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Revamping Wargaming Education for the U.S. Department of Defense

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Guest Author



By Jeff Appleget, Jeff Kline, and Rob Burks

Introduction

The U.S. Department of Defense has failed to educate generations of military officers on the skills of wargaming. Wargaming creates the environment in which uniformed leaders practice decision-making against an active, thinking adversary. Wargaming is also required by the Department of Defense's planning process to create sound and executable plans, is inherent to designing new doctrine and operational concepts, and is a vital element in the cycle of research.¹

For these reasons, military leaders must have the ability to create and conduct wargames. However, the current military education process does not impart this critical knowledge.

Background

Ed McGrady, distinguished Center for Naval Analyses wargamer, opened a recent commentary on wargaming by saying, "There is a widespread misunderstanding of what wargaming is..." and we agree wholeheartedly. Too many in the Department of Defense believe wargames are computer-based combat simulations used to produce quantitative

analyses, but they are not. Wargaming is about human decision-making. Joint Publication 5-0 *Joint Operation Planning*'s wargaming definition makes this clear: "Wargames are representations of conflict or competition in a synthetic environment, in which people make decisions and respond to the consequences of those decisions" (emphasis added).

Most defense wargaming practitioners recognize three purposes for wargames: educational, experiential, and analytic. Educational and experiential wargames are focused on the player. The primary output of these types of wargames is a better educated or experienced player. For example, success might lead to an officer who now knows how a new weapon system is employed or has experienced fighting against a threat in a different region of the world. There are usually no other 'results' to demonstrate the wargame's value.

On the other hand, analytic wargames focus on producing findings and recommendations in response to a sponsor's tasking. Therefore the product of these wargames is not player-focused but sponsor-focused. Planning wargames, as outlined in Joint Publication 5-0 (Step 4: Course of Action analysis and wargaming), are specific analytic wargames with the task of analyzing courses of action, which then inform the development of a plan. Other analytic wargaming activities include developing new concepts of operations, doctrine, Tactics, Techniques, and Procedures (TTP) for emerging and future technologies, and front-end wargaming for experimentation and exercises to ensure that these expensive endeavors are properly focused and can achieve a high return on investment. We can learn much about new technologies and concepts through wargaming without burning a penny's worth of fuel.

Current Status

Department of Defense wargaming is at a crossroads. It seems self-evident that the Department of Defense should own the responsibility to improve its wargaming. While Federally Funded Research and Development Centers (FFRDCs), educational institutions, and defense contractors may have roles to play in wargame improvement, only the Department of Defense can choose to lead and embrace a comprehensive end-to-end cycle of research construct. This construct includes wargaming, computer-based combat simulations, and other quantitative and qualitative analytic techniques that, when properly leveraged, provide quality decision support to the department's leadership. It must begin by addressing the shortcomings in wargaming education.

The 2015 call to reinvigorate wargaming has inspired the reintroduction of wargaming into some service school classrooms. Hence, a portion of uniformed field grade officers have an appreciation for, and may have actually played, wargames. However, the inability of the Department of Defense's uniformed members to design and conduct their own wargames still has not been addressed in professional military education. Today, the Department of Defense relies on FFRDCs, educational institutions, and defense contractors to design and conduct wargames on their behalf. While these organizations produce useful wargames, the

sheer number of wargames that should be executed across the department cannot all be performed by these organizations—they simply do not have the capacity, nor does the department have the budget.

However, there is a far more fundamental problem on the department's reliance on these organizations. This reliance is, in effect, outsourcing the intellectual underpinnings of the nation's defense strategy, officer professional development, and the department's acquisition process.

Wargaming should become an integral part of the military officer corps' professional education. The skills required to design and conduct wargames go hand-in-hand with the skills required to plan and execute military operations.

The lack of wargaming skills and experience in our field grade and senior officers should be a warning to the department's leadership. Wargaming was once the primary venue for the exchange of ideas, debates on tactics and doctrine, the sharing of lessons learned from previous operations and experiences, and the operational and doctrinal education of junior officers.² Now it has largely disappeared from officers' professional development. The 38th Commandant of the Marine Corps' Commandant's Planning Guidance states this concern very succinctly:

"In the context of training, wargaming needs to be used more broadly to fill what is arguably our greatest deficiency in the training and education of leaders: practice in decision-making against a thinking enemy. Again, this requirement is inherent in the nature of war. In modern military organizations, it is, along with the fear of violent death, precisely the element of real war that is hardest to replicate under peacetime conditions. Wargaming historically was invented to fill this gap, and we need to make far more aggressive use of it at all levels of training and education to give leaders the necessary 'reps and sets' in realistic combat decision-making."

