

AFTER ACTION REVIEW AND DEBRIEFING METHODS: TECHNIQUE AND TECHNOLOGY

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ABSTRACT

State-of-the art, well-crafted After Action Reviews (AARs) can increase unit learning and aid in speedy, but comprehensive, exercise evaluation. AARs can be powerful training tools that can visually document performance improvements and help develop strategic learning. Improved techniques and advanced technological features can increase AAR effectiveness. Technology now exists to allow chronological analysis of simulation-based training events, enabling review of exercises from both friendly and opposing-side perspective; and “take-home packages” that allow analysis of results when the unit returns home.

Research demonstrates that improved AAR procedures can be more effective than traditional approaches. Today, with a choice of AAR methods and available technologies, unit commanders can select the most appropriate for the situation and desired outcome. For example, essential training points can be captured by taking advantage of current AAR systems. Also, reports can be developed for both the immediate review situation and for take-home package replays.

This paper presents recommended AAR procedures based on research, current automation capabilities, and compares selected AAR systems and their technological features that could help commanders gain maximum performance improvement from each training exercise.

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INTRODUCTION

Improved After Action Review (AAR) conduct techniques and the use of advanced technological features available in AAR systems can lead to more effective exercise training and retention. This paper addresses techniques for conducting AARs, technological features that are desirable in an AAR system, and a sampling of state-of-the-art AAR systems.

BACKGROUND INFORMATION

What is AAR?

The traditional debriefing following a training exercise examines the positive and negative aspects of a unit's performance. In the past, this type of debriefing has been in a lecture-style format conducted by the unit commander (See Figure 1). The unit commander describes the major aspects of the training scenario starting with the training objectives and finishing with the commander's assessment of the unit's performance. However, this may not be the best way to determine if the unit has learned the lessons of the training exercise (Scott, 1983).

Specialized debriefing formats, known as After Action Reviews (AARs) have been developed. These methods eschew the passive lecture format in favor of an interactive, participatory environment (Downs, Johnson, & Fallesen, 1987). It is not the purpose of the AAR to tell the participants what they should have learned, but rather to maximize group interaction to investigate what they did learn and what the implications are for future engagements (Lederman, 1992; Steinwachs, 1992). Active participation leads to a greater level of participant motivation and provides many different perspectives of the training exercise (Scott, 1983). AARs have two assumptions: (1) that the training exercise has been a thought-provoking experience for the participants, and (2) that the participants need to

analyze this experience to get the most out of the training exercise (Lederman, 1992).

Figure 1. Example of AAR Briefing in Field.



The Three Phases of an AAR

An AAR leads the participants through a three-phase structured discussion of the training exercise. During the description phase, the participants think about what happened during the training exercise. During the analysis phase, participants examine how their respective actions contributed to the outcome of the training exercise. During the application phase, participants apply the lessons learned to real-world situations (Steinwachs, 1992; Lederman, 1992).

The debriefer should ask different question types during each AAR phase (Thiagarajan, 1992; Steinwachs, 1992). These questions (summarized in Table 1) are designed to focus the participant's attention on information relevant to the current AAR phase. During the description phase, questions

encourage participants to focus on what happened during the training exercise. In the analysis phase, questions prompt participants to focus on the causes of major training exercise events. During the

application phase, questions prompt participants to consider using the newly acquired information in other contexts and situations.

Table 1. Descriptions and Questions for Each of the Three Phases.

Phase	Purpose	Description	Sample Questions
1	Description	Participants think about the experience of the training exercise	What happened during the training exercise? How do you feel about the training exercise?
2	Analysis	Participants examine their respective actions during the training exercise	How do you account for what happened during the training exercise? What would you change about your performance in the training exercise?
3	Application	Participants apply lessons learned from the training exercise to real-world situations	How would you apply the strategies learned to real-world situations?

AAR Products

Gavitt (1995) addresses the various *products*, or presentation materials, that are available for implementation during the AAR. These products can be as simple as a drawing or as complex as a computer-generated representation of the training exercise (Scott, 1983). Either the debriefer or the AAR system generates these products. Several product formats are available (Figure 2): word slides, sketches, statistics, battle summaries, and “battle sets” (Gavitt, 1995).

