The Training Brain Repository—Exercise Design Tool for Home-Station Training

Col. David G. Paschal, U.S. Army, Retired, and

Maj. Alan L. Gunnerson, U.S. Army, Retired

The business of planning and developing home-station training has assumed greater significance as the Army transitions to an *Army of preparation* in an environment of reduced resources.[1] The challenge to create a more robust home-station training capability requires realistic training that incorporates the depth and complexity of real-world operational environments; technological capabilities that are affordable and sustainable; and a return to command ownership of the process of creating training tasks, objectives, and goals.

In support of the Army's effort to revitalize home-station training, the Training Brain Operations Center (TBOC), an element of the U.S. Army Training and Doctrine Command (TRADOC) G-2 (Assistant Chief of Staff, Intelligence) Operational Environment Enterprise, is answering this challenge. The TBOC has created a tool that returns ownership of training to commanders by harnessing technology to train faster, better, and more efficiently.

The tool replicates the operational environment by setting the conditions in which meaningful training can occur, and it facilitates how users plan and

Exercise

Real World Data

Google earth

implement training while significantly reducing the time it takes to develop rigorous exercises. This article illustrates how the Training Brain Repository-Exercise Design Tool (TBR-EDT) facilitates a commander's ability to increase the complexity, realism, and depth of an exercise's live, virtual, and constructive training environment with previously impossible speed and fidelity.
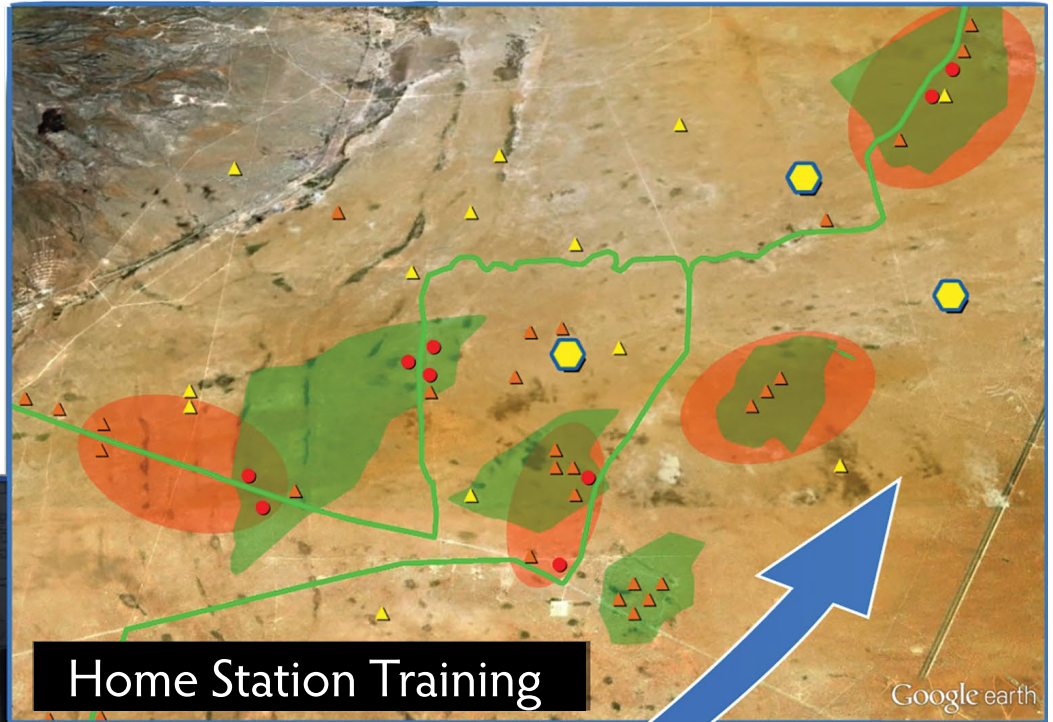
Home Station Training

Design

Another development is the Training Brain Repository. This web-based tool enables trainers to build their own exercises to meet specific training objectives without a team of script writers. Interestingly, all of these training scenarios are stored and available to others as well. So, let's say I need a training package focused on an Africa-based scenario. If none exists, I can use the repository's capabilities to quickly build the simulation scenario I need. That scenario will then be available for any brigade in the Army to use for their own training.

