The successful resolution of national and international crises is the most demanding and crucial test of our government's senior-level decisionmakers and their staffs. This is especially true of Defense and State Department officials.

Good crisis management, however, requires considerable skill and experience of a type and level few civilian executive appointees have prior to assuming their new duties and responsibilities. All too frequently, they acquire the relevant skills and experiences by "on-the-job-training" during an actual crisis. In view of the profound impact such crises can pose for our national well-being, if not our very survival, it would seem to be in our best national interests for senior decisionmakers and their key staff members to acquire as much crisis management skill and experience as possible by means of simulated crises in order to prepare them to handle real crises more effectively and efficiently when they occur. Senior-level military personnel are typically more fortunate in this regard, however. They have generally had some exposure to wargaming activities and crisis management seminars at one of the service war colleges or have acquired related, although typically lower level, experiences in one or more command assignments.

During periods of international crisis, neither the Defense nor State Department acts alone. Nor is the DoD role restricted solely to the international or military contingency type of crisis. It may be called upon in times of major natural disasters as well. The Defense Department normally interacts and cooperates with many other agencies of the federal government. Good communication between DoD and the many other agencies involved is basic for resolving almost all major crises. The opportunities for working together and thereby gaining crisis management skills and experience for all parties, short of an actual crisis, are quite limited however.

While national and international crisis management has much in common with management concepts and practices in general, it has its own unique perspectives, questions, requirements, experts, and advisors. Without a well-established and sufficiently large educational or training mechanism, it is virtually impossible for senior-level officials to gain the relevant experience and critical skills necessary to properly manage major crises. Inexperience, however, leads to not asking the "right questions," to making incomplete assessments, to ignoring the short-term or long-term implications

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for the United States, to poorly defined or unrealistic objectives, and to inappropriate actions. It can also cause the inexperienced crisis manager to ignore the "what if" contingencies always present in sensitive international crises. Furthermore, learning "on-the-job" during an actual crisis can be enormously costly in terms of manpower and other national resources. It can lead to terribly short-sighted solutions and disastrous actions, all of which might have been avoided if key decisionmakers and their advisors had gained sufficient experience prior to an actual crisis coming to a head.

Fortunately, a number of mechanisms and techniques do exist to provide extremely valuable training and insight to potential crisis managers. Central to the mechanisms and techniques of interest to the Defense Department are the concepts and practices known as modeling, gaming or more specifically wargaming, and simulation. The remainder of this article will be devoted to a discussion of what models, simulations, games, and wargaming are; where they originated, their uses and misuses; and their relative value and validity for crisis management training, as well as other defense activities, such as policymaking, planning, and operations. I will also discuss who currently uses these techniques in DoD and elsewhere, and for what specific purposes.

Let's start out with an explanation of what these four terms mean as they are key to achieving a better understanding of the larger context of defense analyses and decision-making. A *model* is an objective representation of some portion/aspects of the real world. It may be a representation of an object or structure, or an explanation or description of a system, a process, or a series of related events. Models provide the means for structuring and simplifying complex problems. It is thus easier to manipulate models than the real world. Models serve to accumulate and relate the knowledge we have about different aspects of reality. For example, a globe is a model of the earth; a network diagram is a model of a communications system; a set of equations may be derived to represent a sector of an economy. Some models are *iconic* and look like what they represent (e.g., a model airplane or the sand table topographical map, and equipment models used for teaching tactics); others are *analog* in nature (for example, a slide rule replaces quantities by distances proportionate to their logarithms). Finally, there are *symbolic* models which use numerals, letters, or other symbols to represent real world properties. There are two types of symbolic models. The first is the *descriptive* model in which properties are

"The main reasons for DoD war games are planning, insight, and problem identification—not predicting the outcome of major crisis or combat."

expressed in words or diagrams. A typical example is the organization chart. The second type is the *mathematical* model in which symbols represent logical or quantitative relationships between different entities. Mathematical models can be static (independent of time) or dynamic (changing with time). Math models are further subdivided into *analytic* math models for which an exact numerical solution can be determined, and *simulation* math models that may be used to converge on solutions to very complex problems involving uncertainty (probabilistic occurrence) and risk.

It should be noted that models are never intended to be anything more than useful approximations of the real world they seek to represent. Only the key or salient features are included. Nonessential features are omitted. The specific variables and details incorporated into a model are those considered necessary and feasible given the purpose for which the model has been designed. Representations of broad overall processes or major systems are usually referred to as "macro" models, while highly detailed abstractions of a single subsystem or segment of a process are called "micro" models.

