



Participants in Unified Challenge 16.2 input information into the gaming system March 2016, Fort Leavenworth, Kansas. (Photo by Maj. Christopher Ellis, U.S. Army)

Army Future Force Experimentation Unified Challenge 16.1

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As part of the Army's campaign of learning, U.S. Army Training and Doctrine Command (TRADOC) conducts a series of experiments to help develop the Army of the future.¹ The current focus of Unified Challenge, TRADOC's current campaign of learning, is on the 2030 timeframe and involves a wide variety of specialties across the full array of Army skills, anticipating an extremely challenging environment. It is an excellent stress test for our future

(2030) concepts. Our experimentation focuses on limited aspects of the future environment, allowing the Army to gain a deeper understanding of its challenges while properly husbanding its limited resources into areas we think we need to address the most. Some of these include required future capabilities, future formation structures, roles and responsibilities (primarily of brigade, division and corps), and what needs to be contained within the formation (organic) and what

formations need to access from other organizations (task-organized).

We innovate based on a reasonable understanding of the environment and capabilities that are likely to be available in that timeframe, while still having enough time to make those ideas and capabilities real and suffusing them throughout the future Army force. This “sweet spot” between big ideas and hard reality is most useful in maximizing the Army’s ability to influence its future. Experimentation allows us to anticipate and adapt to future challenges before we invest our country’s treasure in development and production of a force that might not be suitable for tomorrow’s battlefield.

There is great effort to both discover answers to our critical questions and share that knowledge with others who need it. Our emphasis on building the Fiscal Year 2016 Campaign of Learning is to support cumulative learning, build up our collective understanding of key questions, and not waste resources relearning what some in the organization already know.² Our desired end state is to provide rigorous experimentation that develops focused information that assists in updating operational and organizational (O&O) concepts. In other words, we want the best, most innovative concepts possible that we improve by testing them under stressful situations before people are placed in harm’s way.

Methodology for Developing Experiment Parameters

The Army’s Campaign of Learning uses a number of learning venues.³ Our responsibility at the Joint and Army Experimentation Division is to conduct experiments: putting capabilities and people in an environment and assessing what happens. We utilize different types of experiments based on what we need to learn. Game-based experiments (GAMEXps) or simulation-based experiments (SIMEXps) are our primary options. A GAMEXp is a multisided, turn-based, formally adjudicated game that uses a representation of forces and the environment for the purposes of assessing concepts and required capabilities at the organizational level (low resolution). It helps examine how groups of people and things behave and interact, and is better suited to qualitative issues. A SIMEXp is a multisided, real-time game with commanders and staffs (or at least parts of their staff). They use simulated

soldiers, equipment, and environments for the purposes of assessing concepts and required capabilities at the entity level (high resolution). It helps examine individual people and how things behave and interact, and is better suited for quantitative issues. In both cases, the key differentiator for Unified Challenge experiments is to provide credible evidence supporting our insights and findings—a challenging task given the complexity of warfighting.

We frequently alternate between these approaches, depending on our learning requirements, resources available, etc. When appropriate—as in fiscal year 2016—we conduct only game-based experiments. This is reflective of the initial stage of development for the O&O concepts we are supporting (e.g., a lower resolution GAMEXp is more appropriate for early development). As concepts mature, we rely increasingly on simulation-based experiments. In Fiscal Year 2017 we expect to conduct one GAMEXp and one SIMEXp.

Unified Challenge 16.1

As part of our Fiscal Year 2016 events, we conducted Unified Challenge (UC) 16.1, a GAMEXp. (We have also now conducted UC 16.2, and we will provide analysis of that event in an upcoming article.) UC 16.1 provided a venue to determine the capabilities required by the theater army, corps, and divisions, and informed multiple initial O&O concepts. The initial O&O concepts are at the beginning of a multiyear effort to update and reflect a 2025 multidomain battle operational environment.

The experiment had three objectives:

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1. Refine and update the Force 2025 and Beyond (F2025B) capabilities needed by the theater army, corps, and divisions.
2. Assess current formations for modification and identify new formations required in 2025 and beyond.
3. Refine and update what F2025B formations need to be organic or task-organized to the theater army, corps, and divisions.

An important learning demand was identifying what modifications are necessary to current Army command and support relationships so that we clarify roles and responsibilities. Other learning demands addressed force design, to determine

- how much of the force should be “enterprise-based” versus more self-sufficient,
- how to maximize capabilities to the tactical edge,
- how the future force can best deploy and array itself on the battlefield,
- the best balance of manned-unmanned teams, and
- the qualities our information network requires to maximize combat effectiveness of the future force.

In seeking answers to these learning demands during UC 16.1, the following four thematic areas emerged from our analysis of the experiment outcomes:

- tension between command and support relationships;
- clarification of roles and responsibilities between Army echelons, unified action partners and joint, interorganizational, and multinational partners;
- considerations that address interdependency vice self-sufficiency; and
- warfighting effectiveness of a largely enterprise-based force.