Word slides can often show the mission objectives, mission content, or exercise-specific definitions. Word slides are not dependent upon an AAR system for their generation, and can be made in a short amount of time.

Sketches are similar to word slides in that they are static representations of particular facts. They are often used to depict a battlefield map, but can be used for many other illustrative purposes.

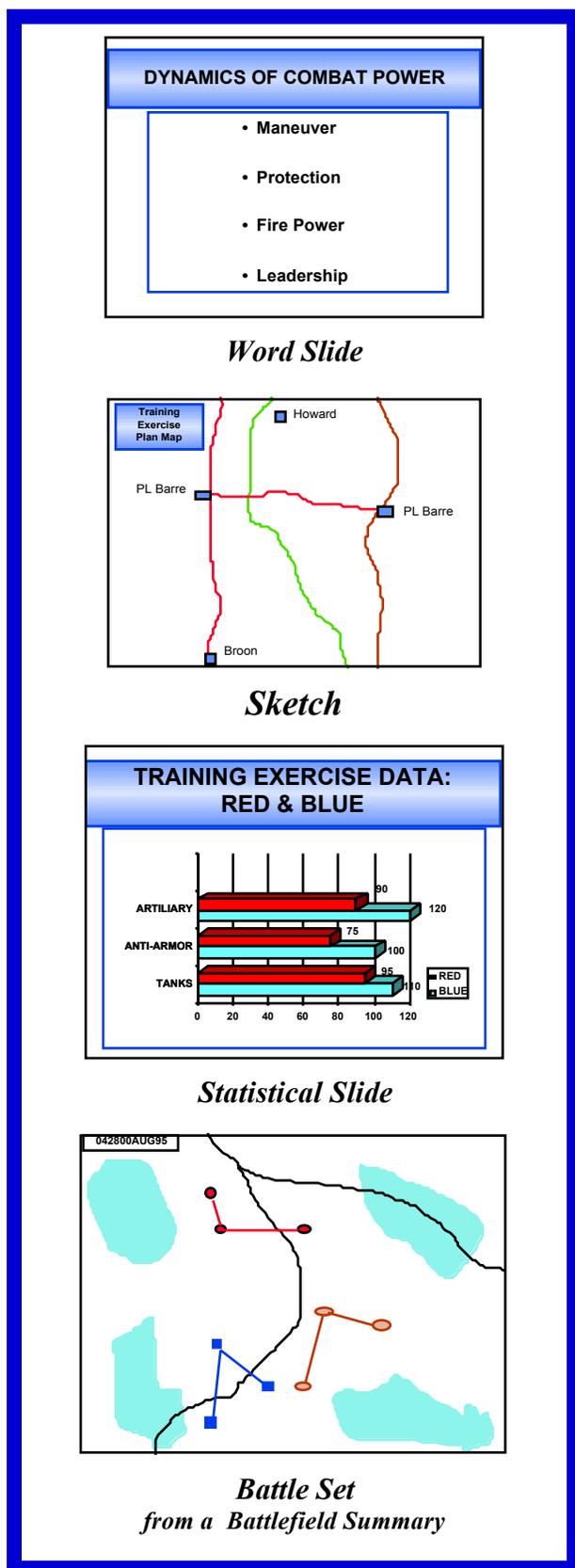
Statistics are typically presented in graphic forms. They can present descriptive statistical information either about a specific point in the training exercise, or they can represent a cumulative summary of some

aspect of the training exercise. While statistics are not dependent upon an AAR system for their generation, it is desirable for the AAR system to have the ability to summarize data.

Battlefield summaries show key maneuvers in an animated format. It is important that the animated sequence have the ability to speed up or slow down the action, as well as the ability to replay a sequence and freeze on single “frames.” Use of battlefield summaries is dependent upon an AAR system that has the built-in capability to archive the training exercise data. The AAR system should also allow the debriefer to extract all or sections of the archived information, and then replay the sequence in any speed and order desired. Electronic markers can assist the observer/controllers or analysts in finding key events for later use.