—Gen. David G. Perkins

As Operation Iraqi Freedom concluded and Operation Enduring Freedom's demands decreased, senior Army leadership directed a holistic review of home-station training for the post-conflict security environment. From this guidance, the training community conducted Army Training Summits I, II, and III.[2] During Army Training Summit II, Gen. Martin Dempsey, then commanding general, TRADOC, asked for a repository that would allow the force to share and access training data regardless of unit or data location.[3] This repository was to contain off-the-shelf scenario materials and files containing models and simulations that would provide an "80-percent solution" [referring to a solution that is effective but less than perfect] that unit commanders could update and tailor with their specific training objectives.[4] This guidance was the catalyst for the initial development of the TBR and subsequent creation of the EDT.

Fulfilling the basic repository requirement through a typical SharePoint collaboration portal would be uncomplicated. However, after extensive analysis and proper framing of the problem, the TBOC identified the requirement for a more fundamental, yet complex capability: exercise design. Thirteen years of top-down training within the Army force generation rotational cycle, where fully

developed training plans and exercises were delivered to deploying units, resulted in atrophy of the skills of Army training managers in both command and staff roles. An entire generation of soldiers has had little experience with the exercise design process at brigade level and below. The Army has needed a tool to automate the exercise design process, empowering units to spend more time conducting training than developing training. Although the TBR-EDT does not teach the design process, it does provide a repeatable and intuitive approach for users to learn the design process.

The Scope of the Challenge

Training developers, in the past, typically have spent an excessive amount of time searching for relevant and realistic data from past operational environments or previous training exercises to develop training events that would meet the commander's objectives. The data may have included unit-specific training tasks, storylines and events, master scenario event lists, tables of organization and equipment, maps, terrain data, and mission command information system requirements.

The methodical, time-consuming process of finding data comes at the expense of time for developing unit leaders and staff for a training exercise. Today's combat-proven soldiers and leaders have grown accustomed to the fast pace and complexities of ever-changing operational environments. Their planning tools should allow them to design and manage training quickly and expertly.

As the Army transitions to an Army of preparation, it must provide high-quality training experiences that replicate real-world operational environments and stimulate agility and adaptability. The TBR-EDT facilitates developing these critical skills by enabling leaders to focus on training more than training design.

What is the Exercise Design Tool?

The design tool is the central component of the exercise design environment, connecting other capabilities in the design environment and allowing leaders to collaborate in designing meaningful training. The TBR-EDT supports accurate replication of an operational environment and provides an innovative capability to create, clone, store, and share Warfighter Training Support Packages (WTSPs).[5]

The TBR-EDT is open source and web based. It provides exercise designers, trainers, commanders, and staffs with an unprecedented ability to find, reuse, and tailor exercises and training information to reflect the desired operational environment and address unit training objectives. The TBR-EDT places the exercise design capability back in the hands of commanders and staffs; they no longer have to rely on predetermined one-size-fits-all scenarios provided by engineers and script writers. Small-unit and higher-level staffs, other service exercise planners, and instructors at TRADOC centers of excellence now can use the TBR-EDT to quickly identify and adapt previously executed training exercises to build tailored training packages based on their commanders' objectives and intent. Users can modify WTSP elements, such as unit types, standard mission-essential task lists, training locations, operational environments, or master scenario events lists, to fit unit needs.