Phil Pournelle, Senior Operations Analyst and Game Designer at Group W, points out a 2018 National Defense Strategy Commission finding that the military struggles to "link objectives to operational concepts to capabilities to programs." Linking of objectives to operational concepts to capabilities is basic military planning. Yet our combatant commands and joint task forces struggle to conduct the planning wargames that Joint Publication 5-0 requires.

According to Joint Publication 5-0, each course of action should be wargamed against the enemy's most likely and most dangerous course of action for a given plan. Assuming a modest number of three friendly courses of action to analyze, that is a requirement for six wargames per plan. And every plan that has sat on a digital shelf for more than a year needs to be dusted off and wargamed again, as the facts and assumptions that underpinned the plan's development 12-plus months ago have undoubtedly changed, often significantly.

Unfortunately, due to time, staff capability, and capacity constraints, at best there may be one wargame conducted per combatant commander's plan: the commander's favorite Course of Action against the enemy's most likely Course of Action. Insufficient time is allotted to conduct the wargame, resulting in poor design, less thorough execution, and results that fail to illuminate the plan's operational risks or propose contingencies. This lack of time inspires the quick application of seminar games that devolve into BOGGSATS – a Bunch of Guys and Gals Sitting Around a Table.

As recent commentary from Peter Perla, author of the seminal book *The Art of Wargaming*, and Phil Pournelle³ have pointed out, wargaming should also be an integral part of analysis, experimentation, exercises, and the broader cycle of research. Far too often this is not the case. Instead, the department relies on analysis methods such as cost-benefit analysis, capabilities-based assessments, and analysis of alternatives that provide technical rationales for procurement decisions. However, in the Department of Defense, these analyses must be tempered with a thinking adversary in mind. Our potential adversaries in the future are concurrently developing new doctrine and concepts, fielding new technologies and force structures, and procuring new systems that increase our risk or limit our military options. Wargaming is necessary to gain an appreciation for our competitors' capabilities, options, and objectives.

Wargaming has always been an integral part of the Army's analysis to support their department's acquisition of new technology and weapons systems. Army analytic organizations, such as the Center for Army Analysis and the Training and Doctrine Command's Analysis Center, integrated wargaming with their computer-based combat simulations to provide comprehensive qualitative and quantitative analysis to support key acquisition programs several decades ago. Both tools are still used together, productively, today.

This approach's benefit is two-fold. First, the warfighters brought into the wargame's concepts of operations (CONOPS) that employs units equipped with new technologies provide input into the analysis process and gain a better appreciation for the quantitative analysis products that the combat simulations could provide. Second, the analysts gain a better understanding of how a new force would fight differently and use that knowledge to inform the instantiation of the schemes of maneuver required by their combat simulations, which in turn improves their quantitative analysis products. To do this properly, operations research analysts must create the wargaming environment, conduct the wargames, and determine how to best integrate the wargame's qualitative output into the computer-based combat simulations so that the study produces both qualitative and quantitative analysis.

Unfortunately, some of the department's more senior analysts that cut their analytical teeth using computer-based combat simulations believe that wargames provide little or no analytic value. This view completely misses the fact that counterinsurgency, hybrid warfare, the gray

zone of conflict, and competition short of war are not well addressed by the millions of dollars the department invests in the maintenance, staffing, and running of kinetic-focused combat simulations and the organizations that support them.

In a recent *Naval War College Review* article, Capt. Robert Rubel (ret.), professor emeritus of the U.S. Naval War College and former chair of its Wargaming Department, stated, “Two-sided gaming should be a widespread and essential part of the professional education process from pre-commissioning through senior service colleges and even flag level courses.” He went on to describe several virtues of wargaming:

- “A routine diet of two-sided gaming can generate and hone the ability to reason competitively.”
- “Making two-sided gaming the default PME vehicle will help to re-create a sandbox in which innovative reflexes can be developed.”
- “Repeated struggling in competitive situations is more likely to produce new ideas and insights, especially if such experience is widespread in the officer corps.”

Rubel also goes on to caution: “Two-sided gaming is not easy. The design of such games must take care to channel competitive instincts properly.”

In summary, the Department of Defense’s need for increased capacity to conduct quality wargaming starts by educating its officer corps on how to design, conduct, and assess analytical, educational, and experiential wargames.

The Way Ahead

We propose jumpstarting wargaming education in the Department of Defense with a two-pronged approach. First, the Department of Defense needs wargame designers at an apprentice level. Any officer who is a candidate to serve on a general or flag staff (most field grade line officers) should complete a basic analytic wargaming course to enable them to bring value to a wargaming design team. We do not advocate for a specialty track for wargamers. Instead, all military leaders should be wargamers (such as the Navy’s flag ranks at the onset of WWII). The Army and Marine Corps do a decent job of introducing their young officers to some of the building blocks of wargaming. While sand table discussions, table-top exercises, and rehearsal of concept drills incorporate several of the elements of wargaming, they are typically missing the conflict or competition that a thinking adversary produces. These events provide a wargaming-like basis from which to build. A logical place for such a course is in the command and general staff college level of Joint Professional Military Education.