“Battle sets” are selected frames taken from the battlefield summary, that often show a critical event or turning point in the training exercise. Statistical data or labels to illustrate a specific aspect of the frame are usually shown superimposed over the battle set. Like battlefield summaries, battle sets require an AAR system that stores training exercise information and allows the extraction of individual frames and the generation of supplementary data.

Figure 2. Examples of AAR Products.



DESIRABLE AAR TECHNIQUES

Holbrook (1987) states that while the AAR is an interactive activity, it should have a definite structure that is understood by all of the participants. How well the AAR is structured is dependent upon whether or not the participants adhere to techniques established by AAR research.

Roles of The Participants

The debriefer's role (see Figure 3) is to direct the flow of the AAR. This is accomplished by asking questions that are designed to lead the participants to realizations about the training exercise. These questions are established in advance of the AAR following the training exercise. The debriefer must, therefore, know the flow of events of the training exercise and the critical events that are rich in learning content (Scott, 1983).

Figure 3. Example of Interactive AAR Process.



It is important that participants realize that the AAR is an important and necessary component of the training process. Participants should feel free to offer their thoughts that are relevant to the AAR course of discussion. On the other hand, participants should hold back when they feel others have more valuable information to offer. (See Table 1.) Scott (1983) lists some basic rules relevant to how participants should conduct themselves during the AAR. These include: (1) Only one person may talk at a time, (2) participants should wait to be called upon by the debriefer, and (3) all information volunteered should be relevant to the training exercise. Participants should also remember that the debriefer is in charge, and that their role is to learn from their training experience.

Working With Large Groups

Large groups present some difficulties for both the participants and the debriefers. It may be difficult for all participants to be involved in a large group AAR. Also, a larger group may be more difficult to control.

Subdivide. Steinwachs (1992) describes three options for conducting AARs with large groups. First, a large group can be divided into smaller groups. However, not all participants will be able to communicate with each other or augment each other's information. Additionally, several debriefers are required for this technique. If these debriefers are skilled, however, this technique can work quite well.

Fishbowl. A second option is to retain the large group and use the "fishbowl" technique. In this case, the group currently involved in the discussion organizes themselves in chairs around the debriefer and the presentation materials. To help maintain participant attention, participants not currently engaged in the discussion observe from outside the circle until they wish to become involved, at which time they rotate with someone currently in the circle. This works well as long as the discussion is limited to those participants in the "fishbowl" chairs. However, not everyone is able to join in the discussion at the same time.

Subdivide & Report Out. A third option is a combination of small and large groups. In this technique, the large group is first divided into smaller groups that discuss the training exercise with the aid of debriefers. Later, the large group reforms to discuss the findings of the smaller groups. This is the most preferred option because it affords participants a chance to participate and provides multiple perspectives of the training exercise.

AAR TECHNOLOGICAL FEATURES

There are various features that are desirable in an AAR system. These features have the capability to optimize AAR conduct by efficiently storing the training exercise data and making it available for playback, by preparing useful AAR products, and by providing take-home packages.

Training Exercise Information Archive

Training exercise information used for AARs is typically stored in a database. These databases should share common design protocols. This allows information stored in the database to be exported to various training environments (Meliza, Bessemer, Burnside, & Schlecter, 1992). (Figure 4 illustrates a sample AAR Database System.)

Training Exercise Replay

Training exercise replay allows the unit to view the entire exercise from multiple perspectives. This replay can be videotape footage of the unit's actions or computer imagery generated by the AAR system. The debriefer should have the ability to move quickly through the training exercise footage to highlight critical training events at will (Gavitt, 1995).

A useful option in replaying the events of a training exercise is the ability to change the actions of those involved. This usually occurs after the actual training exercise, and involves the debriefer changing the data archived in the AAR system. Changing some aspect of the training exercise can enable participants to see what would have transpired if they followed a different course of action (Crissey & Johnson, 1994).