In one of the oldest known war games to man, chess, the pawns (foot soldiers) and pieces (bishops, knights, and so forth) are really "models" and serve to represent each opponent's armed forces and capabilities. The chessboard is simply a highly abstracted model of the battlefield or battle area.

The term "simulation" refers to the general process by which certain real world systems, operations, or phenomena are imitated using representational devices such as models, game boards, computers, or other equipment. The focus of the term is on the process of imitating (or simulating) the reality of concern. It is not on the models or items used, nor on the "rules" which must be followed. This leads us naturally into a discussion of games, gaming, and war games. Webster's (3rd Intern. Ed.) defines a "game" as: "A physical or mental competition conducted according to rules in which the participants play in direct opposition to each other, each side striving to win and to keep the other side from doing so." "Gaming" is simply the process of playing the game itself.

Modern wargaming as we know it is the offspring of military and political science and operations research. These areas are quite broad in scope and contain issues and techniques that have been topics of intensive and expanding study for the past several years. The definition of wargaming is actually a result of an evolutionary drift of the words games, gaming, and wargaming into the military, operations research and political science vocabularies. Webster's defines "war games" in two major ways, namely: "(1) A simulated battle or campaign designed to test concepts rather than the skill of forces or fitness of troops or equipment and usually conducted in conferences by officers acting as the opposing staffs" or as "(2) A two-sided umpired training maneuver with actual elements of the armed forces participating." "Wargaming" is once again simply the process of playing (or executing) a war game to its natural conclusion.

War games can be classified in many ways. One approach is to differentiate between them on the basis of their purpose, scope, and method. Typical reasons for using war games include training and education; operations planning and evaluation; R&D planning, management, and evaluation; and force planning. The scope of such war games ranges from the standard "one-on-one" engagement to the "many-on-many"

skirmish, and from there it broadens to the battle and thence to the full blown theater and global-level conflict.

Wargaming methods or techniques vary just as a war game's purpose and scope do. The techniques used range from the familiar military field and command post exercises or maneuvers seen on TV to manual war games (such as those published by the civilian/commerical wargaming companies Avalon Hill and Simulation Publications, Inc. (SPI), to computer-assisted war games to interactive computer games and finally to the analytic or fully computerized games.

The type of technique used in wargaming directly affects operational realism and the impact of human decisionmaking on the outcome of the war game. For example, as we proceed from military exercises to the partially computer-assisted game and thence to the interactive, computer, and analytic games, we lose the kind of realistic experience so crucial in the training of tactical combat commanders. They need to experience the operational impact of their decisions. The different techniques vary greatly in their relative degree of abstraction, convenience, accessibility, and outcome reproducibility. As you might expect, wargaming becomes more abstract, convenient, accessible, and reproducible in outcome as you transit the spectrum from military exercises to manual, computer assisted, and thence to computer analytic games. This occurs because the actual set of variables which can affect the war game proper have become much more limited, and have in turn been simplified. This results in greater ease of use and reproducibility, but moves from the realism of the field towards a significantly higher degree of analysis and abstraction.

The "unit cost" of each type of war game can also vary considerably. Large-scale field exercises are typically the most costly on a one-for-one basis with other types of games. However, the actual cost to design, develop, and fully test a single computer model to play analytic games can be millions of dollars. However, once developed, subsequent computer games can be played (or run) at very little cost and in relative short time.

Each technique has its own relative strengths and weaknesses. Not all are as appropriate or useful for the same type of application. For instance, field exercises are excellent devices for training and conditioning troops; however, they are poor tools to use for force planning. The same can be said of analytic computer games. They are of little use in conditioning or training troops but can be of great assistance in answering or illuminating force planning questions and issues.

The most appropriate and valid objectives for using war games and simulations within the DoD context are to: better understand complex phenomena, identify problems, evaluate alternatives, gain new insights, and broaden one's perspectives. The least valid or appropriate objectives for using war games and simulations are to predict combat/crisis outcomes or control broad and highly complex programs.

Prediction and control are only appropriate when dealing with relatively simple or extremely well-defined activities or phenomena where uncontrolled variables exert very little or no influence upon the outcome. For example, predicting the outcome of design changes in an airfoil by means of wind tunnel trials and computer simulation is an appropriate objective.

Predicting or trying to control the outcome of something as complex and wide-ranging as "the next World War" using war games and simulations is naive and foolish. Does it make good sense under such circumstances to simulate or game strategic and theater nuclear exchanges? To simulate or game conventional warfare? The immediate and emphatic answer is yes! Yes, that is, if the objectives are the valid and appropriate ones noted above. Can anyone think of a better or more cost-effective alternative for studying nuclear and conventional conflict? I can't.