The TBR-EDT complies with and automates processes contained in Army Training Circular 7-101, *Exercise Design,* and it stores WTSP data in accordance with TRADOC Pamphlet 350-70-1, *Training Development in Support of the Operational Domain.*[6] More importantly, the TBR-EDT is integral to the development of the Army's Integrated Training Environment, another training tool that links live, virtual, constructive, and gaming capabilities to accurately replicate operational environments. Combined with the TBR-EDT, the Integrated training environment increases training efficiency and overall effectiveness by allowing soldiers and leaders to spend more time training and less time managing training.[7]

Although the TBR-EDT follows the Army's exercise design process, it is not just for Army users. Anyone in the Department of Defense with a common access card can access and use the TBR-EDT or search for unclassified and classified WTSP data for their own organizational use. The TBR-EDT is accessible on the Nonsecure Internet Protocol Network at https://tbr.army.mil and the SECRET Internet Protocol Router Network at https://tbr.army.smil.mil.

In addition, the TBOC and the Joint Staff Directorate for Joint Force Development (J-7) are partners in an effort to create a joint EDT that is joint exercise life-cycle-based and will be available on the SECRET Internet Protocol Router Network. This joint tool may become a large piece of the Joint Live Virtual Constructive 2020's "Scenario Management Tool," a single EDT that will incorporate additional joint data to enable developing joint training exercises for all the services.[8]

Components of the Exercise Design Tool

TRADOC created the TBR-EDT capability by integrating separate capabilities and technologies to automate the exercise design process. This effort required designers to combine and integrate authoritative data, start-of-exercise data, mapping and operational graphics, a storyline synchronization tool, a collaboration capability, role player development, higher headquarters' operation orders, and data reuse, while mapping the entire process.

Authoritative data. The TBR-EDT links with and receives data from authoritative sources including the TRADOC Intelligence Support Activity, the Department of the Army's Intelligence Information Service, the Central Army Registry, the Combined Arms Training Strategy, the Joint Lessons Learned Information System, and the J-7's Joint Training Data Service.

It publishes to the Rapid Data Generation Common Data Production Environment, enabling the rapid discovery, retrieval, and reuse of data and services across the spectrum of communities enabled by modeling and simulation. The goal is to present the right type of authoritative data to the user at the appropriate point in the exercise design process, alleviating the need to search for each type of data separately. To support regionally aligned force training, the *red force* (opposing or threat structure) will soon include real-world threat data, provided through the Modernized Integrated Database.[9]

Collaboration. The collaboration capability in the TBR-EDT allows a unit staff, or numerous distributed service or joint staffs, to work simultaneously on developing the WTSP documentation. Upon creating the exercise, the initial exercise owner can further assign and delegate (or disable as required) additional roles to other users.
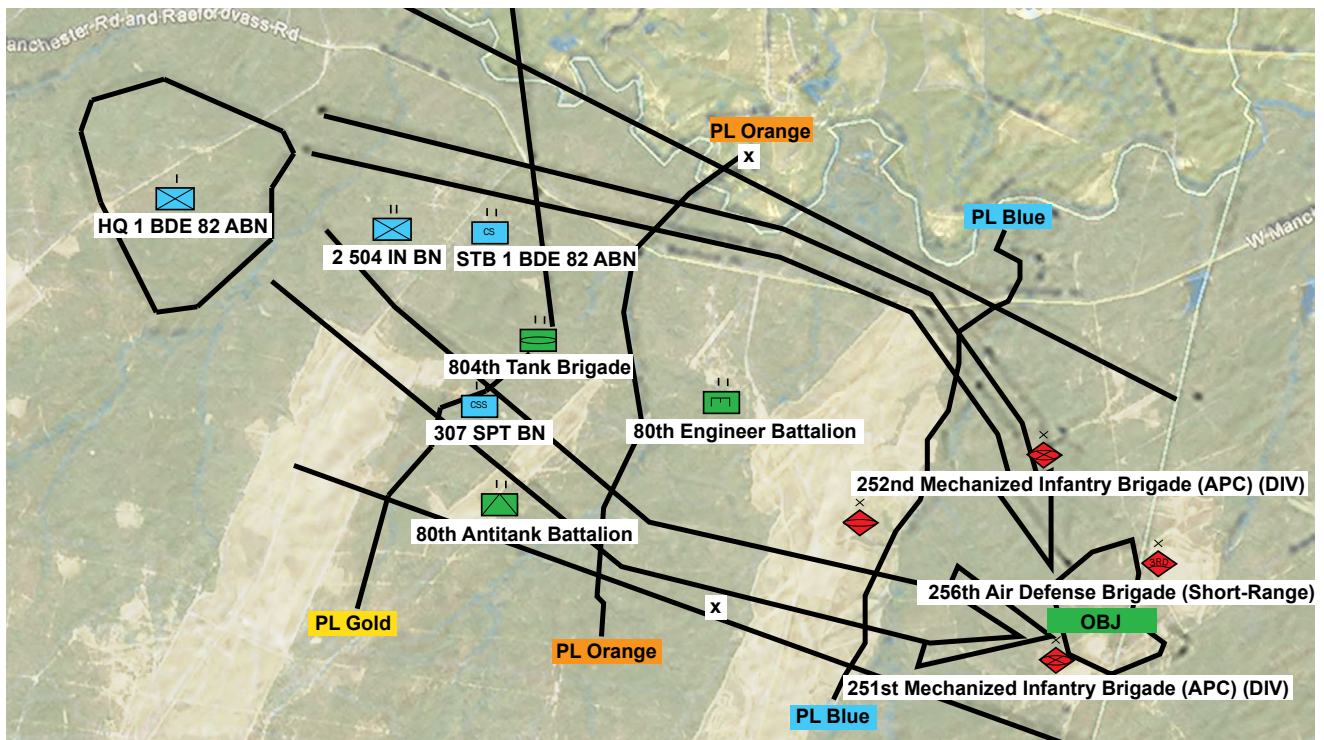

