development Group, an organization that works concurrently to analyze different types of training simulations and models for operational use. Thirty percent of the organization is running

and designing new models, and the group has a variety of different warfare games and computer models that take advantage of a wide range of computing formats. TRAC's computer models focus on time and resources used in activities such as intelligence, surveillance, and reconnaissance; maneuver; fire; and irregular warfare.

TRAC's research incorporates more general, social-science based questions. Because of this broad focus, TRAC connects with a variety of different war gaming centers, such as the Center for Naval Analysis, as well as individual academics, such as Professor Philip Sabin at King's College London. Instead of developing tools for niche situations or irregular issues that might arise on the field of battle, TRAC focuses on trying to develop tools for use in broader situations and is in the process of developing new leadership models for Army operations.

The majority of the interview focused on a recently developed game that might hold promise for interagency cooperation and planning outside the defense establishment. This game was developed to foster leadership traits in participants and requires seven players to challenge their decision-making skills to be more in-line with what is required by the simulation. By playing this game, the hope is that participants will develop targeted leadership capabilities. The game is not designed for linear play; rather, each player is handed a background card and assigned a particular in-game faction to help with role-playing capability. The rules of the game are simple enough to allow participants to fully immerse themselves in the gaming environment and complex enough to lend real-world credibility to the outcome.

TRAC has run this particular tabletop game several times, and each time several participants appeared frustrated and alienated over the course of the simulation. Luckily, instead of quitting and halting the game before the end is reached, the rules allow for natural breaks in gameplay,

making these periods of agitation teachable moments for training purposes. This frustration also helps people believe in the characters they are playing, making complexity a necessity if the simulation is going to mirror real-world events. TRAC sees the game as a success, and it has even caught the interest of *Foreign Policy* magazine, which is interested in publishing an article pertaining to how "caught up" in the game participants seem to get.

After discussing their recently-created game, TRAC personnel went on to discuss the practicalities of porting this simulation to a federal agency outside the military. While the interviewees seemed to think it would be possible to do so, they were wary about cultural limitations that pervade some sections of government. For example, State tends to focus more on group dynamics rather than action planning in a complex environment. Leadership training tools would be helpful in an environment such as State; however, the current management environment tends to make simulation unpalatable.

The educational capabilities of gaming are still seen as a military phenomenon. Other sectors of government are only slowly coming around to seeing their utility. A game like the one developed by TRAC could provide valuable insights to agencies dedicated to foreign affairs and policy development. Demonstrations of the game and trial participation are needed to introduce these agencies to the idea of adopting simulation as a new tool in decisionmaking.[12]

National Simulation Center

In an interview with the Director of the U.S. Army's National Simulation Center, he spoke briefly about the organization's purposes and simulation capabilities. Currently the National Simulation Center is organized with six primary offices responsible for designing different modeling tools for training. These offices use non-systematic training devices to collect information on training to improve group dynamics and operational capabilities. The goal is to develop robust modeling and simulations requirements that allow for new and innovative training tools and devices. The Center accomplishes this primarily with simulation support to the Army's Mission Command Training Program.

Unlike the other organizations interviewed, this particular section of the Army is constantly looking toward the future of operations—particularly Army Force 2025. The National Simulation Center's focus on future capabilities emphasizes the human dimension, discovering new strategically important ways to harness tomorrow's training and technological capabilities for today. One of the main issues plaguing today's military is the operational and technological tool left over from the days of the Cold War. These "legacy tools" exist without a purpose, prompting groups like the National Simulation Center to develop new ways of divesting these outmoded forms of training and technology from the military. These cognitive questions are important to the National Simulation Center, as behavioral modeling is an important aspect of training not just inside the military, but in other endeavors as well.

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The National Simulation Center has an important place in the U.S. military and chiefly leads war simulations for most of the Army's operational needs. Developing these models for an interagency purpose is seen as a goal only achieved in the far future. The National Simulation Center sees the first step of broader

application of military simulations as the integration of joint modeling throughout the DoD. Certain constructive models can only be used in highly selective circumstances, and even after their use, the results provided can only have so much predictive power. The problem with current military simulation techniques is the aggregating of units. Soldiers and other principal actors in a simulation are homogenized for the purpose of the game, which is necessary for the strictures of the model but undercuts the validity of the results. These shortcomings make interagency application a difficult sell, as many professionals in other areas of government use these problems as justification for forgoing modeling and simulation altogether. While the limitations of modeling and gaming currently hurt its prospects for widespread federal adoption in the status quo, in the near future these problems might be eliminated.

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Currently the military is working on new forms of adaptive gaming using cloud-based computing. The decentralized aspects of cloud-based computing allow for models to be run that surpass current technological capabilities found on a single computer system. A whole world could be rendered, with multiple computers handling the texturing and players participating and changing the game mechanics from around the world. This new form of simulation could be run once and then subsequently be manipulated in a "time-step" manner. This new flexible form of simulation might make other agencies more willing to try and incorporate modeling into their decision-making and training regimen, with less skepticism of their predictive capabilities.