War game and simulation applications (e.g., training) were discussed earlier. Not stressed, however, were their crucial role and use in the many studies and analyses done for senior DoD decisionmakers. As long as we keep these analytic tools in their right perspective, they are extremely valuable in studies and analyses. They are, however, only one type of input and only one key factor of the many which influence the policy and decisionmaker. The senior policymaker and decisionmaker are greatly influenced by a number of other key factors.

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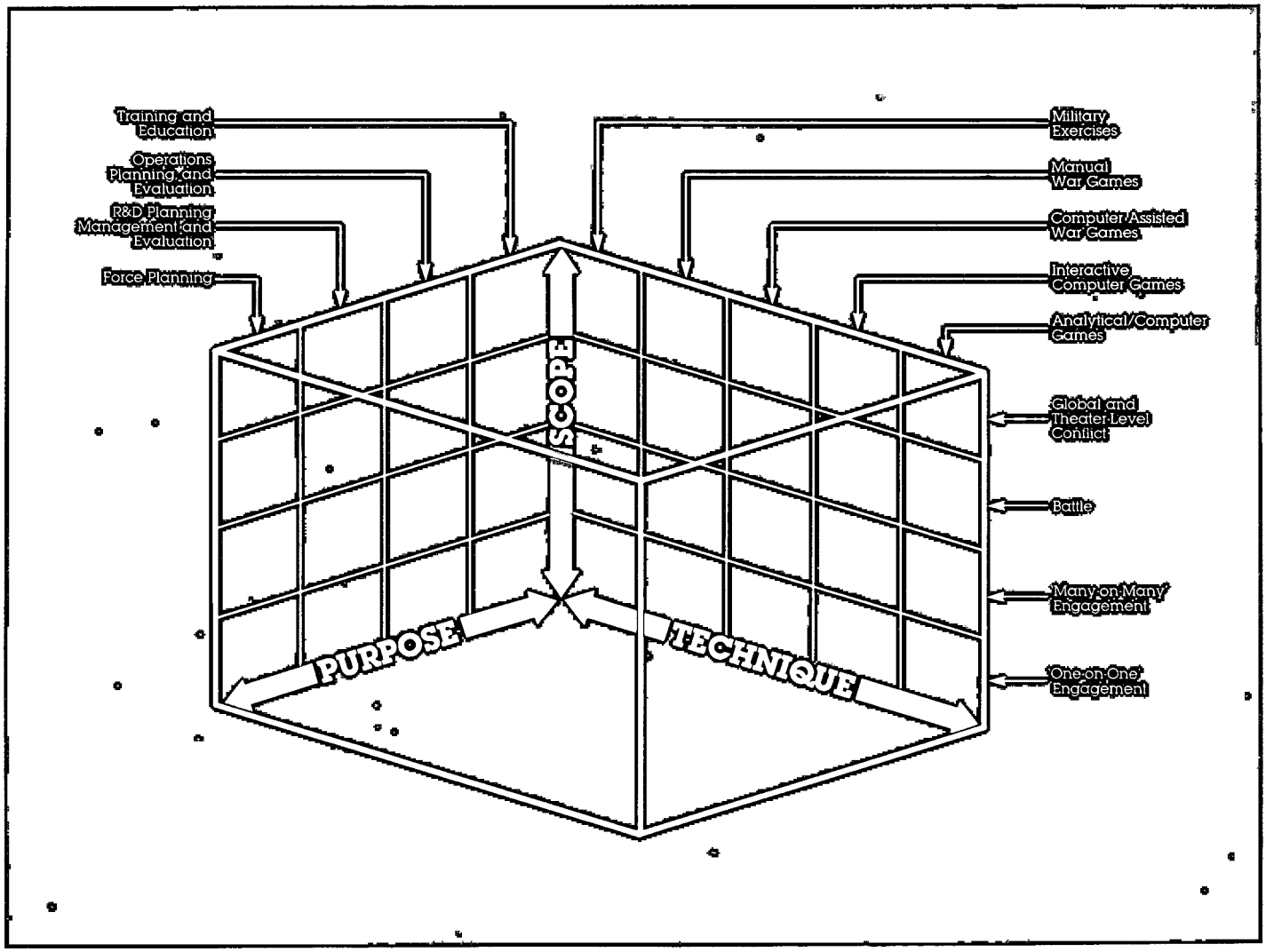
Included among these other factors are national strategies; objectives and priorities; budgetary constraints and timing considerations; current intelligence and projected trends (e.g., regarding a potential adversary's capabilities and intentions); politico-military judgment; and the individual decisionmaker's past experience, sense of history, and personal value system. If this larger context is kept in mind, the role of war games and simulations will be seen in a more realistic view.