Figure 1. TBR-EDT Mapping and Graphics, Task Organization

These roles are owner, contributor, and reader. Each role has certain capabilities that facilitate the creation, implementation, and execution of the exercise. For example, these capabilities include—

● Owner: The S-3 can review the overall WTSP as it is being developed by the unit staff.

● Contributor: Unit staff members, such as the intelligence , logistics, or signal staff officers can develop their own separate annexes, appendices, or tabs for the operation order.

● Contributor: An attached fire support officer from a supporting unit can complete the fire support overlay.

● Contributor: Support units stationed at another post can complete their portions of the logistics annexes.

● Reader: Supporting personnel at the mission training complex or a combat training center with the responsibility to execute the exercise can observe and comment on the planning as it develops in real time.

Start-of-exercise data. The TBR-EDT supports live, virtual, and constructive situational training exercises; field training exercises; and command post exercises by producing start-of-exercise data through an Order of Battle Service (OBS) file (versions 2.0, 3.0, and 4.0 are currently supported).[10] The TBR-EDT exports OBS data (Army and other services) to stimulate simulations, such as the Joint Conflict and Tactical Simulation system, with a future expanded capability for One Semi-Automated Forces and Warfighters' Simulation. Presently, it contains the *red* (opposing or threat) and *green* (host-nation or coalition) *force* structure for the Decisive Action Training Environment, version 2.1.[11]

Mapping and graphics. The TBR-EDT provides mapping and drawing tools, allowing the user to take advantage of different mapping technologies to draw operational graphics. Figure 1 provides an example of a system-generated map with graphics.