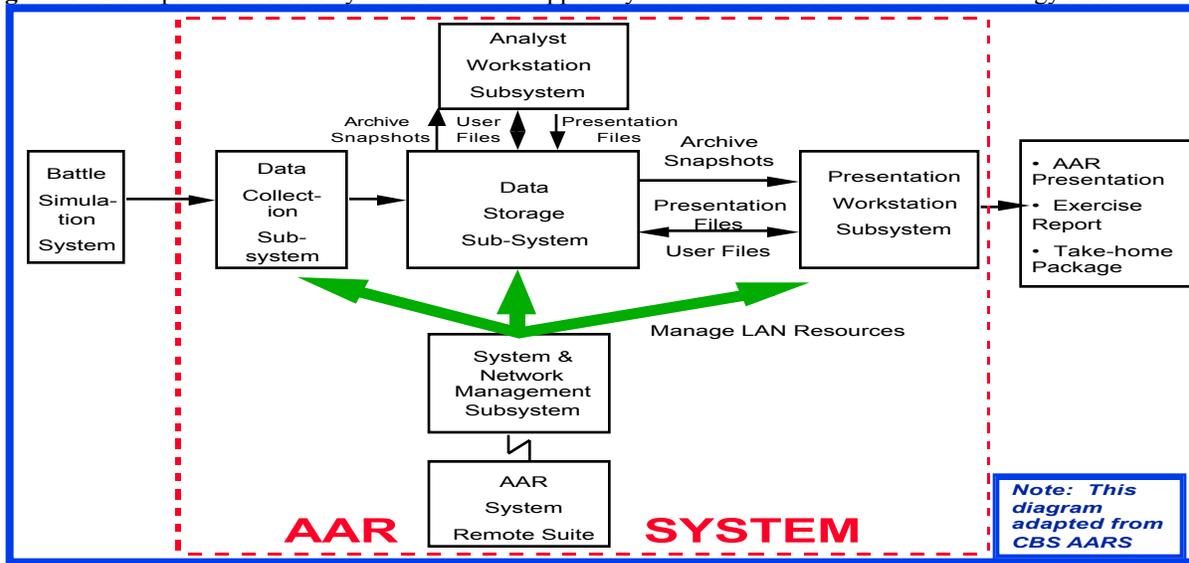
Automated AAR Materials Preparation

The generation of products for the AAR, by the AAR system, saves the debriefer time and has the potential to produce superior AAR products. It is important that the AAR system have the capability to take the information archived about the training exercise and translate it to a presentation format that is easily interpretable by participants. Certain kinds of information are best represented in particular ways; e.g., information about a series of critical events is best represented in an animated format, while information regarding unit status at the end of the exercise is best represented by statistical information (Gavitt, 1995).

Take-Home Package Generation

It is useful to have information about the training exercise to review after the AAR. Take-home packages can take the form of videotapes of the training exercise, computer-generated imagery for use on a smaller computer system, or statistical information. These packages allow the unit to review the training exercise, without the need for access to the AAR system (Crissey & Johnson, 1994). Three types of packages may be prepared: (a) the initial take-home package may consist of battle summaries and AAR slides; (b) the final exercise report may add to this initial package a more detailed description of each battlefield operations area; and (c) the professional sustainment package often uses the exercise scenario and happenings to pose "what-if" questions about actions or outcomes that could be different if alternative situations arose instead of the events which actually happened in the exercise.

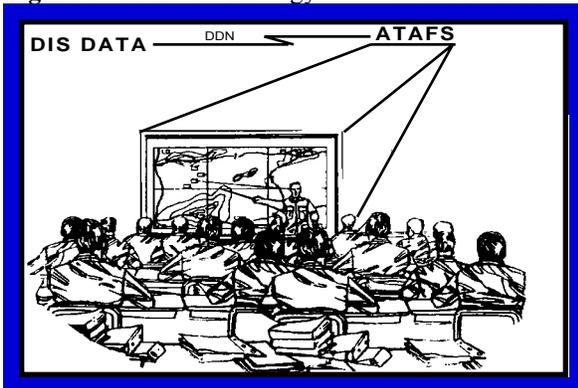
Figure 4. Example of an AAR System Database Support System Needed for Advanced Technology AARs.