UC 16.1 Design and Planning

UC 16.1 began long before teams arrived at Fort Leavenworth, Kansas, to conduct the main event. In addition to the standard planning meetings, we conducted a “Set the Experiment” event as part of our preparations. Its purpose was to establish conditions for conducting experiments in a given scenario, driven by the experiment objectives and supporting learning demands. Inputs to UC 16.1 also included

- two Future Force Design seminars (the second was attended by Chief of Staff of the Army Gen. Mark A. Milley, who provided guidance on our way forward),⁴

- the first TRADOC commander-led “How the Army Fights” wargame,
- O&O concept updates,⁵
- a Learning Demand Review Board,
- a production workshop (to develop a concept of operations, etc.), and
- a significant research effort to identify appropriate science and technology enablers.⁶

This GAMEXp took a top-down approach, focusing on echelons-above-brigade formations (i.e., theater army, corps, and divisions). The participating brigades looked at the implications of the higher echelon operations to their O&O concepts. Our follow-on experiment, Unified Challenge 16.2, looked at brigade-level formations, their O&O concepts, and how they integrate into their higher echelons, in a more bottom-up approach.

Participants in the GAMEXp included two former division commanders; seven former brigade commanders and twenty-three former battalion commanders; U.S. Air Force, U.S. Marine Corps, Department of State representation; and a British military representative. Participants were from the relevant combatant commands and all TRADOC centers of excellence. This brought operationally savvy players together with future-concept authors to provide a rich team of experts to address a very challenging situation. To provide the clash of ideas and drive innovation, we utilized threat experts who were free-thinking—and more than a little devious—to provide a credible representation of our future opponents. This clash of ideas is critical to challenging our ideas and developing new approaches to potentially radically different threats.

In UC 16.1, the first vignette involved phase II (seize initiative) of an operation, first utilizing the “base case” force and 2020 O&O concepts.⁷ Vignette 2 was a phase III (dominate, major combat operations) construct. Once the base case plan was completed, the core team that developed the plan briefed all participants (including the Red Team). Then all teams learned the “advanced case” capabilities and repeated the same operation using a 2025 era O&O concept with additional science and technology enablers. The teams planned with these more advanced designs and capabilities, and then briefed to the whole group. The Red Team then took time to assess the situation, plan, and then brief their formation’s

actions. While Red was assessing and planning, the Blue Team conducted excursions to look at specific topics of interest in a seminar format. This allowed us to get at our primary learning demand, the vulnerabilities to our network. It also highlighted the need for some better-refined command-and-support relationships between higher and lower echelons, and contributed to answering our other learning demands.



Team leaders from Unified Challenge 16.2 discuss challenging issues determined during game play at Fort Leavenworth, Kansas. (Photo by Maj. Christopher Ellis, U.S. Army)

UC 16.1 Data Collection

Beyond having an analysis team integrated throughout the experiment, we used multiple overlapping data collection methods to maximize our probability of success in achieving our objectives. Our experiments utilize online discussion boards, surveys, facilitated discussions, player templates for planning inputs, and excursions to ensure we address a rich array of questions from the whole community of interest. The game design also included assessment groups, which are essentially functional subject-matter expert participants that were then tasked to assess the operational outcomes of the experiment and facilitate focused learning. We designed data collection to rigorously answer as many of our research learning demands as possible and to facilitate our postevent analysis.

We also invited senior leaders to meet for discussions during working lunches. These were rich discussions in a more relaxed environment that contributed to our learning effort. We were able to steer these discussions toward issues we felt required additional thought to ensure we met our experiment objectives.

UC 16.1 Outcomes

The following are the key outcomes from UC 16.1, organized according to their relationship to the learning demands.

Echelons-above-brigade outcomes. These cover findings related to organizational decisions regarding theater army, corps, and divisions.

- A theater army can function as task force or functional component command for short-duration contingencies. Higher intensity or longer duration contingencies exceed the capabilities of the theater army.
- Echelons-above-brigade maneuver-support assets need technology and weapon systems to provide timely and seamless integration to supported brigade combat teams.
- The Multi-Modal Distribution Company had the highest potential payoff in terms of reduced risk to soldiers. It provided multiple domains for resupply and provided greater distribution flexibility across multiple domains (modes, nodes, and routes) in an austere environment.⁸

Network-related outcomes. These summarize the findings regarding the Army's capacity to wield communication tools to maximum effect. All of the

outcomes can be understood as describing how the Army's ability to realize the potential benefits of the intelligence enterprise is dependent on robust and secure communications, which requires well-designed systems and proficiency at using them.⁹

- Cyberspace is a significant dilemma and a challenge to future operations as evidenced by the desire to have organic friendly offensive and defensive cyberspace capabilities. A large part of the challenge stems from each commander's inability to articulate requirements, since cyberspace operations are a relatively new area of concern at the tactical and operational levels, and because they are more highly classified.
- The Integrated Fire Control Network and the Integrated Air and Missile Defense Battle Command System were effective and provided air defense with a common centralized fire control and mission command network.
- Tactical commanders lacked the ability to accurately understand, visualize, and describe the positioning, navigation, and timing environment.

