PAVING THE WAY FOR 21ST CENTURY TRAINING
THE SYNTHETIC THEATER OF WAR

LTC William R. Johnson, Ph.D.
Program Manager, DARPA-ISO
Arlington, Virginia

Charles L. Kanewske
Program Manager, SAIC
Arlington, Virginia

James T. Blake, Ph.D.
Resource Consultants, Inc.
Vienna, Virginia

ABSTRACT

Change is apparent in all walks of life, and military training requirements are no exception. This is a challenge and a tremendous opportunity. The Defense Advanced Research Projects Agency (DARPA) is meeting this challenge through its Synthetic Theater of War (STOW) program. It is working to solve the difficult simulation problems for training and mission rehearsal and providing the user community an unparalleled opportunity to shape the training environment of the next century. This paper will cover STOW's progress to date on applying R&D for the operational community and DARPA's near-term interactions with its sponsor, the U.S. Atlantic Command (USACOM).

ABOUT THE AUTHORS

Bill Johnson is the DARPA Program Manager for the Synthetic Theater of War, Advanced Concept Technology Demonstration Program. He has 18 years of Operational and Research and Development experience. Bill has served in various Cavalry and Armor commands in Germany and Korea as well as with the Joint US Military Assistance Group-Korea, the Army Armor Center's Directorate of Combat Developments, Headquarters Army Materiel Command, and the Army Simulation, Training and Instrumentation Command in Orlando, FL. Bill holds an M.S. in Systems Management from the University of Southern California and a Ph.D. in Human Factors Psychology from the University of Central Florida.

Charlie Kanewske is the Program Manager of the Synthetic Theater of War System Engineering, Integration, and Demonstration (SEID) contract. Under this contract, Mr. Kanewske directs a team of 50+ software developers and computer engineers in the development, integration and test, and demonstration of advanced distributed simulation technologies. Previously, Mr. Kanewske was the Division/Program Manager for the Simulation Engineering and Modeling Contract for the DARPA WAR BREAKER program. Prior to joining SAIC, Mr. Kanewske had nine successful years as a Commissioned Officer in the US Navy with duties ranging from Division Officer onboard an FF-1078 Class Frigate to Project Engineer on a major Department of Navy research and development program. Charlie holds an M.S. in Electrical Engineering from the Naval Postgraduate School.

Jim Blake is the Technical Director of RCI's Army Simulation Training Program. He is responsible for integrating simulation technologies for military training applications. Jim is working on technologies to create new services that integrate or complement virtual, live, and constructive simulations on a synthetic battlefield and integrate simulations with command and control systems. He has more than ten years of experience in modeling and simulation in industry and the military. Most recently at Booz•Allen & Hamilton Inc, Jim was responsible for the technical aspects of the Advanced Distributed Simulation (ADS) program. His last military assignment was as the senior Uniformed Army Scientist. He holds a B.S. in Accounting from the University of Tampa, an M.S. in Systems Engineering from the Naval Postgraduate School, and a Ph.D. in Computer Science from Duke University.

PAVING THE WAY FOR 21ST CENTURY TRAINING
THE SYNTHETIC THEATER OF WAR

LTC William R. Johnson, Ph.D.
Program Manager, DARPA-ISO
Arlington, Virginia

Charles L. Kanewske
Program Manager, SAIC
Arlington, Virginia

James T. Blake, Ph.D.
Resource Consultants, Inc.
Vienna, Virginia

INTRODUCTION

Change is apparent in all walks of life, and military training requirements are no exception. This is a challenge *and* a tremendous opportunity. The Defense Advanced Research Projects Agency (DARPA) is meeting this challenge through its Synthetic Theater of War (STOW) program. It is working to solve the difficult simulation problems for training and mission rehearsal and providing the user community an unparalleled opportunity to shape the training environment of the next century.

The purpose of this paper is to highlight some of the capabilities of DARPA's STOW 97 Advanced Concepts Technology Demonstration (ACTD) that will be used at the U.S. Atlantic Command's (USACOM) Unified Endeavor 98-1 Joint Training Exercise. For the operational users, this ACTD provides an understanding of what capabilities are currently possible and what the future may provide the warfighter in terms of enhanced training simulation capabilities. To put the ACTD in perspective, USACOM's goals and objectives will be presented along with DARPA's technical objectives for the STOW program.

