

TRENDS IN MILITARY GAMING

Milton G. Weiner

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The RAND Corporation, Santa Monica, California

In 1961, Thomas characterized military gaming as "a vast jumble of techniques for the study of military problems." He was referring to the variety of methods being used by different organizations for different purposes. That characterization, however, is as true today as it was then. Not only is the spectrum of gaming techniques very broad, despite the increased emphasis on the use of computers, but military gaming techniques have spawned, directly or indirectly, a whole series of applications in non-military areas.

The 1950s saw the adaptation of military gaming techniques to the world of business and management; the 1960s have seen the adaptation of military gaming techniques to a host of urban problems. Games like Metro, Pollution, Neighborhood, and City I are examples of this activity. In high school and college classrooms, in psychotherapy sessions, in the training of executives, etc., adaptations of military gaming have appeared.

All of these have at least one aspect in common: they deal with confrontations between protagonists, which is one of the unique aspects of gaming. In fact it may be appropriate to call this entire class of activities "confrontation analysis," with military gaming being that branch of confrontation analysis that is concerned with military problems.

There is no simple explanation of this proliferation of gaming into the business, urban, social, and other areas. One cannot assert, as those of you who have been involved in military gaming can testify,

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that it is the result of the unqualified success that military gaming has had in providing answers to military problems. Nor can one argue that it is solely because the development of computers has made it possible to model the complexities and dynamics that are involved in military, urban, and social confrontations.

I suspect the basic reason is found at a much deeper level. As people have become aware of the areas in which confrontations occur, they have searched for techniques by which they can understand, organize, and communicate the complex relationship of these confrontations. In a sense they desire a way of modeling the confrontation, and gaming provides at least one ready means. Historically, military operations epitomized the direct confrontation of protagonists, but more recently we have become increasingly aware that confrontations in business, social planning, and many other areas are crucial phenomena in these activities. If this view is correct, it is likely that gaming will continue to expand into any field where it is recognized that confrontations between individuals, agencies, corporations, nations, etc., are occurring. Thus one can expect that some form of gaming technique will develop in such areas as law and order, race relations, and family relationships.

In fact, one can easily formulate the outlines of a game in which the main protagonists are the police and militant groups, with other participants representing the business community, or the educational system. The procedure of the game might be to identify the objectives of the various protagonists; the action options ("moves") available to each; the counteractions for each of the options; and the outcomes from various combinations of action and counteraction. Such a game might have as its primary objective the communication and understanding between the protagonists of the choices that each has available and the impact of each choice.

While some cases the purposes of this or similar types of games might be to improve communications, in others it might be training; in still others it will be to identify available options for future actions and to assess, perhaps crudely, the consequences of these specific options.

Having wandered briefly into the more general area of gaming in order to illustrate a belief that the general trend is toward more gaming in new areas where confrontations are or will be taking place, let me now return to military gaming.

The expansion in military gaming has followed the general direction indicated above. In the 1960s military gaming extended into the political-military area. Political-military exercises and crisis-management games developed. Military gaming also extended into both the lower and higher levels of warfare, as we became aware of probable confrontations in these areas. Guerrilla warfare games illustrate one extreme and Space Warfare games illustrate the other. The details of these developments are outside the scope of this presentation, and they are cited simply to indicate the trend to a wider scope of military gaming.

Despite this increased scope of military gaming, the vast majority of military games--and I have no statistical data for this assertion--still tend toward modeling the large-scale conventional combat operations of World War II and the Korean war. I draw no conclusions from this fact, but I do find it difficult to reconcile with the frequently made statement that guerrilla warfare and counter-insurgency operations are probably the primary types of military situations with which the U.S. will be faced in the coming decades.

Turning now to what may be more appropriate--and perhaps more comfortable--subject, trends in the techniques of military gaming, I think that three of them stand out. First, of course, is the increasing use of computers.

Military operations are complex and dynamic affairs. It is not surprising that the speed and capacity of computers offer military gamers a powerful tool for representing military operations. Computers provide either bookkeeping tools for military games or means for the simulations of combat operations in considerably greater detail than has been possible in the past.

A relatively complex game of 1800s, The Kriegspiel of Venturini, which required a board of 3600 squares, 60 pages of rules, and hours

to play, could probably be played in seconds on current computers. It is not uncommon for modern computer games to involve hundreds of inputs and thousands of calculations. And with the computers came techniques such as Monte Carlo and sensitivity testing, which provided gamers with increased scope in the study of military problems. More recently the use of time-sharing has provided increased flexibility to gaming. Today it is possible not only to operate on-line with the computer, but to have the game participants geographically separated. Different agencies, in different locations, can bring to a game situation their particular military, political, or technical skills. The use of time-sharing computers is likely to increase in the future and will probably generate requirements for special simulation programs, display devices, and on-line analysis techniques.

