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SCENARIOS, SIMULATIONS, AND GAMES

By

JAMES JOHN TRITTEN

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Report is substantially revised and updated version of "Creative Use of Scenarios," NPS-56-87-001, April 1987, 16 pp. Report discusses use of scenarios primarily in support of games and simulations and also for the creation of alternative futures. The use of scenarios for education/training, research, and persuasion is then analyzed. Considerations for the creation of scenarios is then outlined. Author concludes that the final measure of effectiveness for a scenario is if it sparked something else.

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Scenarios, Simulations, and Games

James John Tritten

"Surprise and the single Scenarios" is the title of a rather thought provoking article by Sir James Cable.[1] The essence of his article is that the United Kingdom should not prepare its military with just one contingency in mind. Related theses have been debated in the East and West for many years; should Soviet military strategy be based upon the doctrinal assumption of quick escalation to nuclear war? Should U.S. nuclear forces be procured with the requirement to survive a well executed surprise first strike?

In considering these and related politico-military questions, scenarios are often created to flesh out the concept or the problem being considered. For the purposes of this paper, a scenario is defined as a statement of the assumptions made about the international politico-military environment.[2]

For example, military planners in the USSR have used alternating scenarios to consider possible paths that armed conflict could take in order to assess the impact of short or long time scales on the nature of the conflict. Similarly, they have used those time variables to assess the course of nuclear and conventional warfare interactions and vice versa; e.g. if a European NATO war is likely to be nuclear from almost the beginning, then it is likely to be over quickly, hence planning scenarios lasting months are unrealistic. Yet if the war goes nuclear in Europe quickly, then the USSR must solve its

"America problem" caused by U.S. nuclear forces maintained in North America or at sea and outside of the immediate theater of military operations.

Similarly, varying scenarios are used by American defense specialists to demonstrate the impact of different scenario threat assumptions on the amount and types of nuclear forces that the U.S. should buy that would "guarantee" an acceptable level of retaliation. For example, if the war is expected to start in Europe, then "bolt from the blue" scenarios of surprise nuclear attacks on North America may not be as realistic as those which assume strategic warning.

Scenario creation is an acceptable methodology used by political scientists for developing alternative futures as an educational device or to create an input that will then be used for other purposes.[3]

Scenario writing exercises have the advantage of being extremely adaptable; they can combine aspects of a number of other methodologies (therefore minimizing the drawbacks of a single method) and can be tailored to specific objectives or environments. They can force the participant to deal with the comprehensive effects of decisions and multiple paths that events might take. Depending upon the participants, a scenario writing exercise can be an extremely creative environment with great potential to break beyond normal modes of thinking. Since they result in a verbal description of the environment, they are

reasonably user friendly and likely to be read. Scenario writing is very easy to do and relatively inexpensive.

One drawback of scenario writing exercises is that if they are not tied to some follow-on event, they can lead to idle speculation without participants being held responsible. If tied to some other methodology, such as a simulation or game, the exercise might replicate the flaws of the input and magnify the impact of the error. The credibility of the scenario is limited by the expert judgment of the scenario builder. Writing scenarios is extremely resource intensive.

Scenarios are also used to support technical evaluation of weapons systems.[4] Scenarios in support of such evaluations must adequately define the spectrum of a weapons system's operating environment so that a full and balanced evaluation can be made of its capabilities. Whereas scenarios used in support of technical evaluations can be overcome with good analysis, in the social sciences, one can argue that the scenario can even predestine the results of the analysis.[5]

Rather than bemoan such limitations of politico-military scenarios, it is my intent to explore the opportunities and drawbacks of scenarios used in simulations and gaming when such techniques are used to explore complex questions for education, research, or persuasion.

What Does a Scenario Depend Upon?

It has been argued that politico-military scenarios have an intrinsic worth of their own; that they should be thought out and then stored on a shelf to be plucked off when necessary to support some future simulation, game, analysis, or operation. The alternative view is that scenarios support other actions, hence have no value of their own and should therefore not be created to await call-up at a later date.

The most important determinant of the scenario is the purpose for which it will be used. The purpose of the scenario writing exercise or the simulation or game that a scenario supports will be influenced by and in turn influence a number of other factors such as available time, location, scenario time, sponsors, and player/participants. These additional factors will be discussed later. At this point, three major purposes will be considered; training/education, research, and persuasion.