Similar to Command Post of the Future, the TBR-EDT provides the user with several map
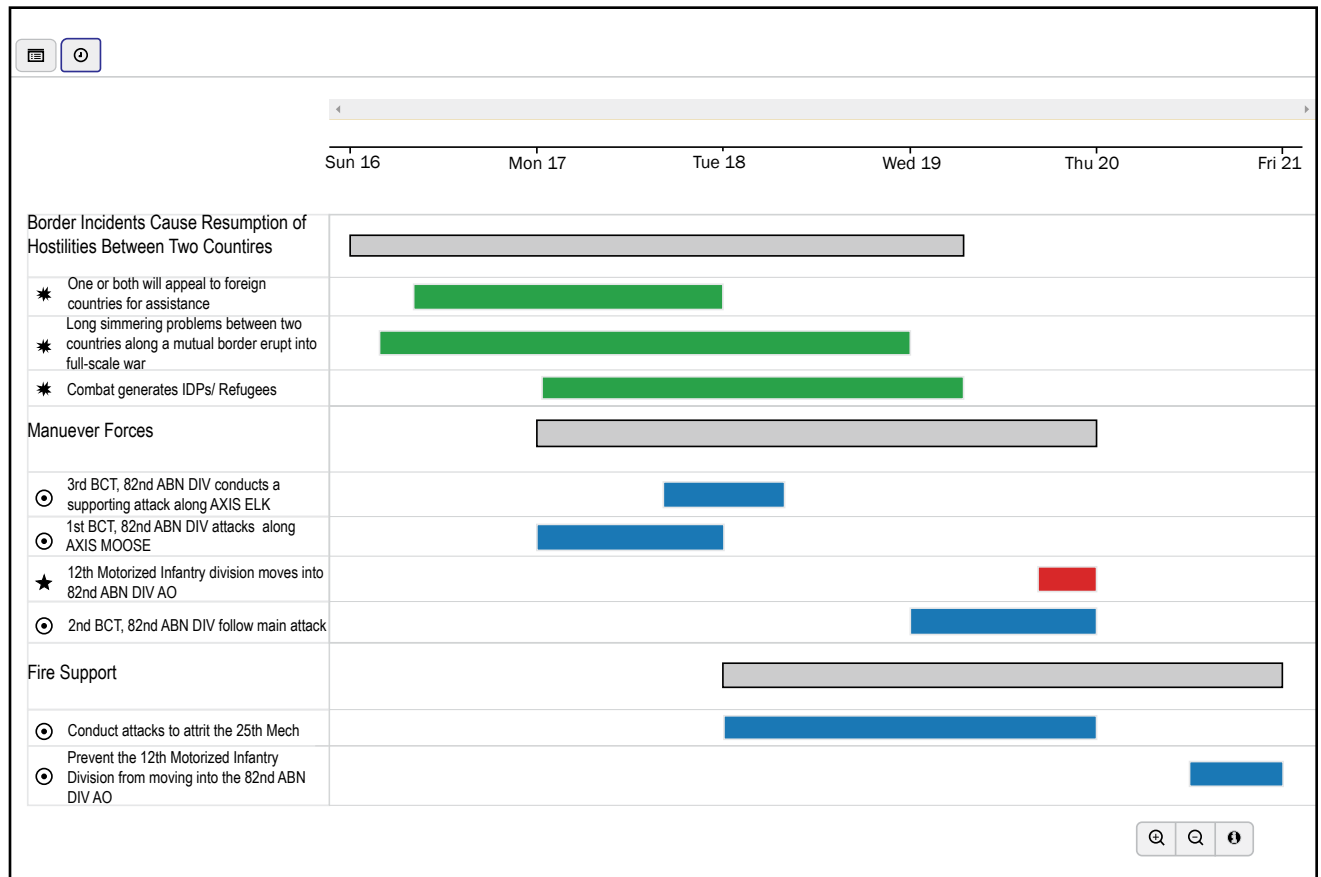

Figure 2. TBR-EDT Storyline Synchronization Tool

choices and multiple overlays, allowing multiple users to develop graphics in multiple layers (mission command, movement and maneuver, intelligence, fires, sustainment, protection, units, and user-customized) at the same time. Users can toggle the overlays on and off to display various layers, depending on mission requirements. Users can also create additional custom layers of graphics to depict phased operations, intelligence preparation of the battlefield, courses of action, or any other desired graphic requirements. If a user changes the training location, the graphics automatically move to the new map location where they can be easily repositioned, resized, or reoriented to fit the new terrain and operational requirements.

Storyline synchronization tool. Gone are the days of tedious storyline and event synchronization using Excel, sticky notes, or manually created events designed to cause different outcomes. TBR-EDT's storyline synchronization tool reduces or eliminates this action. With this tool, users and planners can deconflict storylines and events to ensure they take place at the correct time during the exercise.