Unified Endeavor will be used as the operational context for the ACTD. The STOW demonstration will be conducted in two phases. The first phase will demonstrate a next-generation exercise generation capability that will speed-up exercise preparation and help address the requirement for rapid preparation for mission rehearsals and crisis response. Following this phase, an entity-based STOW exercise, centered around the mission rehearsal for Combined Joint Task Force (CJTF) amphibious operations, will be conducted.

USACOM'S GOALS AND OBJECTIVES

The goal of the STOW 97 ACTD is to demonstrate the capability of high-resolution (platform-level) simulation to support Joint Command Staff Training/Mission Rehearsal Exercises. A fully functional training system for STOW 97 is neither anticipated nor required, but a functional portion of the technology in development will be available in order to evaluate the potential of this technology.

USACOM's Goals

- Demonstrate the program's Joint Task Force (JTF) training capability in a realistic, operational context.
- Provide integrated training support from exercise generation through After Action Review (AAR).
- Allow the operational user to assess the system's JTF training and crisis rehearsal potential.
- Provide a stay-behind capability with reusable components useful for continued training exercises.

USACOM's Objectives

The STOW 97 ACTD will demonstrate technologies (in an operational context) that have the potential to achieve USACOM's objectives in a future, full-system implementation. The full system will provide comprehensive training and a crisis rehearsal capability. USACOM's overarching objectives for simulation support are:

- Higher quality simulations, through
  - Higher resolution entities.
  - Higher fidelity environments.
  - Operational C4I for simulation interfaces.
  - Knowledgeable Semi-Autonomous Forces (SAF).

    - Higher quality after action review.
- Lower overhead, through
    - Fast data base builds.
    - Reduction in support personnel.
    - Increased computer communications capability.

DARPA STOW ACTD OBJECTIVES

The Defense Advanced Research Projects Agency's (DARPA's) objectives for the STOW 97 ACTD are listed below. The ACTD will address as many of these objectives as feasible.

- Demonstrate a High Level Architecture (HLA)-compliant system architecture.
- Integrate Advanced Distributed Simulation (ADS) technologies into a system that demonstrates a JTF-level training exercise.
- Demonstrate advanced synthetic forces capabilities:
    - High resolution models to support Joint and combined operations.
    - Limited demonstration of Command Forces (CFOR) up to the battalion level.
- Demonstrate advanced synthetic environments:
    - High resolution terrain.
    - Realistic environmental effects and battlefield phenomenology.
    - Dynamic terrain effects.
    - Interaction of synthetic forces with the terrain, environmental effects and phenomenology.
- Demonstrate a high quality after action review capability.
- Demonstrate interfaces between the simulation and go-to-war C4I/mission planning systems.
- Demonstrate ability to rapidly generate a tactical scenario.
- Transition STOW technologies to JCS-sponsored and Service-specific simulation programs, *e.g.,* JSIMS, WARSIM, NASM, MARISIM, as well as the United Kingdom.

UNIFIED ENDEAVOR (UE) 98-1

The Unified Endeavor 98-1 exercise in October 1997 will provide the vehicle for the STOW 97 demonstration. The UE 98-1 exercise, focused at training the Combined Joint Task Force and component staffs, will be supported by a federation of simulations using the Aggregate Level Simulation Protocol (ALSP). STOW 97 technologies, supportive of this training event, will run on a parallel, but separate, distributed computer network to minimize any potential impact to the training audience.

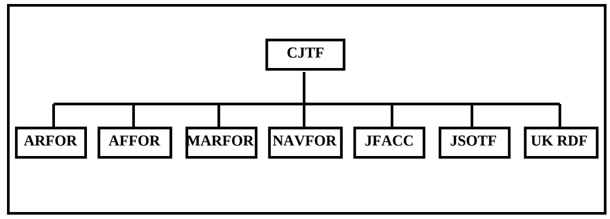

Figure 1. JTF Command Relationship and Supporting Components

Figure 1 shows the task organization of the CJTF. It is organized as a traditional JTF with the addition of a UK RDF which the CJTF commander will employ as a cohesive unit.