Training/Education

Many simulations are done for training and each of those requires a scenario. A basic example of this is the fire drill for a ship's crew or the emergency procedures trainer for flight crews. In these simulations, the scenario is used to set a semi-realistic condition requiring personnel to exercise their skills in some area that otherwise would not be experienced. The emergency conditions are carefully controlled and participants are allowed to walk through their procedures, stop and analyze specific actions, or repeat them if necessary. Once practiced in

a simulation, personnel actions taken in an actual emergency have the advantage of this type of preparation.

On a more sophisticated level, education also makes use of scenarios. When introducing the concept of alternative futures, scenario writing is an acceptable methodology. The student benefits from the experience of having to flesh out all of the particulars required to complete a scenario.

Long ago, lawyers recognized the value of moot court to assist candidates in becoming practicing attorneys. Similarly, model United Nations or governments are often used to expose students to the workings and authority of complex bodies. These type educational simulations only make sense if some actions are required to be taken; a scenario is played out.[6]

When students here have to go through the steps necessary to pass a bill or to defend a client, they see how political decisions are made and they have the opportunity to refine their skills in such settings. Players and participants in these type simulations have the opportunity to learn much more than the facts of the process being simulated .

For example, the purpose of a scenario creation exercise, a simulation, or a game may be advertised as an exploration of some particular concept or facet of war. In reality, however, the real purpose may be to educate senior operationally-oriented military officers about the political nature of war. In order to

accomplish such a educational exercise, a very sophisticated and well thought out scenario is required.

Simulation and gaming may be the most successful way to educate some of these individuals. Despite the fact that there are numerous articles and books on the relationship of war and politics, or that there are many university level courses one could take to discuss this area, the busy military officer may not have had the opportunity to do any of these. Exposure to a well constructed simulation or game with a supporting scenario might be just the short course necessary to get important points across to an audience within the "system." It has been my experience that gaming is not a pejorative term to the military and many officers are eager to "learn" from such exercises.

Similarly, to reach foreign policy experts or academics with a message on the limits of military capability to support political options, a well-crafted scenario supporting a simulation or game is an excellent method to force these individuals to "crunch the numbers" and get a better feel for what is possible.[7] Again, seminars, courses, books, or articles could do the same job but "experiencing" the event may provide an opportunity for learning that will last beyond the short-term.

Where the objective of a scenario writing exercise or a simulation or game is identical in two exercises, but on the one hand military officers are the participants, and on the other hand civilian academics are, a very different scenario would be

required. This should be obvious but too often gamers argue that one scenario can serve a multitude of purposes.

Games can be an excellent vehicle to expose participants to dynamic asymmetries in Soviet-American war fighting styles or in war termination requirements. A well thought out scenario can be used to help Western Army officers understand that a future war in Europe/the Soviet Western Theater of Military Strategic Operations might not necessarily be represented by a series of pistons along avenues of advance. The Soviet preferred method and style of operation is instead, envelopment and encirclement. In this case, the war as fought by NATO might not necessarily be the same as that being fought by the Warsaw Pact. This creates complicated requirements for the scenario design and play of a game but a game may be the best vehicle to illustrate the point.

