

The WALEX Process

John M. Nolen

The Warfare Analysis Laboratory Exercise (WALEX) process is a methodology that has evolved over many years for conducting open seminar war games in the Warfare Analysis Laboratory. Developed to analyze problems in naval and Joint warfare, the WALEX process has proven to be a highly adaptive and flexible approach to addressing a variety of complex, collaborative efforts, especially Joint warfare. This article describes the underlying concept of a WALEX, its basic features, and how it is developed. It also suggests that the WALEX process will continue to be applied to new problems in addition to those of Joint warfare analysis. (Keywords: Analysis, Collaboration, Exercise, Joint warfare.)

INTRODUCTION

During the 1990s, the Warfare Analysis Laboratory (WAL) often served as a forum for defining future needs and requirements, particularly regarding new missions in limited regional conflicts. Often, these analyses focused on determining the military utility and “value added” of new systems and technologies. Such uses of the WAL reflected two pivotal themes of national defense planning for the 1990s: the emergence of new missions in the post–Cold War era and the need to perform such missions in a cost-conscious world. Not only was the Cold War over, but so too were its defense budgets. In more recent years, the defense establishment has shifted its focus in Joint warfare from increasing overall warfighting capability to reducing multiple and possibly redundant military systems and acquisition programs. The growing importance and complexity of Joint warfare analysis in a cost-conscious world have

stimulated the search for new analytical approaches and analysis tools.

This search for new analytical approaches may explain the increase in WAL exercises—known as WALEXs—used to examine Joint warfare problems. This article describes the underlying concept and features of these exercises and how they are developed using a methodology known as the WALEX process. In addition, other problem areas where this process may be applied are suggested.

NEED FOR COLLABORATION

Perhaps the strongest reason for applying a WALEX to Joint warfare analysis is that Joint warfare is fundamentally a collaborative process. Soldiers, sailors, airmen, and Marines must merge their unique and

common skills under a single, Joint commander who must synchronize land, air, and sea power into a single, coherent campaign. How well all the services collaborate in preparing their forces for Joint warfare—through the adoption of Joint procedures and the procurement of interoperable systems—largely determines the individual and collective capabilities they bring to the theater.

The WALEX fosters collaboration through a disciplined, analytical approach. It presents a common problem, normally as a scenario, and solicits an open discussion of it, encompassing the multiple perspectives of a carefully selected group of diverse participants. A moderator assists the participants by facilitating the flow of information, suggesting lines of discussion, and framing issues for further exploration. Discussions may deviate from the formal agenda to explore new issues as they emerge. Depending on the objectives of the exercise, discussion may be directed beyond issue identification toward more in-depth analysis, consensus building, or collaborative problem solving and decision making.¹

THE WALEX CONCEPT

The basic features of a WALEX are as follows: all information is shared by all participants, emphasis is not on victory but on identifying issues, scenarios are stopped at critical times to allow discussion and debate, and discussions are documented for further analysis.

Some types of war games may compartmentalize information among participants in order to simulate the “fog of war,” requiring participants to make military decisions based on imperfect information. In sharp contrast, a WALEX focuses on breaking down barriers to information and encouraging the exchange of perspectives and ideas about a particular problem. The focus is not on “winning,” nor is a WALEX intended to train participants to exercise their decision-making abilities under simulated conditions. Rather, the intent of a WALEX is to engage the participants in an intellectual examination of a particular problem or set of problems and solicit their experiences, perspectives, and judgment. This approach is particularly useful in addressing complex problems where no single participant is likely to have a complete view of the problem and its associated policy, operational, and technical issues.

For example, policy-level participants may have a broad view of how a particular weapon system, such as a Theater Missile Defense system, would support U.S. national interests. Technical specialists would have a better understanding of how such a system would function and its technical capabilities and limitations. Operational-level participants would appreciate the

issues associated with deploying, maintaining, and operating such a system in a given theater. Merging these views into a common, collaborative setting is both the art and science of a WALEX.