The anticipated structure of the training audience for the STOW portion of UE 98-1 is a CJTF executing a joint-level training event. Service functionalities will be constrained by Advanced Distributed Simulation technologies available for the exercise; therefore, the maneuvering force of the Army Forces (ARFOR) will be a heavy brigade reinforced with systems normally found at the division or corps level. ARFOR missions will center on movement to contact, a hasty attack, and securing an objective. There will be additional functionalities demonstrated as the scenario and synthetic environment permit.

The Air Force Forces (AFFOR) will be a composite wing with a structure to conduct traditional air component missions: close air support, offensive and defensive counter air, tactical reconnaissance, and deep strike operations against opposing forces moving into the close battle area.

The Marine Forces (MARFOR) will be a Marine Expeditionary Force (MEF) (Forward) with an air, ground, and Combat Service Support (CSS) component. The combat service support element will not be played in the simulation but will be represented by role players. An amphibious assault will form the central part of the JTF operation and be the activity about which the JTF staff will conduct its battle staff tempo drill and mission rehearsal.

The Naval Forces (NAVFOR), in addition to supporting the amphibious assault, will conduct area air defense, strike operations, and combined counter mine operations with the UK.

The United Kingdom (UK) Regimental Deployment Force (RDF) with the exception of the combined mine clearing operation, will operate as a component of the JTF but remain an integral unit with defined missions rather than being integrated into service component elements.

Opposing Forces (OPFOR) organization and force structure will have capabilities for operations against all elements of the JTF as well as Theater Ballistic Missile (TBM) operations. It is a realistic and flexible armed force representing a composite of varying capabilities of actual world-wide forces. It constitutes a baseline for training US forces, in lieu of a specific threat force. This OPFOR can conduct conventional, force-oriented combat. Additionally, it can redefine the terms of conflict and pursue its aims through terrorism, insurgency, or partisan warfare. The size and composition of the OPFOR is considered sufficient to meet the training objectives and requirements of the STOW exercise.

To flesh out the CJTF organization, a Joint Forces Air Coordination Center (JFACC) and Joint Special Operations Task Force (JSOTF) are also represented.

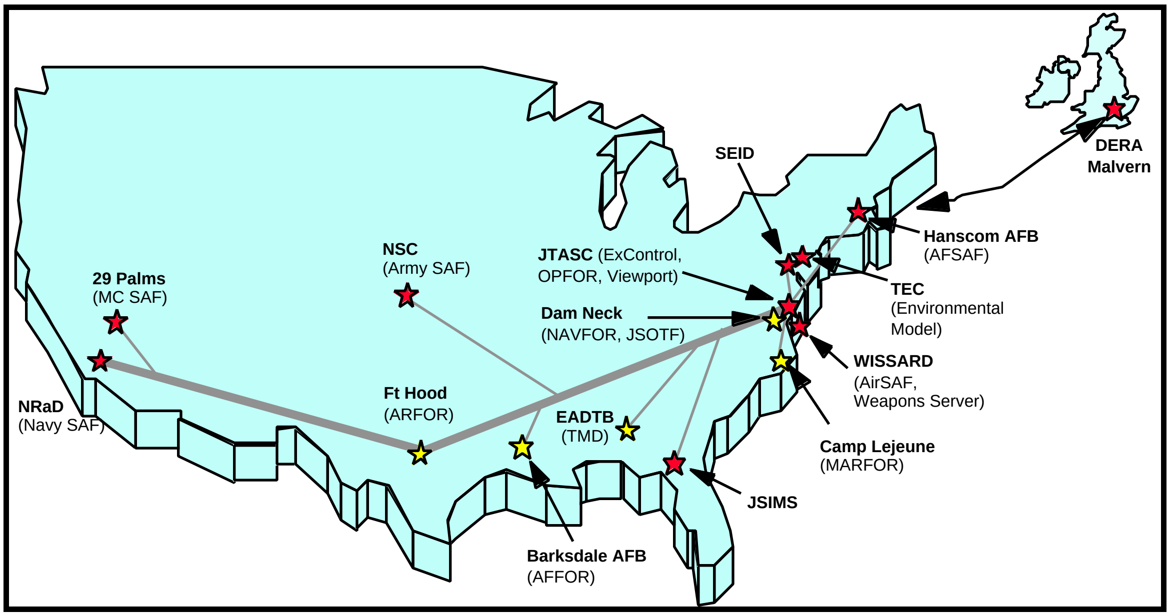

Figure 2. Synthetic Theater of War (STOW 97) Advanced Concepts Technology Demonstration Sites