Second, there needs to be an executive-level wargaming course for senior leaders. Senior officers who supervise and consume the results of wargaming today, such as primary staff officers on Combatant Command or other flag officer commanded staffs, need to understand what wargames are, how they are different from computer-based combat simulations, what

to expect from well-designed wargames, and the level of resource investment required from them and their staff to obtain quality wargaming results. They also need to realize that their younger charges must couple their wargaming education with playing and designing wargames to become proficient wargamers. They must give their subordinates enough time to game. Moreover, senior leaders should lead by example, participating in and encouraging wargaming activities in their commands.

Over time, the wargaming apprentices, through playing, designing, and conducting wargames, will mature in their wargaming skills and take on wargaming leadership roles. Note that the goal is not to identify a pipeline to create wargaming masters. Such masters are rare individuals, and some may emerge from the ranks of military wargamers produced. But, just as most officers will never achieve flag rank, most uniformed wargamers will never become wargaming masters. The FFRDCs, educational institutions, and Department of Defense contractors have wargaming masters, and their expertise will still be needed to support the department. However, many good wargames can be designed without requiring the supervision of a wargaming master.

Since 2009, the Naval Postgraduate School's Operations Research Department has offered an 11-week Wargaming Applications course to its resident students that focuses on the design, conduct, and analysis of wargames for Department of Defense, allied, and partner sponsors.⁴ The faculty designed the course recognizing that the Naval Postgraduate School's Operations Research graduates – our military's newest Operations Research analysts–needed to be able to design, conduct, and analyze a wargame. Acquiring these skills enables them to participate in, lead, and eventually supervise the end-to-end campaign analysis that incorporates wargaming, computer simulations, and other qualitative and quantitative analytic tools as future analytic assignments will require. The course organizers did not fully recognize the added benefit of this education until some of the Operations Research graduates started serving at Combatant Commands. These graduates, now staff officers, reached back to the Naval Postgraduate School to report how useful their wargaming design skills were in helping the Combatant Command staffs design and conduct useful planning wargames. They asked if the Wargaming Applications instructors could come to their location and teach a cadre of the Combatant Command personnel the same basic wargaming design skills they had internalized at the Naval Postgraduate School.

In response, NPS developed the week-long Mobile Education Team Basic Analytic Wargaming Course around the same philosophy as our resident wargaming course: learn by doing. The objectives for this course were two-fold.

First, it builds a cadre of personnel who can initiate, design, develop, conduct, and analyze a wargame. Unified Combatant Commands have leveraged this opportunity by having personnel from their operational planning teams and staff sections attend the course and work in teams to learn how to design, develop, and execute a wargame.

Second, since the sponsoring organization chooses the wargaming topic used in the course's practical exercises, the organization can have the core foundation of a wargame created and demonstrated that can then be further built out and used by the organization to meet other organizational wargaming requirements. NPS has conducted over 20 week-long Mobile Education Team Basic Analytic Wargaming Courses around the world, including five at Combatant Commands. Today, NPS conducts 6-8 Mobile Education Team events annually, and demand remains high.

The philosophy in teaching wargaming is that it requires a hands-on, learn-by-doing approach. Both the resident and Mobile Education Team courses are over 70 percent practical exercises, where the students are applying the techniques that we illustrate in the lectures. In both courses, a Department of Defense, ally, or partner sponsor provides the wargaming topic that serves as the impetus behind the practical exercises. Student groups design, conduct, and then analyze wargames for their sponsors as the course's graduation exercise. Since 2009, the Naval Postgraduate School resident student wargaming teams have conducted over 70 wargames for 35 Army, Navy, Marine Corps, Joint, International, and Industry sponsors. NPS views the wargaming course graduates as wargaming apprentices. They have enough knowledge and experience to make useful, often significant, contributions to any wargaming effort required in the department. Several recent graduates have actually led wargaming design initiatives at their respective organizations soon after graduation.

Conclusion

If the Department of Defense is serious about improving its wargaming capability, it needs to invest in its people through wargaming education. That education needs to be practical and applied at the company and field grade level, preferably as part of their Joint Professional Military Education or graduate school opportunities. If it is a priority to emphasize wargaming's role in Department of Defense decision-making, simply "doing more wargames" is insufficient. Preparing warfighters to employ wargaming to the full extent of their purposes must be a necessary element.