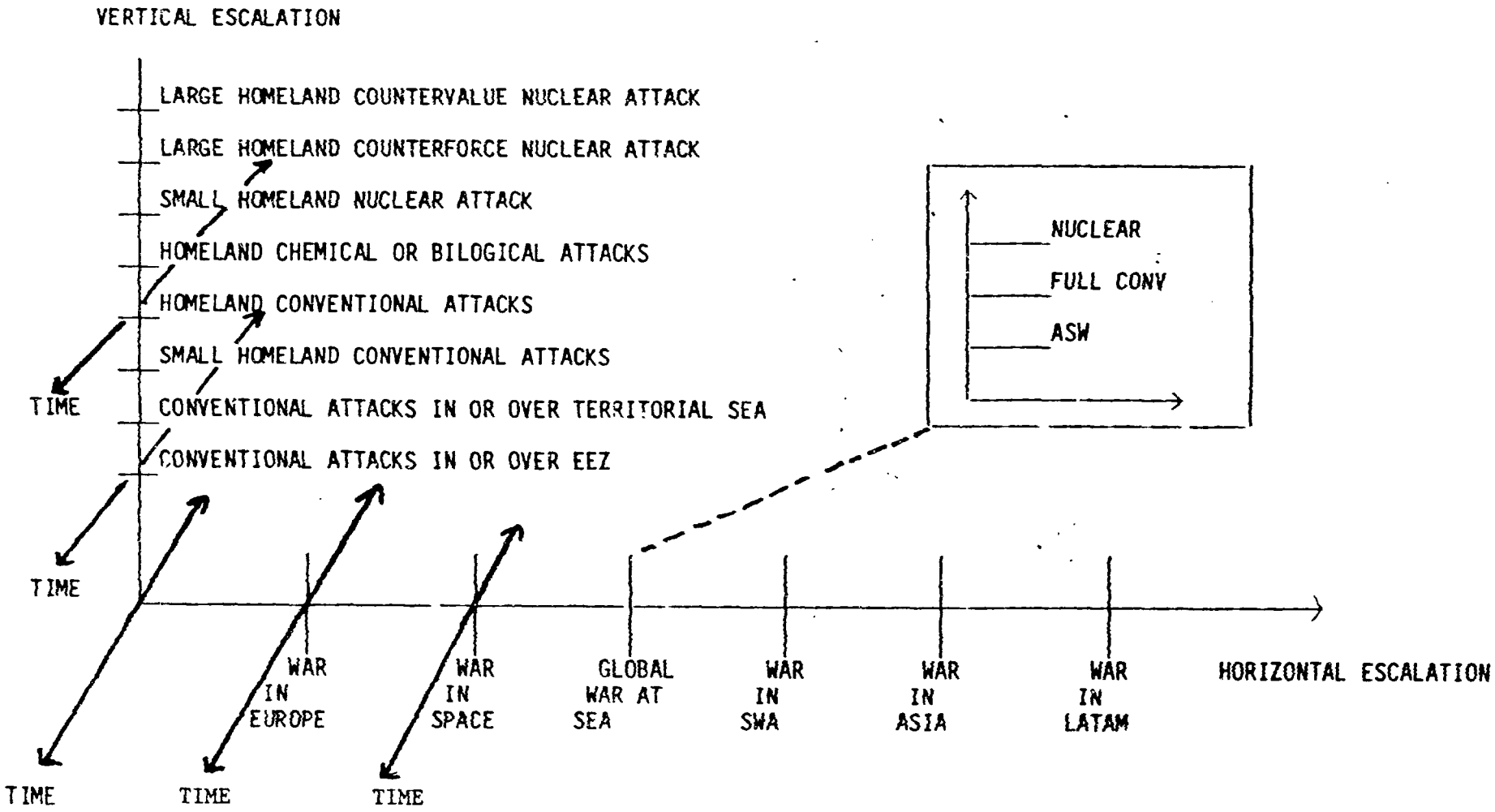
Gaming complex issues also require scenarios capable of moving from one spectrum of politics and war to another in order to play out all possible interactions that might occur. For example, in simulating the arms control negotiation process, one needs to factor in the role of legislatures, courts, public opinion, the media, allies, etc. to more fully flesh out the complex interactions that influence or are influenced by the arms control issue at hand.

Similarly, a complete war game should not deal only with the armed conflict portion of the war. To do so will lead participants to believe that escalation decisions only involve moving up or down the so-called vertical escalation ladder or

expanding/limiting armed conflict horizontally beyond or to theaters of origin. A more correct representation of war involving political, economic, moral and similar arenas would reveal that escalation also involves economic warfare, world public opinion, actions by allies, and the very crucial variable of time. Time as a variable in warfare is a most frequently overlooked one that scenarios by their very nature force participants to deal with. The act of extending the period of a war is also more correctly viewed as escalation. Figure (1) is a representation of the armed conflict portion of warfare that becomes obvious and is reinforced by scenario writing or the play of a game or simulation. Similar diagrams need to be created for all the components of war.