Figure 2 provides an example of the storyline synchronization tool. The tool enables the manipulation of the timing and duration of storylines and events along a master timeline. Once changed, underlying files instantly update the entire master scenario events list, which can then be downloaded or printed.

Role player development. Role playing in today's operational environments must be authentic,

efficient, and effective. The importance of role players has gained increased emphasis to better expose U.S. military, interagency, intergovernmental, and multinational participants to the diverse set of operational environments, cultures, foreign languages, and organizations.[12] The TBR-EDT includes the capability to develop and reuse role-player actors and their associated instructions as part of the operational environment. Specific role attributes include name, gender, marital status, occupation, date of birth, and nationality. Overall, there are a total of 36 attributes available for assignment to a specific role player. The role attributes act as feeder data to other reports that may be used within the exercise. Figure 3 provides an example of system-generated role-player attributes.

Higher headquarters' operation order. One of the major exercise design components, and often the most time consuming to create, is the higher headquarters' operation order that drives the unit's military decisionmaking process. The TBR-EDT provides the capability to build any number of doctrinally compliant higher headquarters' operation orders, including up to 150 corresponding annexes, appendices, tabs, and exhibits.

The TBR-EDT maps data between the base operation order, annexes, and appendices, and then automatically fills in specific operation order data, thus reducing the time required to create the order. For example, the mission statement in the base order will automatically populate the corresponding mission paragraph within the annexes, where users can use it as is or modify it as necessary. If the mission statement in an annex is modified, it will

Figure 3. TBR-EDT Role Player Attributes

automatically appear in the next lower document, but it will not change the base order itself. The user can also add images and hyperlinks within the order and annexes. In addition to the operation order, the user can create a warning order to initiate the exercise process or a fragmentary order to manipulate or drive the exercise.

Data reuse. Data reuse is a major feature of the TBR-EDT. It allows users from across the Army to leverage previously generated exercises. Tailoring the input from previous exercises conducted by other Army users maximizes efficiency and greatly reduces the time to design an exercise.

A brigade operations staff officer (S-3) in Georgia can clone an S-3's work in Hawaii, Texas, or South Korea and then modify that work to suit his or her own unit's unique training objectives. After cloning the exercise, the S-3 can search for and reuse other individual exercise elements. These may include storylines, events, operation orders, role players with associated reports, or data tied to the operational variables (political, military, economic, social, infrastructure, information, physical environment, and time).

In another example, a unit may be deploying to a location that has internally displaced persons. That unit could search stored exercises from several different theaters for events that contain internally displaced persons and then modify those events for use in its own training exercise. The TBR-EDT also allows units to search for types of operations and operational environments similar to those they are preparing for—such as stability operations in Indonesia—so they can locate sample training objectives to help them develop objectives for their units.

Scheduled Updates to the TBR-EDT

Future versions of the TBR-EDT will allow users to search through many years of applicable mission command information system operational messages that generally support the events and storylines within the exercise. When users find the appropriate messages, they will be able to use the TBR-EDT's embedded tools to transform proper names, date-time groups, and locations within the message data to fit the specific training environment. Once transformed, the message content is changed to replicate the new training location, but the context of the original

Training Brain Repository
TBR

OE Data
PMESII-PT Data
Force Structure
WTSP
Unit METL
Storylines/ Events
Road to War
OPORDS

Exercise Design Tool
EDT

TBR

COEs   Installations

message remains the same, allowing trainers to create a much more realistic and robust exercise event.