Scenarios play a pivotal role in these exercises by offering plausible, real-world situations that give context to discussions. They allow participants, in a collaborative setting, to methodically step through a series of complex events and to identify and examine the interactions and critical issues associated with them. The scope and purpose of a WALEX ultimately drive the level and detail of these scenarios. For example, in an exercise exploring the policy options offered by a hypothetical Ballistic Missile Defense system, the scenarios described regional conflicts in broad diplomatic and military terms. Participants were asked to explore U.S. policy options given the existence of the hypothetical missile system. In another exercise that examined Joint medical operations, scenarios described individual casualties, and participants were asked to examine the detailed processes of patient treatment and evacuation. The key value of scenarios and the discussions and analysis that they stimulate is their focus on likely events and the sequence of interactions among people, organizations, and systems that these events trigger.

Given its focus on open discussion and collaboration, a WALEX is at risk of becoming a simple brainstorming session where ideas are expressed and opinions are voiced. Though insightful, such sessions may fail to frame complex questions completely or to adequately probe key issues. A successful exercise is built on analytical discipline, both in design and execution. It provides a clear context for discussions by identifying the policy, operational, technical, organizational, programmatic, or other considerations that are involved. It stimulates participants to address critical questions and to refine and articulate their answers in detailed, analytical terms. It seeks to distill discussions into explicit conclusions and insights that adequately consider a broad range of facts, interests, and perspectives.² The successful WALEX is crafted by a process that has evolved over several decades.

THE WALEX PROCESS

An exercise in the WAL normally lasts from 1 to 3 days. However, the time required to design, prepare, conduct, analyze, and document a WALEX may take several months. This entire plan of action is known as the WALEX process. A useful conceptual framework is to view the WAL as a place, the WALEX as an event, and the WALEX process as a comprehensive, disciplined procedure that addresses all activities before, during, and after the event. Figure 1 illustrates

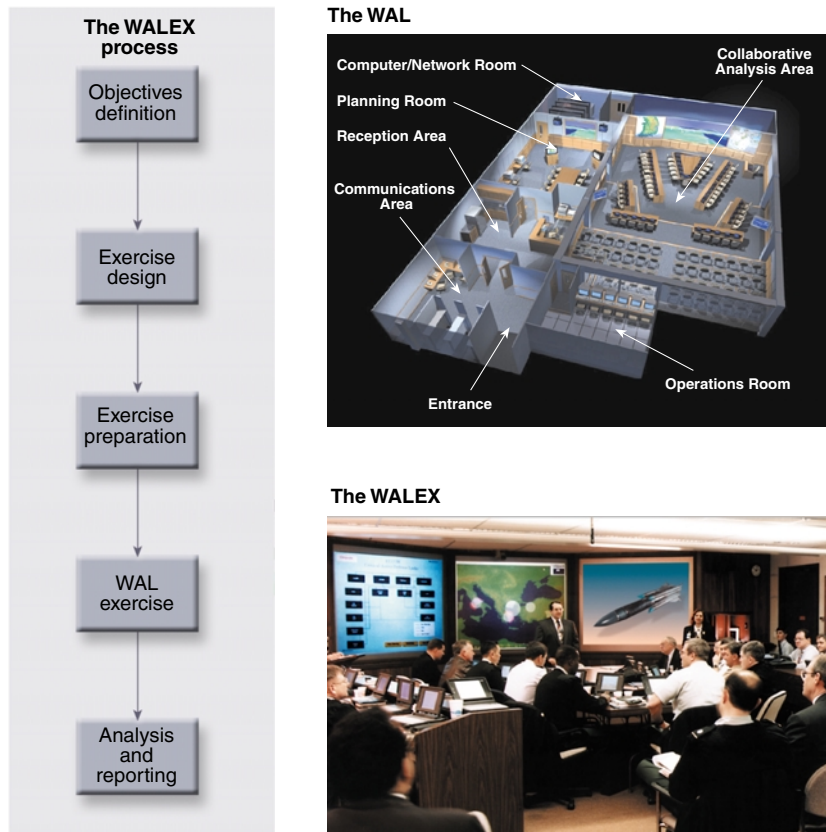


Figure 1. The WALEX process and its conceptual framework.

this conceptual framework and lists the major steps of the WALEX process.

As Fig. 1 shows, the WALEX is only one step in a comprehensive process. It begins with defining objectives and is not complete until those objectives are met through the analysis and reporting step. The underlying power of the WALEX process is its emphasis on a consistent, disciplined, collaborative investigation of complex problems where no single person or organization is likely to represent all pertinent information or points of view. As a consequence, the process is well suited to address not only specific problems, but as a component of larger analytical or program efforts such as requirements development, concept assessment, technical evaluation, or system acquisition. The specific steps of the WALEX process are described in the following sections.