POSSIBLE
ESCALATION DIAGRAM

FIGURE (1)



A well designed supporting scenario can help participants of a simulation or game better understand the relationship of political interests to required military capabilities. They also can help those in positions of authority to understand that not only is war a competitive process, but so is the period between the armed conflict portion of wars.

By their very nature, games and simulations tend to focus investigation of outputs rather than inputs. This is a worthwhile goal for education that is well served by the use of games and simulations. As an example, a war game dealing with the AIRLAND battle or follow-on forward attack (FOFA) operations will help illuminate the net worth of either of the the concepts in achieving their objectives; not on input measures, i.e. the intrinsic nature of the command structure or on the forces to be purchases. If the emphasis is on process (demonstrating the value of looking at output measures), then one type of scenario would be used to support such a game. If the emphasis is on substance (trying to assess the worth of the AIRLAND battle or FOFA), then a different type of scenario might be required; one that supported research and was not tailored toward education.

Scenarios used for training and education <u>must</u> be credible to the participants and obviously feasible to support the exercise within the allotted time period. As we move from scenarios used for training and education to those used in support of research, the requirement for credibility subsides.

Research

Similarly, scenario writing, games and simulations can be conducted for the purpose of research. For example, such exercises can be sponsored for the purpose of stimulating participants well-experienced in some specific area to think creatively about a subject that they had thought was previously "mined out." This type exercise requires a much more sophisticated scenario than one constructed for an education-supporting exercise.

A free-wheeling seminar game, whose scenario allows flexibility, might be just the vehicle to create interaction between a group of experts who otherwise feel that they have to represent organizational interests. A shared topic of interest can be openly discussed by a group of experts using such a non-threatening seminar environment by offering no identification of the affiliations of the participants, by not using titles or ranks, by mixing in government and non-government participants, and by frequently reminding the participants that "after all, this is just a 'game'."

The results of such interactions might well exceed that produced by more traditional methods. As an example, a group of individuals who have already written numerous articles and books on the subject of war termination might find that they stimulate others and in turn are stimulated by the interactions of a game whose scenario was designed to explore this issue. They might find that offering non-traditional options in a gaming

environment is more acceptable than by presenting them at a formal conference. Obviously, scenarios must be flexible for such exercises and may totally have to be re-written during a simulation or game to support the path that participants desire to go in order to properly address an issue.

Path gaming is a new type of seminar style game that has recently been used in the Washington environment. Path games present special challenges for scenarios. Rather than being a simulation or game of a specific event, the seminar is used to explore alternative futures.

One type of path game will pick a specific alternative future, say the president's dream of a defense-dominate world or one in which there are no ballistic missiles. The scenario for such a game is to go from the present time and move along one or many paths to that goal. The scenario for such a game may either be fixed or flexible.

Other types of path games move from the present to an unspecified future along whatever path the participants desire to explore. This type of path game is the most challenging for the scenario writer since major portions of the scenario literally is made up during the game itself. This degree of flexibility calls for the use of scenario writers with considerable experience and special skills.

To get a group to consider extremely complicated issues, war termination being a good example, the scenario required might be one that is capable of knocking the legs out from under the

players. Using that case, rather than have a scenario created out of the more customary cases of possible future wars, a totally unexpected but intriguing scenario might be just the vehicle to cause participants to focus on the major issue rather than how to fight or prevent the war in the first place.

Games and simulations may in fact be a major input to follow-on analysis conducted for very specific purposes. In such cases, the scenario is constrained by the requirement to support the follow-on analysis. Thus while in some cases, it is entirely appropriate (and may even be necessary) to re-write a scenario during a "creative" exploration simulation or game used for research, other types of games may have to rigidly follow the "script" in order to stick to the issues that will be addressed during follow-on hard analysis. Obviously selection of players can be crucial to the feasibility of conducting either type game.

Many scenario writing exercises,simulations, and games are designed to explore strategy/force mismatches. One major option for such exercises is to hold to a desired scenario and then manipulate the force structure, exploring the impact of varying possible force structures on the ability to attain goals. Alternatively, forces can be held constant, and the scenario or strategy varied, exploring the possibilities of new strategies.