STOW 97 SITES

While the sites to be played in the STOW 97 ACTD are still being finalized, Figure 2 provides a tentative set of locations. Included are the service component sites, as well as sites from which OpenSAF simulations will be operated. This ACTD will be a distributed exercise and DARPA has addressed both communications and security issues with new technologies.

Communications

The STOW network will be required to pass all simulation and exercise specific data between simulation computers, other networks may be used for Command, Control, Communications, Computers and Intelligence (C4I) communications and other functions. The STOW 97 Wide Area Network (WAN) will be based on Asynchronous Transfer Mode (ATM) and multicast technologies. Currently available implementations of these technologies limit the number of sites which can be supported, and create both cost and technical barriers to extensions of the network. These restrictions will disappear with time, but not before the STOW 97 exercise. The FASTLANE ATM encryption device will be utilized for classified collateral communications.

The Defense Simulation Internet Joint Program Office (DSI JPO) is responsible for providing and maintaining the communication lines, WAN equipment stack, and possibly the LAN device. The STOW Program will provide the core simulation computer resources; however, some items may be the responsibility of the site or Service. Each site is responsible for its own site preparation and internal network wiring and power, as well as for daily operations. Maintenance responsibilities and procedures are still being developed. Technical support will be provided by the DSI JPO and the Site Preparation Team.

Security

A significant portion of the forces simulated in STOW 97 will be provided by Service-specific models that may contain operational parameters of weapon systems and platforms classified SECRET. For this reason, the entire STOW 97 exercise will be conducted at the SECRET level.