SAMPLE AAR SYSTEMS

The following are short descriptions of several AAR systems. These descriptions are not meant to be evaluative but rather a review of the kinds of capabilities that state-of-the-art AAR systems possess. They are highlighted based on the literature, brochures, briefing slides, and personal communications available to the authors as of 31 Aug 95. By the time this paper is presented, additional changes are likely to have been scheduled or made in rapidly progressing development area. Figure 5 presents a depiction of a typical AAR system, ATAFS (see below). Table 2 presents a current summary of the systems described with their technological features.

Figure 5. AAR Technology at Work in ATAFS.



ATAFS

The Automated Training Analysis and Feedback System (ATAFS) is a stand-alone Silicone Graphics **Figure 6.** ATAFS Screen.

workstation that allows the observer, controller, or debriefer to view the training exercise in real time or as a replay. Displays include battle flow, fire fight, timeline, graphics, and tables. They can monitor the exercise from a plan view. Voice can also be played back synchronously with top-down views. ATAFS also has the capability of automatically generating both products for the AAR and questions that are appropriate to each of the three AAR phases. Automatic generation of AAR material is based on the observer or controller's responses to interactive prompts and embedded knowledge based rules. In addition, ATAFS can use SIMNET data to produce AAR materials. Finally, this AAR system has the capability of producing take-home packages, for use by units when they return home (LB & M Associates, Inc., 1994). Further enhancements are in the works, such as inclusion of Distributed Interactive Simulation (DIS) protocols. (Figure 6 [below] illustrates a sample ATAFS screen.)

BODAS

The Brigade Operations Display and After Action Review System (BODAS) is a software package that offers real-time viewing as well as replay capabilities. BODAS has the capability of generating a realistic representation of the battlefield and all of its participants. BODAS can link virtual and constructive simulations with live maneuvers. Like the ATAFS system described above, BODAS has the capability of providing materials for the AAR as well as the capability of producing take-home packages (CUBIC Defense Systems, Inc., 1994).

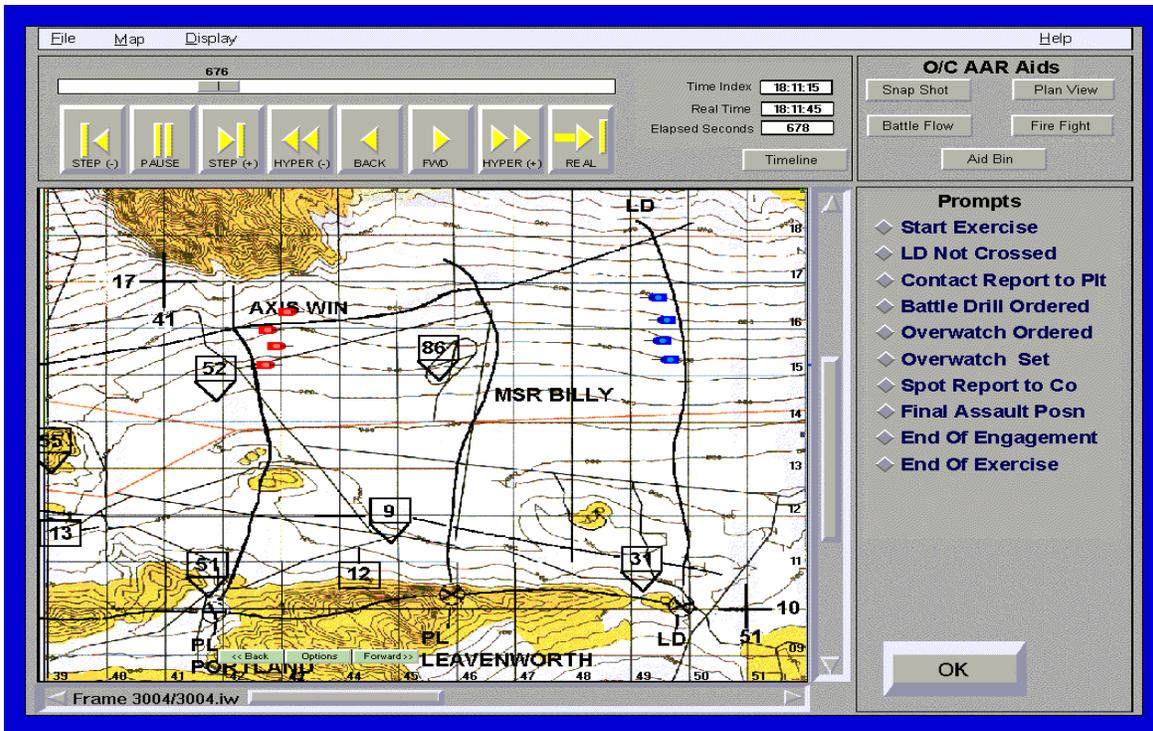
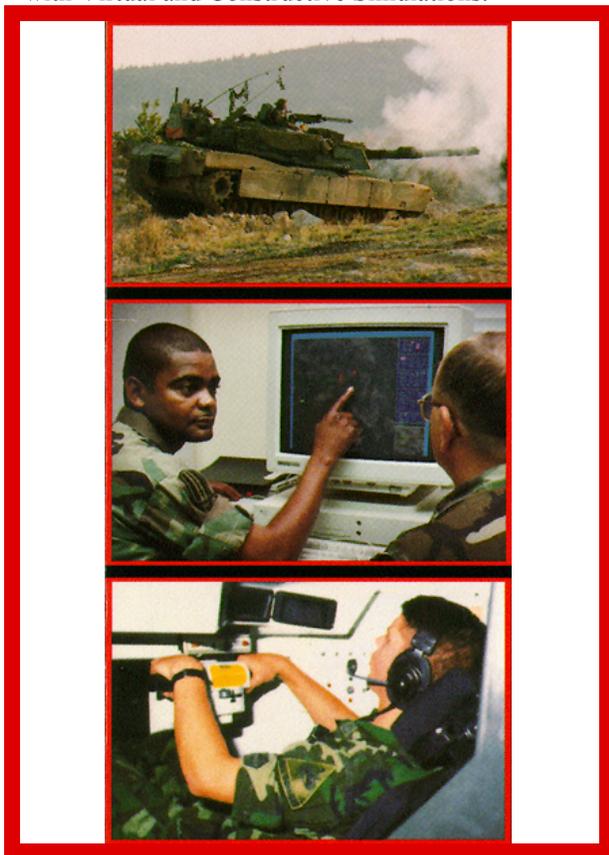