Unfortunately, those developing this new simulation design are not optimistic about its short-term prospects. Those at the National Simulation Center refer to this model as being "six months out," making widespread adoption of this particular simulation unlikely in the near term.[13] While the National Simulation Center might be a way out from developing a simulation that could be useful for interagency purposes, another group working with the military has developed a simulation called Athena that could potentially have organizational utility outside the Army.

Athena

While the military organizations interviewed discounted many of the simulation possibilities for interagency use, the Athena Program is a possibility for broader federal application. The Athena group, consisting of TRADOC contractors, developed a model that provides potential courses of action to address a specific, outlined, foreign-policy scenario. This group is currently using this model to address countering the Islamic State threat. While it may not have as much predictive power as other modeling frameworks, the outcomes provided by the Athena model is a level of detail not found in other simulations. This particular simulation focuses on the key areas of political, social, economic, and cultural issues. Analysts with operations research and systems analysis training run the simulation and provide background on the courses of action outlined in the model. The simulation is governed by a particular set of rules with four fundamental cornerstones—autonomy, cultural associations, safety, and relationships. The last three cornerstones provide detail as to the mood of the particular situation being modeled. This simulation is currently being used to support military commanders in the field. The end goal for Athena is to put the model on the Internet and make sure that a declassified version of it is open for editing and updating by the

public at large. The Athena group believes there are broader interagency options for the simulation and have begun discussions with State.[14]

Private Sector

Interviews with a private-sector defense contractor involved in simulations also revealed a modeling platform that can be used to run computer simulations for a variety of different agencies and private entities The modeling software distinguishes itself from other computer-based simulations by having the capability to test existing planning parameters in unique ways by running multiple models at the same time. Outside of providing an external military perspective, the primary application of the principal model pertained to interagency, commercial training activities.

The model most often used for interagency purposes focuses on increasing communication and planning capabilities for emergency management and disaster situations. By using this model, the organization will have rapid analytic capability utilizing geographic information system. While the defense contractor handles the modeling aspect of the simulation, the agency using the model must develop its own interface technology, which is fairly easy with the plug-and-play modeling platforms readily available today. By having the ability to develop its own interface technology, not only can the agency use this model for a variety of different operating platforms, but it can also merge with other simulations that share a common operating picture.

Currently the focus of modeling in the private sector pertains to mapping natural and manmade disasters. While some work is being done on modeling force-on-force situations outside of the military context, it is infrequent. Instead of focusing on simulating conflict, most private entities are working on developing new models that map future energy concerns and resource constraint problems. Resource concerns are growing in importance and unlike simulating situations, which require parameters governing people and their attached complex personalities, these models could potentially have more predictive power and be easier to design. With simulation in the private sector diversifying into numerous areas, this flexibility showcases just how important model-assisted interagency decision making and planning can be. Right now interagency simulation could be accomplished utilizing any number of methods including pre-assembled gaming toolkits or open source modeling efforts. However, as the personnel at TRAC mentioned, many are simply unwilling to adopt something new. A major concern in the private sector, which would seemingly be true inside the federal government, is the worry that someone's job will be dissolved if the simulation outcomes recommend more efficient policies or supplants a predictive position that may have existed in the organization.[15]

Conclusion and Recommendations

Utilizing simulation and gaming as a tool for operational planning and training has shown real promise inside the military and has been used to great effect for many years. Despite the benefits of simulation showcased by its use in the U.S. Army, the interagency application of these same models may be a long-term goal. Without a change in bureaucratic culture or rapid advances in technology, these models will only have limited use from an interagency standpoint. Adopting several of the approaches found in the private sector, including open source software collaboration and cloud-based computing, will help facilitate an interagency integration. However, until those tactics are used, simulation use in an interagency context will, unfortunately, always remain "six months away." ***IAJ***

NOTES

1   Telephone interview with co-founder of private defense contracting organization, June 11, 2015.

2   Philip Sabin, *Simulating War: Studying Conflict Through Simulation Games*, Continuum International Publishing Group, New York, 2012, p. xvii.

3   Anne M. Baylouny, "Seeing Other Sides: Nongame Simulations and Alternative Perspectives of Middle East Conflict," *Journal of Political Science Education*, 2009, p. 214.

4   William W. Bostock, "Using Global Simulation to Study Ethnic Conflict," *Academic Exchange Quarterly*, 2008, p. 192.

5   Baylouny, p. 214.

6   Baylouny.

7   Baylouny, p. 228.

8   Jeremy Youde, "Crushing Their Dreams? Simulations and Student Idealism," *International Studies Perspectives*, 2008, pp. 349–350.

9   Baylouny, pp. 214–215.

10   Michael Goon, "Peacekeeping the Game," *International Studies Perspectives*, 2011, p. 254.

11   Stephen M. Shellman and Kürşad Turan, "Do Simulations Enhance Student Learning? An Empirical Evaluation of an IR Simulation," *Journal of Political Science Education*, 2006, p. 21.

12   Interview with Director of the Analysis Development Group, Paul Works, and Sara Lechtenberg-Kasten, TRAC, June 11, 2015.

13   Interview with COL Craig Unrath, Director of the National Simulation Center, June 23, 2015.

14   Interview with James N Kraker, Principal Athena Analyst, and Jumanne Donahue, July 15, 2015.

15   Telephone interview with co-founder private defense contracting organization, July 1, 2015.