Now a brief word about the problems and misuses of war games and simulations. The major potential problems involve people, data, variabilities, the models themselves, and "theory." The basic people problem is the fact that there is frequently a disjoint or lack of communication between the decisionmakers' and policymakers' needs and the activities of the people who design, develop, and use war games and simulations. Models and games use data just as an automobile uses gas—data makes the game or simulation go! However, the "right" data is not always available, or it's not at the proper level of detail. Worse yet, data may not be valid or reliable. It is almost always difficult (unless planned for) to maintain. Models can also cause problems. They must be appropriate for the use intended, must have inherent validity, and



This three-dimensional matrix depicts the range of DoD wargaming, with many variations in purpose, level of realism, and scope of crisis being gamed. Field exercises, for example, are good for troop training, but poor for force planning purposes. As a game becomes more abstract, there is some loss in the feeling of realism.

must be maintained to be of continuing value. Individual differences in variabilities can cause difficulties as well. Last of all, there is really no comprehensive theory of war (or combined arms combat for that matter) which is either proven or accepted by all parties; Sun Tzu, Jomini, Von Clausewitz, et al., notwithstanding.

The principal misuses or abuses of war games and simulations include the previously mentioned "prediction and control" ones. The most blatant abuse today, however, is advocacy. This involves the use of war game/simulation-backed studies and analyses to "sell" plans, programs, and budgets and usually has significant "vested-interests" at stake. They are also misused on occasion in a counter-advocacy role to purposely confuse, detract from contrary positions, or otherwise mislead the analytically unsophisticated decisionmaker.

Given the potential problems and periodic abuses cited above, several questions immediately arise. For example, do we need and should we really use and depend upon war games/simulations for any purpose within the DoD or, for that matter, anywhere else? The answer is once again an emphatic yes, assuming we keep them in context and proper perspective. For our own sake, we must become more knowledgeable and discerning users of these very useful and powerful analytic tools. We must demand they not be misused, but must simultaneously be sufficiently knowledgeable to keep the users and "misusers" honest and objective. We must assure ourselves that we have sufficient and experienced in-house reviewers and devils' advocates. In short, there is no practical, timely, cost-effective, or reasonable alternative to war games and simulations for accomplishing certain aspects of the defense business. In like fashion, there is no practical alternative to the intelligent and experienced use of such powerful and valuable tools and techniques.

"A problem with wargaming is that there is really no comprehensive, agreed-upon theory of war. Games designed to 'sell' a plan or program are an abuse of the technique."

Probably the most useful technique for training future and current-day crisis managers is the Politico-Military (PM) game or simulation routinely used by the Politico-Military Division of the Studies, Analysis, and Gaming Agency (SAGA) of the Organization of the Joint Chiefs of Staff (OJCS). Similar PM games are conducted by the CIA, the RAND Corporation, Yale University, the Massachusetts Institute of Technology, and others. In addition, the National Defense University and service war colleges normally hold at least one such game per year. The mission of SAGA's P-M Division is decidedly unique. It is to plan, prepare, and conduct politico-military simulations, under the aegis of the Chairman, JCS, on an interagency basis within the executive branch of the US government.

The typical PM simulation conducted by SAGA focuses on how to assess and then manage a major crisis. Strict non-attribution is the rule, and it generally discourages role playing, feeling it detracts from crisis resolution and the interplay between participants which should be the prime focus of the game. The crisis issue or topic to be gamed is selected from a great number suggested annually by the services, the unified and specified commands, the intelligence community, other federal agencies and departments, the Office of the Secretary of Defense, and, of course, by SAGA or other elements of the OJCS. The subjects chosen for simulation are normally very timely and of a classified or sensitive nature. Creating the game hypothetical crisis or "scenario" is a full-time and lengthy process, taking up to six months of very intense research and involving numerous discussions

Rules For the Strategist

☐ **Know what your adversary has to gain or lose in his dealings with you.**
The limits on his ability to compromise with you are determined by what he gains or loses, not on what you gain or lose. You must know as accurately as possible what he is placing at risk in his contact with you.

☐ **Keep your adversary as ignorant as possible about your specific objectives and stakes.**
Without a reference point, it's extremely difficult for him to even know if you are being unreasonable.

☐ **Know your adversary.**
In order to have a negotiating advantage, it is essential that you know as much as possible about your adversary's character, value system, attitudes, motives, and habitual behavior.