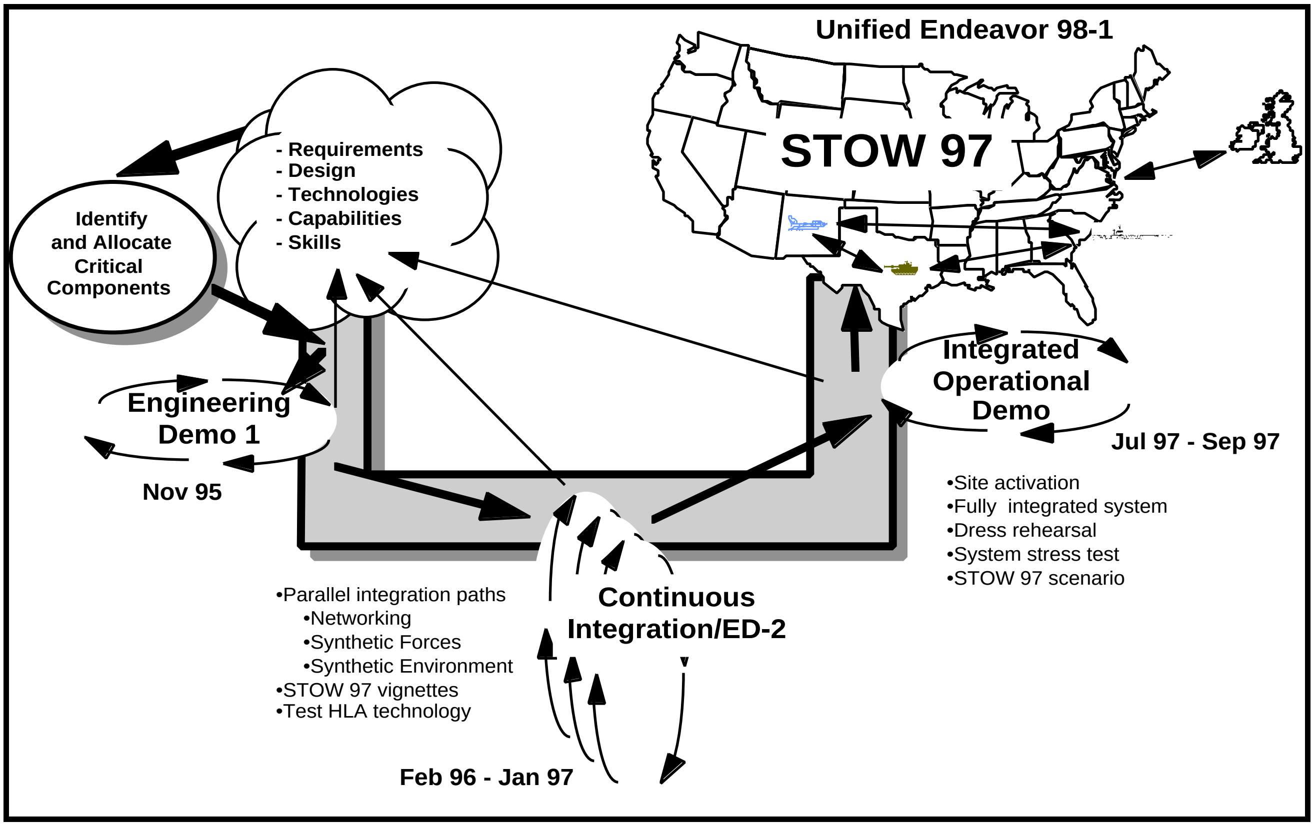

Figure 3. Schedule of Events Leading to the STOW 97 ACTD

TRAINING IN PREPARATION FOR STOW 97 DEMONSTRATION

As shown in Figure 3, an Integrated Operational Demonstration (IOD) is planned for July through September 1997 in order to conduct final preparations for the STOW 97 ACTD. The IOD will include several "dry runs" of the STOW 97 demonstration leading up to a final dress rehearsal in the September time frame. It will be necessary to have all of the STOW 97 sites participating in the IOD events. Scheduling and resource constraints may make it difficult to have all of the component sites and the Joint Training and Analysis Simulation Center (JTASC) facility on line and manned during the entire IOD phase, but it will be necessary to have them on line to the maximum extent possible. In addition, at the component sites and the JTASC, it will be necessary to have at least a portion of the training audience participate in the IOD events. This critical mass of people will provide the continuity of training into the STOW 97 ACTD event in October 1997.

NEXT-GENERATION EXERCISE GENERATION APPROACH

The Exercise Generation (ExGen) portion of the ACTD will be presented separately from the operational exercise (see Figure 4). Its intent is to explain and demonstrate how simulation systems fielded in the future will be able to prepare new exercises more easily.

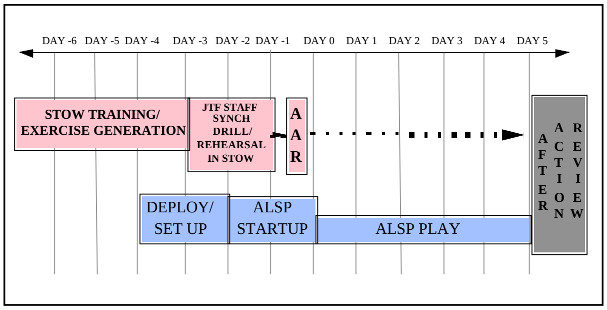

Figure 4. STOW 97 ACTD/ALSP Timing

The STOW Exercise Generation system design is based on the goal of prototyping a Mission Rehearsal/Crisis capability which will allow warfighters, working at their operational C4I planning and analysis tools, to specify the "seed data" which are then expanded through automated and on-line processes to provide the complete set of initialization data for an exercise. Automated processing will demonstrate rapid turnaround for simulation data base creation as well as reduction in required effort. In particular, the STOW demonstration slice focuses on laydown of the ARFOR Brigade.

A complete Exercise Generation system would be an enormous task. Fundamentally, it has to take all of the ideas of the exercise designer and the training audience and instantiate these ideas as data objects in a simulation that will then act in the way all of the people involved intended. Although a completely automated ExGen system is beyond the scope of the STOW program, it will include the following:

- A demonstration thread to show rapid transition of operational plans developed by the training audience to simulation initialization data.
- Simulation network planning through infrastructure analysis.
- AAR planning through scenario analysis.