The latter can be very helpful in illuminating better methods of conducting near-term campaigns with existing forces already on hand. Generally, programming is better served by scenarios that manipulate forces while war planning is enhanced

by variations in strategy while holding the forces constant. Each type of exercise (programming or war planning) would require vastly different types of supporting scenarios. Scenario writing, games and simulations can allow nations to test new doctrines, concepts of operations, strategies, operations, tactics, or alternative force postures.

Programming and war planning games differ significantly but both need to account for the differences between declaratory policies, doctrine, and strategies and actual ones in scenario creation. Although forces tend to fight like they train, the actions nations threaten in order to support deterrence, are not necessarily the ones that nations governed by real people will take when events actually unfold. An examination of a future campaign or war based upon declaratory strategies, etc. might look significantly different than if such an examination were based upon actual plans. Obviously, actual plans and actual capabilities of own forces is a carefully guarded secret, hence the pool of potential players might be totally different for each type exercise which in turn will have an influence on the type of scenario created.

Different scenarios may be needed to support examination of the actions and statements nations make to deter war, the very different actions taken when planning to fight a war, the potential for a total change in operations when actually engaged in combat operations, and the possibility that all deterrent concepts, pre-war plans, or the actual conduct of operations

might have no influence on the the quite unique circumstances undertaken to terminate war-fighting.

In the late 1960s and early 1970s, Royal Dutch/Shell used a technique of "scenario planning" in order to prepare their business for a wide variety of futures.[8] One of the results of this effort was that Shell's management was better prepared for the 1973 oil crisis. Shell's scenario planning forced managers to deal with uncertainty and thereby understand and anticipate risk. It also helped them discover strategic options that they were not seriously aware of. Such an exercise afforded Shell the opportunity to gain a competitive advantage.

Competitive strategies are only recently beginning to gain acceptance within the Pentagon. Gaming is a very useful methodology to explore competitive strategies. By forcing players to consider outputs and by tying military outputs to political objectives, the player is confronted by the need to define (or demand) explicit goals. He is further introduced to the concept of international competition during the armed conflict, after it, and obviously before.

The United States has finally come about and recognized that in "peacetime," we are engaged in a long-term competitive relationship with the Soviet Union and other nations.[9] It is the authors opinion that with the arrival of nuclear weapons, the strategic thinking of many strategists, especially those in the military, excludes the concept of competition and the use of the term "winning."

Whether or not one can "win" a future war, or whether or not we are in a competitive relationship with the USSR is not the issue for this paper. One can argue that the Soviets accept "winning" as the logical goal of any political conflict, but even if one assumes future wars are to be fought to a draw or that there is no competition between nations, scenarios and games offer governments the opportunity to explore ways to gain competitive advantage or to at least force an opponent into a situation where he will not attempt to "win."

Fleet Admiral Chester Nimitz's experience prior to World War II in gaming possible conflict in the Pacific theater have often been cited as one of the best examples of the value of gaming. Gaming efforts of the faculty and staff of the Naval War College in Newport between the World Wars allowed Nimitz to later remark that:

> "The war with Japan had been re-enacted in the game room here by so many people and in so many different ways that nothing that happened during the war was a surprise - absolutely nothing except the Kamikaze tactics toward the end of the war; we had not visualized those."[10]

One major difference in those war games and some of the ones being conducted today is, of course, that for Nimitz, "winning" in war was a perfectly natural and acceptable goal and therefore written into scenarios.

New techniques of artificial intelligence-like systems offer us the opportunity to explore wider ranges of alternative futures than have ever been possible before.[11] Some have even argued that such systems offer the possibility of generating scenarios for

human use.[12] With the speed available in these new techniques, instead of running one or even a handful of game and simulations each year, modern simulations centers will be able to run literally hundreds of alternate cases.

By manipulating one or a few variables and holding the rest constant, analyst may be better able to perform sensitivity and contingency analysis like they have never been able to do in manual games. A supporting system such as this, if it were in support of a large manpower intensive game such as Global at the Naval War College, could be used by the Control team to "game the game" and create well-designed scenarios.

Scenario writing, simulations, nor games are a substitute for reality nor a method of analysis but such new techniques afford us a tool to investigate alternate future scenarios and thereby assist analysts in assessing their impact. In other words, given a set of "what if" political, military, or economic conditions, modern gaming techniques can help government and businesses explore alternative futures that they might have to deal with.