Objectives Definition

Although applied in many different forms, WALEXs are generally used for issue identification and information exchange, analysis, consensus building, and decision making. Hence, the first step in designing a particular WALEX is to define its objectives. This step

should include an explicit enumeration of the desired outcome and products of the exercise. Despite its apparent simplicity, this first step in the process is often the most difficult and the most revisited. It often requires the distillation of years of knowledge, experience, and program effort into a few succinct sentences that state what the exercise is intended to accomplish. Although the sponsor has the ultimate responsibility for identifying the exercise objectives, its planners play an integral role in guiding this process. A useful principle in defining WALEX objectives is to seek “actionable” analyses, i.e., outcomes or products that the sponsor can use to pursue some action such as reaching a design decision, meeting a program milestone, or allocating resources.³

Once formulated, the objectives serve as planning guidance for the rest of the exercise. They are normally incorporated directly into the participants’ “read-ahead” materials and the WALEX introduction.

Exercise Design

Guided by the exercise objectives, the design step addresses the technical approach and schedule, the analysis plan, and the scenarios, tools, and participants that constitute the WALEX. These design elements are discussed in the following list.

- *Technical approach and schedule.* Exercise objectives, program resources, and available time will largely determine the WALEX technical approach and schedule. Large efforts with complex objectives may entail many months of planning and preparation. Smaller efforts with limited objectives may be accomplished in much less time.
- *Analysis plan.* A critical step in WALEX preparation is the development of an analysis plan. It is the linchpin between the objectives and the design, and it will help ensure that objectives are met. If, for example, the objective of the exercise is to produce a list of operational requirements for a new weapon system, then the analyst must develop a structured plan to both identify and capture participant views on system requirements. If the objective is to produce group consensus on system requirements, then the analysis plan must specify how consensus will be

reached. Depending on the participants and the issues involved, consensus may or may not be readily achievable. Techniques for measuring consensus may include the use of surveys and collaborative software tools.

- *Scenarios.* As noted, scenarios play a central role in the WALEX process by providing real-world situations that supply a framework for discussions. Scenarios allow participants to step through a series of complex events and to identify and examine the interactions and critical issues associated with them. The analysis plan ultimately drives the level and detail of scenario information.
 - *Tools.* WALEX designers and analysts have an increasing number of tools at their disposal including visualization tools for conveying information, polling and survey tools for gathering participant opinions, and modeling and simulation tools for depicting complex events or analyses. Three-dimensional modeling tools are particularly useful in describing missile engagement scenarios, radar volumes, or the sensor footprints of spacecraft. Polling tools have been used to reach group consensus on requirements and issue prioritization. Simulations have been useful in depicting scenario outcomes based on differing performance variables. Naturally, the exercise objectives drive the selection of specific tools.
- A critical tool used in almost every WALEX is the Electronic Seminar Support (ESS) System. The ESS is a suite of software tools that supports collaboration by linking participants through a network of laptop computers. During briefings and discussions, participants can enter comments that can be viewed by all other participants. If necessary, they can enter their comments anonymously, depending on the sponsor's wishes and the ground rules established at the beginning of the exercise. Using the ESS anonymously often promotes the exchange of candid opinions and assessments, unfettered by considerations of rank or organizational hierarchy. The key advantage of the ESS System is that it leverages the time available by allowing participants to enter their comments at any time during briefings and discussions.
- *Participants.* A critical ingredient to a successful WALEX is having the right mix of people to accomplish its objectives. In some cases, participants may be relatively similar in terms of age, experience, and perspective. However, in most cases, WALEX designers assemble a diverse group of participants to provide different viewpoints about a problem.

Exercise Preparation

Based on the exercise design, the preparation step establishes baseline technical and operational

information and the need for briefings to convey it, facility requirements and location, exercise materials and displays, and rehearsals of all parts of the exercise. Each of the preparation steps is described in the following list.