Figure 7. BODAS Technology Linking Real-World with Virtual and Constructive Simulations.



CBS AARS

Supporting the Battle Command Training Program (BCTP), the Corps Battle Simulation After Action Review System (CBS AARS) has the capability of extracting critical event and statistical data based on the input of observers/controllers. Incorporated into the CBS AARS is a Geographic Information System (GIS) which can generate tactical 2D and 3D terrain views, including overlays of enemy and friendly unit locations, for use during the AAR (see Figure 8 below). CBS AARS includes both an analyst and presentation workstation to support the AAR debriefer. (Logicon, 1994). Because of the open-ended nature of the BCTP, outcomes cannot be predicted in advance. Analysts integrate these materials into take-home packages including initial battlefield summaries, videotaped segments, slides, and professional sustainment packages containing “what-if” questions.

STARS

The Standard Training Assessment and Reporting System (STARS) has data archival facilities that allow the debriefer to track unit progress, and data for training management. STARS has a task rating system directly linked to the Army Training Evaluation Program/Mission Training Plan (ARTEP/ MTP) standards (see Figure 9). STARS has the flexibility of depicting training exercise data in a variety of formats, depending upon the desired emphasis. Additionally, unit training data can be aggregated to portray an overall view of training progress (Sparta, 1994).

Figure 8. CBS AARS GIS and 3-D Technology.