Simulation Network Planning

STOW will include a "simulation of the simulation" product that can be used to determine whether or not a particular exercise can be constructed in a given way. Distributed simulation is very different than using a single mainframe for simulation, *e.g.,* running the Corps Battle Simulation. There are more capabilities available to the user with distributed simulation, but there are also more constraints on how one can set up an exercise. Taking a complicated network topology with potentially limited bandwidth and a large number of different computers with potentially differing computing power into account for a large distributed simulation is beyond the scope of any manual process. Automated tools are needed to help create the exercise simulation and communications plan. The STOW system for simulating the simulation is currently called the Scenario Analysis Tool / Infrastructure Analysis Tool (SAT/IAT).

Scenario Analysis Tool. The Scenario Analysis Tool is responsible for simulating a given scenario at a very coarse level of resolution. The purpose of the SAT is to give a rough idea of where all of an exercise's entities might be and what they might be doing during a scenario so that a profile of these entities' processing and network requirements can be generated and sent to the IAT. The SAT is not meant to be a very accurate simulation of the battle outcomes in an exercise. It simply incorporates a scripted series of moves entered by the user. Attrition is modeled at very low fidelity; but according to standard service modeling practices. Thus the SAT models where all the units might be, what their missions are (limited to very broad generalizations such as attack, defend, road march, etc.), and whether they are in contact with the enemy. The SAT will have a map display. It will allow users to position and give basic missions to units, and get information and statistics from the battle as it unfolds. The goal of the system is to have an automated linkage between planning systems and SAT; however, this may not be achievable in the STOW time frame.

Infrastructure Analysis Tool. The IAT will have a display of the infrastructure, showing all of the computers and network links and will be color-coded to show their current state in the exercise. Graphs of activity as a function of time for any piece of the infrastructure will be just a mouse-click away. In addition to an ad hoc information presentation capability, the IAT will provide the user with a suite of pre-defined reports that are designed to point out any trouble spots and make the user's job of dealing with problems easier. The SAT and IAT will function as a team. A user, for instance, will be able to click on a unit on the SAT's screen and have the computer that is modeling this unit's entities be highlighted on the IAT's screen and vice versa. The IAT will also provide a graphical editor that will allow the user to design the network architecture in a user-friendly drag-and-drop fashion. As part of this effort, real performance numbers for different computer and network types will be used based on research done as part of the SAT/IAT effort.

The IAT maps units (and their entities) to simulations to computers to networks. The IAT then calculates the processing and network loads on the infrastructure based on the information given to it by the SAT. The IAT provides graphical feedback about computer and network loading as a function of time during an exercise. If a particular computer or segment of the network is seen to be overloaded, steps can be taken in the construction of the real exercise to minimize or eliminate this potential problem. More computers can be bought, or more network bandwidth, or the forces can be rearranged on the given computers and bandwidth reduced to achieve as close to an optimal result as possible. Both the SAT and IAT run as fast as possible, more than 200 times real time. It is thus possible to model an entire week's exercise in less than an hour, so it is also possible to do numerous replications trying out different configurations in a short time.

The results of the network analysis will be used by the automated data distribution tool to ensure that the proper initialization data gets to each workstation which will simulate ARFOR entities.

After Action Review Planning

The SAT will also serve as a tool for planning for data collection for AAR. By observing the coarse-grain progression of the scenario, AAR planners can estimate the areas of interest and critical events for the scenario. This forms the basis for determining the data sets which need to be collected, and hence the computer and operator/trainer resource allocations for the scenario.

DESCRIPTION OF THE OPERATIONAL DEMONSTRATION

Terrain Data Base

The scenario location for the STOW 97 demonstration is Southwest Asia. The terrain data base will be an area approximately 700 km by 500 km. Embedded within this box is an area 60 km by 40 km of higher resolution terrain that surrounds the anticipated location of the amphibious assault and a 10 km by 10 km high resolution box to support Special Operations. These large data bases will challenge the terrain data base generation technologies, as well as the ability of the SAF systems to use it. The exact definition of the area of high definition and placement of targets will be done in conjunction with the final definition of the detailed scenario.