Operational outcomes. These describe what entities and individuals need to be aware of to be best prepared for likely future operational environments.

- The future force will need the "next evolution" of suppression/destruction of enemy air defense.¹⁰
- During a high-intensity conflict threat environment with anti-access/area denial, it is a challenge for the medical company to plan and coordinate for prolonged medical care before medical evacuation is available.
- The concept for Army special operation forces mission command of larger conventional force attachments is plausible. However, the general officer-led

special operations joint task force has limited organic capability and capacity, requiring nonorganic augmentation and enablers to effectively command and control and support conventional force operations.

- Army field-support brigades perform both generating force and operating force missions, often leaving them unavailable to deploy with their supported division and forcing them to conduct split operations.
- Trust among team members must be established before an operation. Trust cannot be accelerated, or "surged."

UC 16.1 Results and Next Steps

In UC 16.1, the focus was on the theater army, corps, and division O&O concepts, with implications for the brigade-level O&O concepts. For UC 16.2, that focus was reversed, with experiments examining brigade level and seeing the implications for echelons above brigade.

We informed force-effectiveness issues and metrics to confirm that changes actually will improve the force. We also identified opportunities and future capability needs as well as developed a more refined understanding of the operational environment of 2030. As part of our effort to share learning, we are careful to provide output to both the Army Warfighting Challenges and the capabilities needs analysis process. Outcomes from UC 16.1 also fed the Unified Quest Deep Futures Wargame, which, in turn fed back into UC 16.2 and effectively supported the current campaign of learning; this should lead to a more effective future force capable of fighting and winning in the complex operational environment we expect in 2030 and beyond. ■

Notes

1. For the definition of campaign of learning, see Training and Doctrine Command (TRADOC) Pamphlet 525-8-2, *The U.S. Army Learning Concept for 2015* (Fort Eustis, VA: TRADOC, 20 January 2011), 62, accessed 22 May 2017, <http://www.tradoc.army.mil/tpubs/pams/tp525-8-2.pdf>. The current campaign of learning is a multiyear effort of intellectual (studies and analysis, concept and capabilities development) and physical (experimentation, evaluations, exercises, wargames) efforts that supports future force development. It is an Army-wide effort within a joint and multinational context, managed by the Army Capabilities Integration Center. See "The Campaign of Learning,"

milSuite Wiki, last modified 21 March 2017, accessed 27 March 2017, https://www.milsuite.mil/wiki/The_Campaign_of_Learning (CAC required).

2. "The Campaign of Learning"

3. Force 2025 and Beyond generically refers to all of the various learning venues supporting the Army's Campaign of Learning as "Force 2025 Maneuvers."

4. "Unified Quest," Army Capabilities Integration Center website, accessed 22 May 2017, <http://www.arcic.army.mil/Initiatives/UnifiedQuest>.

5. Ibid.

6. Office of the Under Secretary of Defense (Comptroller), Chief Financial Officer, "United States Department of Defense Fiscal Year 2016 Budget Request Overview" (Washington, DC: Department of Defense, February 2015), accessed 22 May 2017, http://comptroller.defense.gov/Portals/45/documents/defbudget/fy2016/fy2016_Budget_Request_Overview_Book.pdf. The Fiscal Year 2016 president's budget request for science and technology for defense was \$12.3 billion, which is 2.3 percent of the Defense Department's (\$534.3 billion) base budget. We closely integrate with Department of Defense and Army Research and Development organizations to ensure we utilize appropriate science and technology enablers in our experimentation.

7. We have a set of evolving operational and organizational concepts for each formation that we "stress test" in our experiments

to help improve their integration with each other as well as improve their internal logic, required capabilities, etc.

8. The conceptual Multi-Modal Distribution Company would utilize a mix of manned and unmanned ground vehicles and cargo unmanned aerial systems (UAS). Large UAS could transport supplies and equipment forward from aerial and sea ports of disembarkation, intermediate staging bases, and sea bases to division and brigade-level support activities.

9. The intelligence enterprise consists of Army intelligence and the greater intelligence community, which encompasses all the federal government's intelligence organizations, integrated to provide intelligence to the future force.

10. More information on suppression/destruction of enemy air defense may be found at Air Defense Artillery Online, accessed 22 May 2017, <http://sill-www.army.mil/ada-online/>.

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