Although the advantages and opportunities of new gaming techniques are beginning to be appreciated, enormous caution must be exercised in their use. The modeling community cannot allow its sponsors to think that scenarios generated by or gaming and simulation lessons and insights that result from the manipulation of software or machines are any more "scientific" or "important" than those gained from any simulation technique.

Since scenarios are intimately tied to simulations and games, they are also tied to the intelligence communities threat assessment process and also to the creation of net assessments. In both cases, alternative scenarios need to be assessed and the use of modern computers can be a great aid. The more, however, that games and simulations attempt to explore combat, or other areas that we cannot actually duplicate, the more interest there is in and requirement for good scenarios.

Scenarios used to support research must be feasible but not necessarily credible. To support research, an incredible scenario might even be preferred. Where incredible scenarios are used, Control teams must ensure that appropriate disclaimers are used or classification protects the sensitivity of the concepts.

Persuasion

Another use of scenarios is to create perceptions. For example; (1) if the Politburo reads in the Western open literature that NATO commanders say that due to incomplete funding for conventional defense, NATO will have to resort to early use of nuclear weapons in self-defense; and (2) the Soviets perceive that there are nuclear weapons in Europe; and (3) the Warsaw Pact military reports that there are frequent exercises by NATO whose scenarios demonstrate that they are clearly designed to practice the early release of such weapons; then the Politburo would be justified in reaching the conclusion if they break the peace, they risk nuclear war fighting. In such an environment, to exercise (or simulate or game) without a scenario that lends

support to the perception intended, would be to undermine deterrence!

Similarly, scenarios offer the opportunity for marketing ideas and consensus building. For example, if a simulation or game was sponsored by an organization that was attempting to market an idea or a product, one should not be surprised to find scenarios that supported that idea or product. The ethics of running such exercises are no more complicated than the ethics of creating a motion picture, study, or book that has an underlying message of "sales."[13]

Since it appears that there is a type of individual that is more likely to receive messages if they are found in simulations and games (just as there those who are equally turned off), then by holding a series of structured exercises with pre-packaged scenarios and strong controls, it is likely that a significant number of key individuals could be influenced to the point that a consensus could be built.

During the inter-war years, the Navy and War Departments cooperated in the development of war plans by the Joint Planning Committee. Resulting from their efforts was the creation of a war plan in 1924 against Japan, called War Plan Orange. The substance of Orange changed over the years and Orange itself was never used as the actual blueprint for combat in the Pacific, but the Navy gamed campaigns at the Naval War College up to the commencement of hostilities using Orange as its basis.

Orange as the basis for a scenario for a series of games that were fought over an extended period of time allowed the military to socialize its officer corps about the likelihood of a future war. When the war came, those regular officers who had participated in these exercises understood the basic concepts of the campaigns that would have to be fought and were at a distinct advantage. Years of scenario writing, simulations, and games over the NATO central front should yield us similar advantage.

The Navy Maritime Strategy is another example of a scenario writing exercise that has had major influence on a number of other endeavors. Whether or not you agree with the Maritime Strategy is not as important as the fact that when the term is used to naval officers in any fleet today, the same broad strategic scenario comes to mind. Perhaps most importantly, the Maritime Strategy unified the scenario for a future war among the "barons" in Washington who were previously setting different contexts for the programs and concepts that they were advocating.

Considerations in Designing Scenarios

Although there should not be a "cookbook" for the creation of scenarios, it has become apparent to me in dealing with a number of individuals who have been asked to create scenarios, that some very key factors are often overlooked.[14] Hence, the following discussion is designed to assist the specialist in gaming and simulations when considering a task to create a scenario.

First - The scenario must be dependent upon the overall purpose of the exercise. As has been discussed earlier, whether or not a game or simulation is being played out for training, education, analysis and exploration, perception management, or consensus building, the purpose of the exercise will have a major and first order impact on the scenario selected.

If a game is designed to validate or perform sensitivity analysis on a previous game, there will be major constraints on the scenario. The scenario, in such a case, would have to be identical to the one used in the original game. The control team from the first game would have had to keep close watch on the conduct of that game in order to detect and record in-game modifications to the scenario. Obviously, artificial intelligence-like systems will automatically record the full scenario making this task easier.