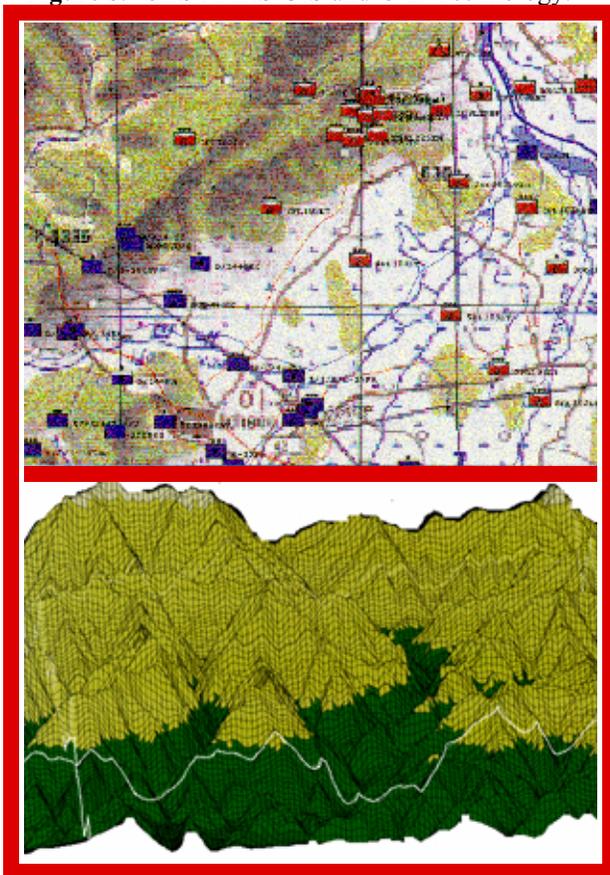
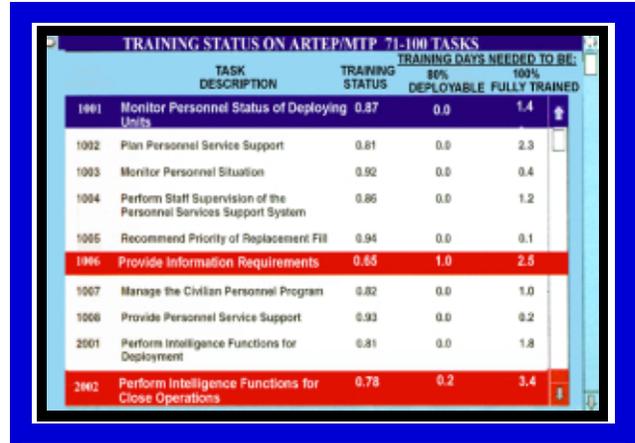
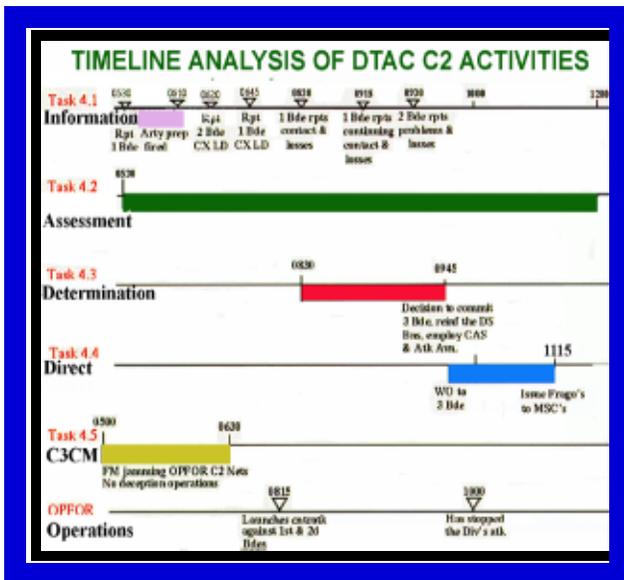


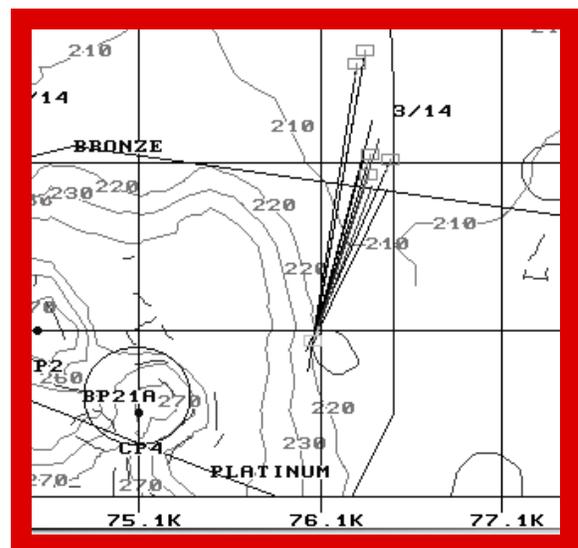
Figure 9. STARS Timeline and Performance Analysis Display.