☐ **Be as arbitrary in your demands as you can, but do not arouse an emotional reaction.**
If you arouse fear, hate, or anger in your adversary, you will limit any relative advantage you might otherwise achieve by your arbitrary demands.

☐ **Do not appear to be arbitrary.**
The less arbitrary you appear to be, the more arbitrary you can in fact be.

These rules represent the essence of the art of strategic negotiation, policy formulation, and decisionmaking. If properly and prudently applied, they can lead to stability and strategic victories in the eyes of friends and foes alike. Once achieved there, it can be converted into strategic victories in terms of peace, power, and position. Conversely, if poorly or unwisely applied, these same rules can lead to international instability and extreme brinkmanship.

These rules apply equally to the strategic (and tactical) analyst and negotiator, as well as to the decisionmakers' and policymakers' supporting staffs.

with very senior government and defense officials, as well as appropriate regional, technical, and other experts. In most PM games, participants or the "players" are divided into two "National Command Authority" teams, almost always representing the United States (the blue team) and the Soviet Union (the red team), and a "control" (or black) team. Occasionally, there will be two blue teams or two red teams, or blue and green (neutral) teams. There is always a control team, however. Its function is to keep the game focused, and generally equally stressed for each side.

The use of such "teaming structures" permits a variety of potential relationships to be simulated. For example, such structuring permits adversary relationships between teams, parallel relationships, and even factionalism within a team to be studied and analyzed. The utility of such a capability is very high in studying a wide variety of international and national crises.

The typical PM game has the three "moves," or major segments, in the normal flow of events. The first move consists of the two (or more) separate teams addressing the same crisis scenario. Each team has the same basic requirements to satisfy during the course of each move. For example, it must perform an assessment of the crisis situation's impact upon its own national/vital interests, as well as determine the impact upon the interests of the other nations who are involved in the crisis. In particular, the team must look at short-term and long-term implications as well as domestic reactions. The team must also establish immediate and long-range objectives; identify the political, diplomatic, military, economic, public affairs, and other actions which must be taken to resolve (or contain) the crisis; and finally, the team must identify and

plan for the unexpected contingencies (the what ifs) that are always a part of the real world.

The second and third moves involve control team "adjustments/contingencies." During the entire PM game, the control team simultaneously monitors the flow of events, actions, etc. of all teams via closed circuit TV (CCTV) and written inputs from each team. This permits them to be an "all-knowing" controller, speeding up or slowing the game as needed, making one team's task more difficult/easier in order to balance certain initiatives, etc. The game finally concludes with individual team and total teams critique attended by all participants. Game attendees almost universally speak very highly of their gaming experience.

Perhaps before we leave the subject of PM gaming we should discuss the key reasons for such gaming. In brief, PM simulations (or games) permit the examination of hypothetical situations involving the interaction of real world factors (political, military, social, economic, cultural, religious, psychological, etc.) in order to:

☐ identify potential world trouble spots,

☐ identify major national security issues, problems, and opportunities,

☐ encourage and stimulate original and creative thinking and the exchange of ideas,

☐ develop new or innovative solutions for the problems identified,

☐ surface new approaches and concepts,

☐ aid in the development of contingency plans.

As noted earlier, the Studies, Analysis, and Gaming Agency (SAGA) of the OJCS has a unique mission. It provides an outstanding example by its professionalism and accomplishments of what PM simulations should be. Of necessity, it is a small organization, focusing on only a small number of issues involving only the most senior members of the executive branch of government. Its training and experiential value is of necessity limited. Its example, guidance, and techniques are there for all branches of the military service and agencies of the Defense Department to use and otherwise exploit. Under the circumstances, it would appear to be in our larger national interests to consider establishing one or more major centers for such PM and related gaming activities throughout the rest of the federal government. This would permit the greater involvement and training of the government's most senior supporting staffs, their other experts and advisors, and those less senior-level managers who at some future time will most likely be called upon to handle new and more complex crises. **81**

Steps For Resolving an International Crisis

- Determine what the real crisis is.
- Get the "right experts" on the job.
- Assess effects upon national security interests of the United States and upon those of the other countries involved.
- Determine short-term and long-term implications for the United States and involved countries.
- Identify immediate and longer range US objectives.
- Identify specific US actions to be taken and when in resolving or limiting crisis.
- Plan for contingencies; anticipate reactions of other parties to the crisis.
- Start discussions as quickly as possible, but negotiate seriously only after the facts are in and the steps above have been completed.
- Keep the right people informed and "in-the-loop."