- *Technical and operational information.* Because WALEXs usually involve a diverse group of participants, it is important to consider what information participants are likely to know and what they will need to know to achieve the exercise objectives. In some cases, participants may share a common body of knowledge that enables them to quickly focus on detailed issues. More often, the diversity of the participants requires that they receive orientation briefings that establish a baseline of information for everyone. Whereas many of these briefings may be delivered by the sponsor or outside organizations, the WALEX staff may assist with revisions that refocus the briefings to meet the exercise objectives.
- *Facility requirements.* Although the WAL has extensive resources, a detailed review of facility requirements (e.g., seating, projection capability, hardware and software capabilities) is part of any WALEX preparation. Depending on the sponsor's needs, an exercise can be conducted at a location other than the APL WAL. In such cases, the size and capabilities of alternative facilities must be considered early in the design phase of the process.
- *Exercise materials and displays.* Some exercise materials and displays may demand extensive preparation time and testing, particularly in the case of simulations, which may require considerable programming or data entry. Upon request, participants can access exercise materials in real time during an exercise.
- *Exercise rehearsals.* All aspects of the WALEX—briefings, displays, and simulations—should be rehearsed. If the exercise is to employ polling, questionnaires, or surveys, these materials should be tested with a sample audience.

The Exercise

Normally, a WALEX begins with an introduction and orientation followed by a presentation of the exercise objectives. Briefings are then given to ensure that all participants are familiar with the germane technical and operational information. Issues relevant to the objectives are then identified and discussed in an open-seminar format as participant responses are recorded by the ESS System or other means such as polls. These exercise elements are described as follows.

- *WAL introduction and ESS orientation.* A briefing is normally given to familiarize participants with the WAL facility and the ESS System.

- *Presentation of objectives and technical approach.* WALEXs usually begin with a clear statement of objectives and a brief description of the technical approach to be used in achieving results.
- *Background information and scenario briefings.* Information briefings are intended to establish a baseline of information and materials for all participants. They may include policy, operational, or technical material deemed necessary for all participants to have a common understanding of the WALEX subject matter and the scenarios to be used. A WALEX read-ahead is often used to minimize the amount of time devoted to the presentation of background information.
- *Identification and discussion of issues.* Some issues will be known prior to the WALEX, and their treatment may be explicitly addressed in the agenda. Other issues may arise as a result of discussions and, depending on their importance, necessitate restructuring of the agenda. A key advantage of the open-seminar format is its flexibility in exploring new issues. A main task of WALEX moderators, while working closely with the sponsor, is to direct discussions to those topics that best support the exercise objectives.
- *Recording of exercise comments.* As mentioned, an important WALEX tool is the ESS System, which allows participants to add their unabridged comments directly into the proceedings record through laptop computers. Experience has shown that nearly all participants adapt rapidly to this procedure. It is often valuable to pause and allow time for participants to reflect upon specific questions, issues, or discussion points and enter their responses into the ESS.

Other collaborative tools, such as polling or voting, can be used to evaluate alternatives against single or multiple criteria. They can identify areas of consensus or divergence in participant views. They can also stimulate and clarify discussions by providing an explicit numerical and graphical assessment of key points argued.

Analysis and Reporting

The final step of the WALEX process occurs after the exercise. Results are analyzed, including ESS comments, polls, and staff notes, and are documented in a final report. Other deliverables are also prepared in this step. Details of this last step are as follows.

- *Analysis of exercise results.* A critical element of the WALEX process, which often distinguishes it from many other collaborative efforts, is the follow-on analysis of the exercise results. Results will normally include comments captured in the ESS System,

results of surveys or other polling techniques, as well as staff notes of discussions. If the exercise included simulations or other means of presenting or adjudicating operational situations, then these outcomes will also be included in the results. The WALEX staff analyzes the collective exercise results in light of the stated objectives, producing general findings such as areas of disagreement and consensus. Depending on the objectives and analytical plan (established in the design step), the analysis may identify detailed issues, procedures, design decisions, or even technical specifications.

- *Publication of results and analysis.* WALEX results and analysis are documented in a final report. Its key components are the observations and recommendations sections, which summarize and assess the issues and participant discussions. The report may also include WALEX staff recommendations regarding further work and analysis.
- *Other deliverables.* If the objectives included the preparation of other documents or products (system requirements, operational architectures, military utility assessments, etc.), these will be produced in the analysis and reporting step.