Feedback from Users in the Field

The TBR-EDT became operational on Nonsecure and SECRET Internet Protocol Router Networks in November 2013, enabling Army units to test it and provide feedback. The TBOC demonstrated the TBR-EDT at training and leader development venues, including the Brigade Pre-Command Course and Functional Area 57 Course, the Maneuver Center of Excellence, and Army National Guard training sites. A comment by one Army user is representative of the feedback TBOC has received on the value of the TBR-EDT: "I just spent a month and a half developing a TSP [training support package]; with the use of the TBR, I was able to create a similar TSP with the same level of fidelity in an afternoon."[13]

One modeling and simulations (FA57) officer recently commented that he believed using the TBR-EDT would improve the development of TSPs at the brigade, division, and corps levels. He said it would make FA57 officers into "rock stars when they get to their first operational assignments."[14] Moreover, senior Army and joint officers are responding very positively, with many saying they wished this type of tool had been available for past training.[15]

The TBOC completed its Army certification of the TBR-EDT in August 2014. The tool is awaiting final Army accreditation with approval of authority to operate.

Conclusion

While the TBR-EDT cannot do all the staff work required to create a home-station training exercise, it will provide an effective start-of-exercise solution. Units still must conduct the military decisionmaking process and create their own unit orders for an exercise. The tool will provide a WTSP that contains tactical, control, and setup materials, as well as evaluation plans and references for exercises. This means exercise planners will easily realize significant resource savings while designing exercises. Units can expect to complete a WTSP in days rather than months, enabling them to concentrate on training more than on training development.

The TBR-EDT's end product is a joint or Army exercise across all levels, developed within a complex, realistic, integrated, and challenging training environment that will drive operations, stimulate staff battle drills, and help meet commanders' training objectives in less time and at a significantly lower cost. If units invest the time to use this valuable capability, it will greatly assist the Army in its effort to revitalize home-station training and build a campaign-quality Army with joint and expeditionary capabilities.

Finally, the TBR-EDT is but one of a number of complementary capabilities available from the TBOC. As an element of the TRADOC G-2 and the Operational Environment Enterprise, the TBOC accesses real-world data, information, and knowledge and shapes them for focused application in training, education, and leader development venues.

The TBOC supports realistic and relevant home-station and institutional training by providing depth and complexity to scenario and exercise development. It develops operational environment visualizations and gaming products consistent with the Army learning model and responsive to unit needs.[16] ■

Col. David Paschal, U.S. Army, Retired, is the director of the Training Brain Operations Center in Newport News, Va. He is a retired infantryman with numerous command assignments and operational deployments, including command of the Warrior Brigade Combat Team, 10th Mountain Division, for a 14-month tour in Kirkuk, Iraq; and the 2nd Battalion, 87th Infantry Regiment, during a deployment to Afghanistan in support of Operation Enduring Freedom.

Maj. Alan Gunnerson, U.S. Army, Retired, is a senior consultant with CGI Federal Corporation, supporting the Training Brain Operations Center as the Data Transformation Laboratory enterprise management supervisor.

Notes

Epigraph. "Q&A: Gen. David G. Perkins," *Military Training Technology*, 10 October 2014, http://www.kmimediagroup.com/military-training-technology/440-articles-mtt/q-a-general-david-g-perkins (accessed 10 November 2014).

1. Retired Gen. Robert Cone, former commanding general for U.S. Army Training and Doctrine Command (opening lecture, 2013 Association of the United States Army [AUSA] Institute of Land Warfare Winter Symposium and Exposition, Fort Lauderdale, FL, 20 February 2013), reported in C. Todd Lopez, "Army Must Shift Focus From Execution to Preparation," online at U.S. Army Homepage, http://www.army.mil, news archive (accessed 2 December 2014). Cone said the Army must shift from resourcing the fight in Afghanistan to preparing for future conflict by investing in leader development and training.

2. Combined Arms Center-Training (CAC-T), "Memorandum for Record: DCG CAC-T Description of the Complex Training Operational Environment (Version 26) and updated implementing guidance," Brig. Gen. Mike Lundy, 29 January 2014.

3. Army Training Summit II working groups met 16-20 May 2011, 21-23 June 2011, and 18-22 July 2011 at Fort Leavenworth, KS. The one-star video teleconference occurred 9 August 2011. Army Training Summit II took place 14-15 September 2011.

4. Headquarters, U.S. Army Training and Doctrine Command (TRADOC), TRADOC Tasking Order IN1325-1649: TRADOC Support to the Army Approved Functional/Multi-Functional (F/M-F) Unit Training Strategy, 21 November 2011.