Colonel (Retired) Jeff Appleget, Ph.D., spent 20 of his 30 years in the U.S. Army as an Operations Research/Systems analyst where he participated in and supervised acquisition and analysis studies using wargaming and computer-based combat simulations. Since 2009, Jeff has been a Senior Lecturer in the Operations Research Department at the Naval Postgraduate School where he teaches wargaming and combat modeling courses. Jeff has mentored over 70 wargames that have been created, conducted, and analyzed by NPS resident Operations Research and Defense Analysis student teams for DoD, Defense partner and allied nation sponsors, and the defense industry. He has led 20 NPS Mobile Education Teams to teach his week-long Basic Analytic Wargaming course in DoD and around the world, to include STRATCOM, CENTCOM, AFRICOM, MARFORPAC, Marine Corps Warfighting Laboratory (two courses), NATO Special Operations Forces, the Australian Defence Force (four courses), the Canadian Air Force, the Indonesian Navy, the

Taiwan Armed Forces, and a Tri-lateral course for the Swedish, Norwegian, and Finnish Defence Research Agencies. He holds a Ph.D. in Operations Research from the Naval Postgraduate School, an M.S. in Operations Research and Statistics from Rensselaer Polytechnic Institute, and a B.S. from the United States Military Academy. His major awards include the 2016 Richard W. Hamming Faculty Award for Interdisciplinary Achievement, the 2011 Army Modeling and Simulation Team Award (Analysis), 2003 Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis, 2003 Simulation and Modeling for Acquisition, Requirements, and Training (SMART) Award, 2001 SMART Award, 1993 Instructor of the Year (At Large), Department of Mathematical Sciences, U.S. Air Force Academy, 1991 Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis, and 1990 Concepts Analysis Agency Director's Award for Excellence. Along with Dr. Rob Burks, Jeff directs the activities of the NPS Naval Warfare Studies Institute Wargaming Center.

Colonel (Retired) Robert E. Burks, Jr., Ph.D., is an Associate Professor in the Department of Defense Analysis of the Naval Postgraduate School (NPS) and with Jeff Appleget, directs the activities of the NPS Naval Warfare Studies Institute Wargaming Center. He holds a Ph.D. in Operations Research from the Air Force Institute of Technology, an M.S. in Operations Research from the Florida Institute of Technology. Rob is a retired Army Colonel with more than thirty years of military experience in leadership, advanced analytics, decision modeling, and logistics operations. He spent 17 years in the U.S. Army as an Operations Research/Systems analyst and has led multiple analytical study teams responsible for Army Transformation and organizational restructuring and design efforts using wargaming and computer-based combat simulations. Since 2015, Rob has taught multiple educational, historical, and analytical wargaming courses at NPS. He has taught the NPS week-long Basic Analytic Wargaming Course 14 times to the Department of Defense and other organizations around the world, to include CENTCOM, AFRICOM, MARFORPAC, Marine Corps Warfighting Lab (two courses), NATO Special Operations Forces, the Australian Defence Force (four courses), and the Taiwan Armed Forces.

Captain Jeffrey E. Kline (ret.) served 26 years as a naval officer, including two sea commands. Jeff is currently a Professor of Practice in the Naval Postgraduate School Operations Research department. He directs the NPS Naval Warfare Studies Institute. He teaches campaign analysis, systems analysis, and executive programs in strategic planning and risk assessment. Jeff supports applied analytical research in maritime operations and security, tactical analysis, and future force composition studies. He has served on the U.S. Chief of Naval Operations' Fleet Design Advisory Board and several Naval Study Board Committees of the National Academies. His faculty awards include the Superior Civilian Service Medal, 2019 J. Steinhardt Award for Lifetime Achievement in Military Operations Research, 2011 Institute for Operations Research and Management Science (INFORMS) Award for Teaching of OR Practice, 2009 American Institute of Aeronautics and Astronautics Homeland Security Award, 2007 Hamming Award for interdisciplinary research, 2007 Wayne E. Meyers Award for Excellence in Systems Engineering Research, and the 2005 Northrop Grumman Award for Excellence in Systems Engineering. He is a member of the Military

Operations Research Society and the Institute for Operations Research and Management Science. He earned a Bachelor of Science in Industrial Engineering from the University of Missouri, a Master of Science in Operations Research from the Naval Postgraduate School, and a Master of Science in National Security Studies from the National Defense University's National War College.

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- Featured Image: EIELSON AIR FORCE BASE, Alaska (Oct. 22, 2020) – A U.S. Army M142 High Mobility Artillery Rocket Systems (HIMARS) launches ordnance during RED FLAG-Alaska 21-1 at Fort Greely, Alaska, Oct. 22, 2020 (U.S. Air Force photo by Senior Airman Beaux Hebert)