UPAS

The Unit Performance Assessment System (UPAS) is a PC-based system that collects and analyzes data from SIMNET exercises. UPAS stores individual data on vehicles and for use in preparing AARs. UPAS displays the battlefield environment and results of individual fire fights in terms of round fired and kills inflicted. Both plan and battle views are available with timeline data. Also, UPAS can present unit statistics in graphs and tables (Meliza, et al, 1992). More recently, UPAS has been successful in developing take-home packages containing clips of the plan view display animation, charts, and graphs available for use on PC disks. Meliza, Bessermer, and Tan (1994) suggested these improvements: presentation tools and their management be improved, and radio communication be integrated. (See Figure 10 for a sample UPAS Screen depicting a fire fight, including fire lines.) These suggestions are also being implemented in STRIPES and ATAFS.

Figure 10. UPAS Fire Fight Analysis Screen (Note: this screen image is reversed and converted to black and white for clarity since screens are colored lines on dark gray background.)



STRIPES

Using an UNIX workstation, the Simulation TRaining Integrated Performance Evaluation System (STRIPES) prototype uses an Oracle relational database engine to integrate data (LORAL, 1994). It adds to the UPAS SIMNET capabilities, the DIS protocol (2.0.3). Through software reuse concepts (85 percent existing code), STRIPES enhances the UPAS user interface by incorporating DIS Developers' Tools like "Data Logger/Scanner, 2D Plan View," and "3D Stealth Viewer." (See Figure 11.) STRIPES has the capability of efficiently archiving and replaying training exercise events and can generate limited statistical information to assess unit performance. Currently, STRIPES' capability is being extended for Command and Control (Hukill & Behringer, 1995).



Figure 11. STRIPES Data Collection Screen in the UNIX, Xwindows, Motif, ANSI SQL Environment. Pictured are the control panel, and the 2D and 3D views.

Table 2. Comparison of Sample AAR Systems.

Sample AAR System	Automated AAR Materials Preparation	Product Formats (Word Slides, Sketches, Statistics, Battlefield Summaries, and Battle Sets)	Video Replay Capability	Take-Home Package Generation
ATAFS	Yes	Standard Formats; also has the capability to generate questions for each AAR phase	Yes	Yes, automated, based on responses to embedded knowledge based rules
BODAS	Yes	Standard Formats	Yes	Yes
CBS AARS	Yes	Standard Formats; also has the ability to produce computer-generated 3-D terrain views	Yes	Yes
STARS	Yes	Standard Formats	No	No
STRIPES	Yes	Standard Formats; data analyses, tables, graphs and views (2D and 3D)	Yes	No
UPAS	Yes	Standard Formats	Yes	Yes, available on PC disk

corrective actions should be taken, and how they can apply what they learned to other situations.

CONCLUSION

Debriefers have, at their disposal, new and exciting techniques and technologies to conduct and support AARs. The techniques encourage students to discuss and think about what happened during the exercise, why their actions contributed to what happened, what

Desirable AAR process techniques include clear definition of roles for debriefers and participants, the size of each debriefing group, the types of questions asked of participants, and the generation of products to use during and after the AAR. Support technologies focus on illustrating or

supplementing information about critical training exercise events. These support technologies include automated AAR materials preparation, training exercise replay, and the generation of take-home packages.

Implementation of improved AAR process techniques and support technologies can lead to a greater level of student understanding of lessons which can be applied to real-world situations. With all the available technology, still the planning of training events, tailored to the needs of unit members, is critical for the learning process to progress at optimum speed and depth. For successful exercises, the technology can increase the amount each participant learns from each training event. In addition to the tools, technologies, and techniques, the role of a skilled debriefer, who can enhance and expedite the learning process with expert knowledge and experience, should not be downplayed. However, with the technology available, even a novice debriefer can expect to conduct meaningful AARs that satisfy requirements for successful learning experiences.

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