OTHER APPLICATIONS

Although developed as a form of wargaming, the WALEX process is fundamentally a method for collaboration. Its features—shared information, issue identification, discussion, and debate—are common to all collaborative efforts. It is not surprising that the WALEX process has been readily adapted to meet other needs beyond Joint warfare analysis. During the 1990s, this process was applied to a wide range of collaborative efforts.

Because WALEXs can facilitate information exchange, analysis, consensus building, and decision support, they can support a wide variety of problem-solving methodologies. Figure 2 illustrates the steps of three such methodologies: the scientific method, military planning, and strategic management. The first column lists the WALEX functions that might support the individual steps of these methodologies. For example, the information exchange function of the WALEX could easily support the initial information-gathering steps of the scientific method, military planning, or strategic management. The WALEX process could also be applied to numerous other problems and methodologies, such as risk analysis, affordability analysis, and operational architecture analysis.

SUMMARY

This article described the underlying concept of a WALEX, its basic features, and how it is developed

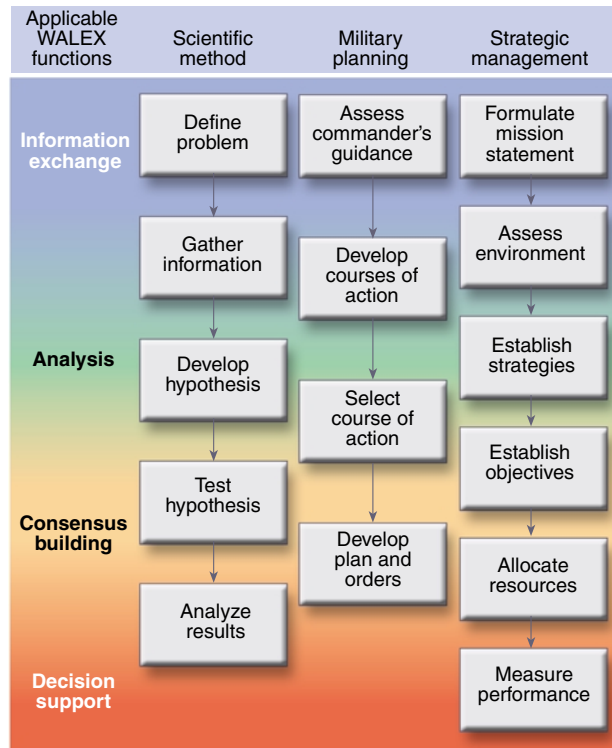


Figure 2. WALEX functions can be applied to various problem-solving methodologies.

using the WALEX process. Because of its disciplined, analytical approach, the process is well suited to addressing the many complex, collaborative problems in Joint warfare analysis. Because of its flexibility and adaptability, the process is also well suited to addressing other complex problems. In the next decade, analysts will face the challenges of applying it to new collaborative efforts never envisioned by earlier WALEX users. Meeting these new challenges will perpetuate the dynamic that initiated the WALEX process: analysts helping sponsors find solutions to complex problems.

REFERENCES

¹Pace, D. K., "Seminar Gaming: An Approach to Problems Too Complex for Algorithmic Solution," *Johns Hopkins APL Tech. Dig.* 12(3), 290-296 (1991).
²Pace, D. K., "Use of Seminar Gaming to Obtain Insights About Theater Missile Defense," in *Proc. Seventh Multinational Conf. on Theater Missile Defense (TMD)*, Annapolis, MD (21-24 Jun 1994).
³Roske, V. P., "Making Analysis Relevant," *Phalanx: Bull. Mil. Oper. Res.* 31(1), 33-34 (Mar 1998).

ACKNOWLEDGMENTS: In addition to the references cited, this article drew upon materials compiled by Russell E. Gingras and Charles F. Frankhauser during the 1990s, as well as material contained in the APL Archives.

THE AUTHOR



JOHN M. NOLEN is a member of the Senior Professional Staff in the Joint Warfare Analysis Department. He received a B.S. degree from the U.S. Military Academy (1973), an M.A. degree in modern European history from Stanford University (1982), and an M.S. degree in business from The Johns Hopkins University (1997). Prior to joining APL in 1997, Mr. Nolen served in a variety of operations and plans positions during a career in the U.S. Army. At APL he has participated on a number of WALEX analysis teams addressing problems in missile defense, Joint medical operations, and command and control. His e-mail address is john.nolen@jhuapl.edu.