Extent and Timing of the STOW 97 Demonstration

As shown in Figure 4, the STOW portion of UE 98-1 will be conducted as a mini-exercise during Phase Three on days Day-3 through Day-1. The purpose of the mini-exercise is to assist the JTF commander in developing a battle tempo for his staff prior to the ALSP exercise. In addition, the JTF staff will be conducting a mission rehearsal of the proposed joint Amphibious Operation. The exercise design will be such that it causes the JTF staff to analyze the situation portrayed and make a recommendation to the JTF commander so that he can make a decision on a course of action.

The STOW portion of the exercise will not be directly connected to the ALSP exercise. However, portions of the tactical scenario could be run twice (once in the ALSP simulation and once in the STOW environment) to allow the JTF staff and the components to compare course of action alternatives or to rerun portions that were not conducted satisfactorily the first time.

While there will be no STOW play during the ALSP exercise, it is important to note that a significant portion of each response cell will participate in the STOW play; and thus the physical areas, occupied by the trainers and trainees, and the C4I equipment will be in use for the STOW mini-exercise during this period. Set up for the ALSP exercise must overlap this activity in such a way that the two do not interfere with each other. This is an important planning constraint on which the success of both the STOW and ALSP exercises depend.

Other Simulator Interactions

In order to provide a Theater Missile Defense capability in STOW, the Extended Air Defense Test Bed (EADTB) simulation will be included in the ACTD. However, no virtual simulators or live simulations are scheduled for use. This is due to a combination of funding limitations as well as the CINC USACOM's desire to minimize the number of troops used to train the JTF Commander and his staff. Plans for integrating virtual simulators into the STOW architecture in FY 98 are being developed as well as the feasibility of integrating live simulations in FY 99.

Conduct of Demonstration

The response cells for the STOW demonstration are also a part of the control structure for UE 98-1. These cells will locate at the same place as the cells for the ALSP-driven exercise, and will be staffed, to a large part, by the same personnel. The response cells consist of service personnel who respond to and interact with the training audience and workstation operators (primarily STOW contractor personnel) who manipulate the OpenSAF simulation workstations "the front ends." Anticipated locations for the response cells (and SAF simulations) include:

- Army - Fort Hood, TX. and National Simulation Center at Fort Leavenworth, KS.
- Marines - Camp Lejeune, NC. (29 Palms, CA and NRaD, San Diego, CA.)
- Navy - Dam Neck, VA. (NRaD, San Diego, CA and WISSARD, Norfolk, VA.)
- Air Force - Barksdale AFB, CA. (Electronic Systems Command, MA and WISSARD, Norfolk, VA.)
- OPFOR - JTASC, Suffolk, VA. (JTASC.)

Stimulating the Training Audience

The main role of the response cells is to provide vital information to the training audience to enable decisions and to control the simulation based on those decisions. Information should be delivered to the training audience via their real-world C4I systems whenever possible. Information transfer will be accomplished via three primary methods:

- Method 1: Information is passed via automated direct interfaces between the simulation and C4I systems.
- Method 2: Information is constructed by humans in response cells based on observations of events occurring in the simulation. This information is then passed to the training audience via manual injection into C4I systems in use by the training audience.
- Method 3: Information is constructed by humans in response cells based on observations of events occurring in the simulation. This information is then passed to the training audience via manual delivery independent of C4I systems in use by the training audience.

The response cells will not be playing ALSP at the time of the STOW portion of the UE 98-1. The response cells will be interacting with the STOW hardware and STOW support personnel to execute the components' portions of the JTF plan and to provide the information to the higher level staffs. STOW will also have to interact directly, when appropriate, to feed the JTF C4I equipment. For example, intelligence feeds directly from a sensor/platform in the synthetic battlefield to the C4I system must be provided.

The training audience will participate to the maximum extent possible from their real-world command centers. Information from the simulated theater of war will be routed to the maximum extent possible through their real-world C4I equipment. The response cell operators will be stimulated by the STOW environment during the STOW portion of the exercise, and will be stimulated by the ALSP confederation during the ALSP portion of the exercise.