5. TRADOC Pamphlet (TP) 350-70-1, *Training Development in Support of the Operational Domain* (Fort Eustis, VA: TRADOC, 24 February 2012). A WTSP is a complete, stand-alone, exportable training package that integrates all training products, resources, and materials necessary to support operating force training. It meets the broader scope of what the collective training community requires for training events. WTSPs may vary greatly in size and depth of content depending on the events to be trained, training environment, audience, and available training aids. A WTSP provides variable levels of detail for describing a unit training event for use in live, virtual (including gaming), and constructive environments, or any combination thereof.

6. Training Circular 7-101, *Exercise Design* (Washington, DC: U.S. Government Printing Office, 26 November 2010); TP 350-70-1 provides detailed guidance supporting TRADOC Regulation 350-70, A*rmy Learning and Policy Systems* (Fort Eustis, VA: TRADOC, 6 December 2011) and amplifying guidance on procedures for producing unit training products. This guide utilizes the instructional system design model often referred to as the analysis, design, development, implementation, and evaluation process.

7. Army Training Network, *Leaders Guide to Training in the Integrated Training Environment: Brigade and Battalion Exercise Planning* (Fort Leavenworth, KS: Army Training Network,

25 September 2014), online at https://atn.army.mil (accessed 2 December 2014); CAC-T Memorandum for Record. Brig. Gen. Lundy directed the integration of the TBR into the integrated training environment.

8. The Joint, Live, Virtual, and Constructive (JLVC) 2020 Technical Architecture is an update to the Joint Training Environment to meet Joint Force 2020 training needs. The technical architecture is an enterprise architecture vice integration of monolithic models; it includes cloud computing and Web 2.0 technologies, and it is requirements based and risk managed. Joint Staff J-7 leads the JLVC 2020 effort. JLVC2020 Cloud-Enabled Modular Services includes a Scenario Management Tool that includes event design and scenario design tools. The joint EDT may provide a large portion of the services required for the SMT.

9. Modernized Integrated Database is a Department of Defense Intelligence Information System Intelligence Mission Application. It serves as the primary repository for data production and dissemination of military intelligence involving worldwide orders of battle, facilities, command and control networks, targeting, battle damage assessments, and other related information required for strategic assessments and national policy decision making.

10. The TBOC selected to use Order of Battle Service (OBS) eXtensible Markup Language (XML) as the modeling and simulation output format for the TBR-EDT. The OBS XML was developed in support of the JLVC federation, and it provides a single source for initialization data across all of its federates. The 23 federates utilized within the JLVC cover models and simulations across joint, Army, Navy, Air Force, and Marine Corps forces.

11. Decisive Action Training Environment (DATE) version 2.1, February 2014. TRADOC Intelligence Support Activity developed DATE to provide the Army training community with a detailed description of the conditions of five virtual operational environments in the Caucasus region: Ariana, Atropia, Gorgas, Minaria, and Donovia.

12. TRADOC, *Contemporary Operational Environment Actors & Role Players Handbook* (Fort Leavenworth, KS: TRADOC Intelligence Support Activity, August 2007), https://rdl.train.army.mil/catalog-ws/view/100.ATSC/C3E9AA9E-AC02-42B8-9365-A06699145435-1274554507263/159-d-0003/coe_arp_hdbk.pdf (accessed 17 November 2014).

13. Senior opposing force analyst comment made during the initial unit testing in late August 2013 of the TBR, Fort Campbell, KY.

14. Comment made by an FA57 officer during a 2014 FA57 Course that included an introduction of the TBR-EDT. The TBR-EDT is currently introduced in various military instructional venues, including the FA57 Course and Brigade Pre-Command Course.

15. During several visits to the TBOC, senior Army and joint officers have made positive comments regarding the TBR-EDT, including the referenced comment.

16. Additional information is available at the TBOC homepage: http://tboc.army.mil (accessed 17 November 2014).