Second - The available game time significantly influences the scenario that can be played. Global war games at the Naval War College that last weeks can go into much more depth than a half-day or one-day game held in Washington by participants who are often answering phone calls while engaged in the play. This is not to say that the long game is necessarily superior to the short simulation; that judgment depends on a number of factors, it is only to say that the scenario depends upon how long one can play.

One can attempt to increase the depth of the short game scenario by asking participants to read it prior to the game.

This may not work for the busy participant and may not even be worth the efforts. Naturally if a scenario contains classified material, the requirements to safeguard such material and account for transit time may preclude this option entirely.

Third - The players themselves will significantly influence the scenarios. In my initial example of a fire drill, the scenario could be very brief and the players are likely to be technical specialists not concerned with major questions of policy. On the other hand, if one seeks the participation of chief executive officers, branch and department heads, the scenarios will most likely be very heavily oriented for major policy question and concern itself at the strategic level. Macro analysis versus micro analysis as the purpose during the game will result in vastly different scenarios. Similarly, the participation by players with experience and/or education can also have a profound influence on the scenario. A macro approach war game for flag and general officers might require a scenario with significant emphasis on political context. The same scenario when used for a group of academics might not work at all.

Fourth - The scenario also depends upon the time and setting of the simulation; i.e. what period of time the sponsor desires gamed and where the game is to be played. Time is a frequently mishandled variable. Whereas scenarios for present day games may be more easily created, the formulation of future scenarios challenges even the best political scientist. Yet precisely for this reason, games, simulations, and scenarios

planning are powerful tools to help analysts gain insight into the future.

Even replaying historical events with variations can challenge historians to create an artificial environment of what might have been. Historical scenarios can be surrogates for present day situations that are otherwise awkward to handle. A good example of this is the Soviet military method of using historical scenarios to make points about questions of current doctrine, strategy, operational art and tactics in an Aesopian web that substitute historical case study for the present or anticipated future.

The physical location of a game is also a major but often overlooked factor in setting a scenario. Exercises that cannot accommodate classified material will require only unclassified scenarios and data bases. Facilities that limit the number of players or that do not have the use of modern artificial intelligence-like support systems or other computers aids will result in less sophisticated scenarios than these which have these advantages.

Fifth - The sponsor of a game is a major variable in setting a scenario. If the sponsor desires to use the game to assist in the exploration in the nature of war campaigns, then a scenario that focuses on crisis response and arms control is totally out of place. Similarly, one would expect that if an agency sponsored a game, then the designers of the game and scenario would be

either specifically or indirectly influenced by current or future programs or preferred strategies.

Final Observations

Scenarios for political-military simulations or games do not need to be as detailed as one might imagine. For example, if a game starts with the current world conditions "as is," a detailed state of the world or major intelligence briefing is probably not required for the players. Control, however, needs to have vast amounts of background material. New advances in computer aids or in artificial intelligence will greatly assist both players and control in keeping track of scenario state.

Unfortunately, there is no simple answer to the question of how detailed and complex a scenario must be. A large complex scenario might turn off senior players who simply do not have the time to be brought up to speed for a temporary exercise. Similarly, a excruciatingly detailed scenario might so stifle the players that a creative intellectual environment cannot be achieved.

Scenarios simply cannot be written and left on a shelf to be pulled off when required. The factors that influence the scenario are far too numerous and important for such a process, although one might use such stored scenarios as a strawman. Each scenario must be tailored to the specific purpose of the exercise, time available, the time period to be used as specified by the sponsor, the capabilities of the participants, the setting, and the available facilities.

Good scenario writing can assist sponsors in using games and simulations to illuminate differences in perceptions, different concepts of operations, and to make concrete certain difficult to understand abstract concepts. As such, games and their supporting scenarios become one more tool for political-military training and education, research, and persuasion. Scenario creation also results in a check list of actions to be considered during real operations.

Scenarios creation in fact can be so important to the gaming and simulation process that a case can be made that the input phase of the game might even yield a higher pay off to the sponsor than will the results, lessons learned, and other outputs. The process of extracting the insights from the creation of a game, or its conduct, is an extremely difficult and time consuming process; one which takes longer than most sponsors are willing to allow.