Another likely outgrowth of time-sharing and multiagency participation in gaming is a desire to standardize both the data and models which are used in gaming. In general the independent war-gaming activities of the past have developed models and data for the specific military analyses with which they were concerned. Occasional attempts have been made to develop standard computer routines or standard planning factors for military analyses, but there has been little widespread use of this material. Differences in the particular military problems that were being studied, differences in the types of computer facilities available, and other factors made standardization difficult. I would venture a prediction that time-sharing, multiagency games, and better data bases will lead to increased standardization of models and planning-factor inputs in the future.

But the increased use of computers is not an unmixed blessing. While it has given military gaming a useful tool and has forced gamers into becoming increasingly explicit about the quantitative input data and the programs which they have developed, it has also forced greater emphasis on modeling the technical aspects of warfare. Thus, the technical performance of the aircraft, the radar, the tanks, the ship, are often modeled in detail and the military operation is simulated in terms of an interplay of technical capabilities.

Warfare, however, is not solely a clash of technologies. And in our warfare models--computer or otherwise--we still face the question of how well we understand or can represent other phenomena of warfare. Of what might be called the five "Ms" of warfare--machines, munitions, motivation, morale, and miscalculation--we have been reasonably successful in representing the first two. But the remaining three--the motivations, which I take to include the situations, circumstances, and objectives of the participants (the set of conditions which we generally label as "scenario"); the morale of the participants, including not only their behavior under fire but their ability to maintain and operate the technical systems in the field; and the miscalculations, including the "fog of war" and the selection of courses of action which can be dramatic and innovative in a conflict--are aspects in which our representations are often poor or nonexistent. I cite these aspects, not because we are not all aware of them, but because I see no trends in military gaming toward devoting appreciable efforts to improving our understanding or our ability to model them. And I sense that the further we move toward the use of elegant computer programs, the more disinclined we are to try to understand these all-too-human aspects of warfare.

A second major trend in gaming is the development of what might be called "micromodels." By a micromodel I mean the detailed representation of a small portion of combat operations. I think we are all familiar with models of infantry combat, air-to-air duels, tank/antitank engagements, and close air support. In most of these models the finest level of spatial resolution is often a single individual, vehicle, or weapon, and time resolution is often in seconds or minutes. Most of these models have come into existence in recent years because of the availability of computers to handle the fine-grain structure of the military engagement. As such, they probably come closer to representing the behavioral level of military forces than any other type of game models. For that reason I believe that although micromodels are usually expensive in time and resources, they represent a trend in gaming which will continue to develop.

If this trend does develop, it will probably lead to the realization of another capability in war gaming to which some effort has been devoted, but which has never become widespread. That is the capability for true "variable resolution" in gaming, i.e., the ability to consider the combat situation at different levels through the use of a hierarchy of submodels tied together through an executive routine. The difficulties of attaining this capability, as some of you are aware, are many, but the development of micromodels has put us closer than we have been before.

Let me next touch briefly on a third trend, one with which some of you may disagree. That is the trend away from "outcome-oriented" games and toward "performance-oriented" games. One of the consequences of using the term "game" for the particular types of military analyses that we conduct is that we are all-too-frequently asked "Who won?" when describing a game. And indeed many of our results are presented in terms of the relative conditions of the protagonists at the start and at the end of the game. But more and more I find that game results do not provide conclusions as to outcome but rather, emphasize comparative performance under particular assumptions. Thus, comparisons of equipment or tactics or organizations, etc., are presented in terms of particular measures of effectiveness under specified conditions. In this way we seem to be moving more toward the use of gaming as an "experiment"--not quite in the classical sense of physics, but at least in the sense of drawing limited conclusions which appear to hold under specified conditions. As a result there seems to be less criticism of military gaming than was voiced in earlier years.

This does not mean that for many people the primary value of gaming, military or otherwise, does not still lie in its use as a training device, particularly for the game designers. It probably means that gamers have become more critical of their own efforts and less willing to interpret their results outside of the framework of assumptions and conditions that yielded those results. As such we may truly talk of military gaming as a research tool.

I am sure that many of you could add other and different trends to my list. But, in summary, I consider the main trends (and non-trends)

in military gaming to be:

1. An expanded scope in the types of military confrontations which we model.
2. An extension of our gaming techniques, primarily those involving computers, through the use of time sharing, multi-agency participation, micromodeling, etc.
3. A move in the direction of true "variable-resolution" games involving detailed submodels operated through an executive routine.
4. Increased emphasis on "performance-oriented" rather than "outcome-oriented" analyses as we use gaming more as a research tool than as a training device.
5. An increase in standardization of data inputs and simulation programs.
6. A continuing concern, but no major efforts to introduce some of the nontechnical aspects of warfare into our models.