AFTER ACTION REVIEW

In a USACOM Joint Task Force training exercise, After Action Review refers to the process of gathering, analyzing, and presenting information regarding how well a Joint Task Force works together to plan and execute an aggregate-level exercise. In these exercises, the primary focus of the AAR is to improve Joint training, not evaluate performance. Steps in the process include planning the AAR and then gathering, analyzing, presenting, and archiving information about the participants' behavior. STOW 97 proposes to improve JTF training through the use of an entity-based simulation. The STOW exercise will serve as a battle tempo drill and mission rehearsal to prepare the JTF staff for the UE 98-1 exercise. In this context, STOW 97 AAR requirements include:

- Provide a tool to examine JTF synchronization during STOW 97.
- Provide the capability to examine instances within the exercise that reinforce training objectives.
- Allow JTF staff to examine how well STOW 97 prepared them for the UE 98-1 exercise.

To meet these objectives, the STOW AAR program will focus on providing tools to plan, gather, analyze, present, and archive information regarding one or more of the following mission threads: Theater Missile Defense, Air Operations, and Joint Counter Mine Operations. In addition, STOW AAR will provide a basic capability to collect, retrieve and analyze information about all other aspects of the STOW exercise in order to support a Facilitated Training Review conducted at the end of the STOW 97 exercise.

Specific AAR features are described in the following paragraphs.

Planning

STOW will examine existing automated systems that allow the decomposition of specified Joint-level tasks into training objectives and evaluate whether they can be adapted as components of the STOW AAR system. In the event that none of these systems are suitable, manual decomposition of the candidate mission threads will be performed as the first step of a STOW AAR planning process. The outcome of this process will include a plan for the collection and management of STOW data.

Data Collection

Data for the STOW exercise will take several forms and come from multiple sources. The source for most AAR data will be the public and private data that comes from the simulations participating in the STOW exercise. The STOW Common Data Infrastructure (CDI) will collect all public data and allow the user to specify what types of private data should be recorded for AAR purposes. Another significant source of data will be the information gathered by data collectors who directly observe members of the JTF as they participate in the STOW 97 exercise. The STOW AAR system will provide them with automated means to introduce information into the CDI. Other types of data collected will include simulation, voice and digital communications, video and C4I system state information. Data will be collected from multiple sites under the control of AAR operators in a fashion that will not inhibit the overall functioning of the network. All of this information will be collected in the STOW CDI in a way which will facilitate later retrieval and analysis.

Data Analysis

STOW data analysts will be able to access the information in the CDI in a number of ways. Simulation data will be retrievable based on specification of time periods, data types and geographic regions of interest. Unit-level data, including location and status, will be retrievable based on specification of time periods, data types and geographic regions of interest. Data access will also be retrievable based on mission type.

The time required to retrieve and analyze STOW data will vary according to the complexity of the request. A small set of pre-determined metrics will be available at run time. A “Hot Wash” capability will provide a pre-defined set of metrics, plus certain basic query capabilities within one hour of exercise pause/termination. A more robust decomposition of the full set of STOW data will be available for AAR within eight hours of the end of the exercise.

Data Presentation

The STOW Data Collection system will provide playback capabilities for all collected data. This includes the coordinated presentation of selected portions of simulation, manually collected, C4I, and video data. Playback will include real time (for most data) and faster than real time (for 2D representations of simulation data) reproductions. Special visualization of selected information will be demonstrated. The main Facilitated Training Review will be presented at a central point, but the data presentation system will allow playback of subsets of data by the component services at other sites. The presentation will be made in a manner compatible with current USACOM electronic whiteboard and video teleconferencing capabilities.

Data Archiving

The STOW AAR system will use the USACOM digital library system to archive the data it collects along with software and schema information required to access that data.

CONCLUSION

The operational community is in dire need of an enhanced training capability and the research community is listening attentively. The successful transition of technology is a team effort. In today’s information age, it is like passing a baton in a relay race. If the baton strikes the tarmac, it will be difficult to regain the momentum. STOW’s capabilities represent the baton and DARPA and USACOM are the runners. DARPA is working closely with its sponsor, USACOM, to ensure that the operational community realizes the maximum benefit from the STOW 97 ACTD.

This paper highlighted several new capabilities being provided to USACOM under the STOW initiative. This is not the end, but rather another lap in a long run.