The measure of effectiveness for a good scenario is whether or not it helped the participants and control do something else satisfactorily. If more time is spent explaining or discussing the scenario than on the issues that the game or simulation is designed to explore, then the scenario was probably not worth it. Good analysis can probably overcome the deficiencies of a bad scenario but a good scenario by itself does not ensure a good writing exercise, simulation, or game.[15]

We cannot afford to look only at single politico-military scenarios. Rather, a wide variety of scenarios should be examined

as a sensitivity or contingency test: i.e. if findings hold up regardless of the scenario, then we can feel more confident about them. To only game a single scenario invites the type of myopia that lead to over reliance by the French on its Maginot Line or on strategic bombing as a deterrent by the British before World War II.

NOTES

1. Sir James Cable, "Surprise and the Single Scenario," RUSI Journal, Vol. 128, No. 1, March 1983, pp. 33-38.

2. Adapted from Seyom Brown, "Scenarios in Systems Analysis," Systems Analysis and Policy Planning: Applications in Defense, E.S. Quade and W.I. Boucher, Eds., New York: American Elsevier Publishing Co., 1968, p. 300.

3. William Ascher and William H. Overholt, Strategic Planning Forecasting: Political Risk and Economic Opportunity, New York: John Wiley & Sons, 1983, pp. 87-90; Perry M. Smith, et. al., Creating Strategic Vision: Long-Range Planning for National Security, Washington, D.C.: National Defense University Press, 1987, pp. 75-80.

4. Dale K. Pace, "Scenario Use in Naval System Design," Naval Engineers Journal, Vol. 98, No. 1, January 1986, pp. 59-66.

5. One of the strongest such claims is made by Carl H. Builder in his "Toward a Calculus of Scenarios," N-1855-DNA, Santa Monica, Ca.: The RAND Corporation, January 1983, p. 10; "If you buy the scenario, you buy the farm."

6. Builder makes the comparison between stage plays and scenarios (see pp. 16-17).

7. This relationship between policy desires and the limitations of the possible was addressed by former Secretary of Defense Caspar Weinberger in the Department of Defense Annual Report to the Congress Fiscal Year 1983, p. I-23: "...policy cannot make demands on military strategy which strategy cannot fulfill."

8. Pierre Wack, "Scenarios: Uncharted Waters Ahead," Harvard Business Review, Vol. 85, No. 5, September-October 1985 , pp. 73-89; and "Scenarios: Shooting the Rapids," Harvard Business Review, Vol. 85 , No. 6, November-December 1985, pp. 139-150.

9. See The Department of Defense Annual Report to the Congress Fiscal Year 1987, pp. 85-88; the Annual Report to the Congress Fiscal Year 1988, pp. 65-69; and the National Security Strategy of the United States (January 1987) , pp. 4, 20.

10. Lecture at Naval war College on 10 October 1960 cited in Francis J. McHugh, "Gaming at the Naval War College," U.S. Naval Institute Proceedings, Vol. 90, No. 3, March 1964, p. 52.

11. The RAND Strategy Assessment System (RSAS) is perhaps the best example of this. see Paul K. Davis and James A. Winnefeld, The RAND Strategy Assessment Center: An Overview and Interim Conclusion About Utility and Development Options, Santa Monica, CA: The RAND Corporation, R-2945-DNA, March 1983.

12. Builder, p. 2.

13. One of the most interesting scenarios for a future war was published as a book for the general public. Interestingly, the war's outcome turned on key reforms, suggestions, and programs that an enlightened public and government had managed to accept in the years that followed its publication. See GEN Sir John Hackett, The Third World War: August 1985, New York: Macmillan, 1978.

14. Peter Perla, A Guide to Navy Wargaming, Alexandria, VA: Center for Naval Analyses, CNR 118, May 1986, contains a useful checklist of the components for scenarios (p. 30). My own efforts are designed to expand upon his suggestions.

15. Pace, p. 60, accepts this position whereas Builder, pp. v and 10, tends to view scenarios as having the capabiity to predetermine the results and conclusions of military planning studies.

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