



**DEPARTMENT OF THE ARMY**  
HEADQUARTERS, UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND  
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FORT MONROE, VIRGINIA 23651-1047

REPLY TO  
ATTENTION OF

ATCG

15 September 2010

MEMORANDUM FOR Dr. Regina Dugan, Director, Defense Advanced Research Projects Agency, 3701 North Fairfax Drive, Arlington, VA 22203

SUBJECT: Defense Advanced Research Projects Agency (DARPA) Initiatives

1. Through the ADSAG, I have been able to follow DARPA activities and have noted with strong approval your creation of the Adaptive Execution Office with the mission "to harness the creativity of DARPA program managers and America's science and engineering community to transition DARPA technology to our warfighters faster and more effectively [and thereby] promote adaptability in DoD by getting additional technologies to the field more quickly and by advancing technologies that will help us build in adaptability from first principles."
2. It is my belief that one of the most pressing needs of our warfighters lies in our ability to adequately train them for the challenges they face today and are likely to face in the future. Technology interventions by DARPA have transformed the Army's training over the past three decades, but we need help now more than ever. Current Army S&T initiatives are unlikely to prepare warfighters for fast-paced, serial deployments that will tax their adaptability, and wartime urgencies foreclose relying on past practices.
3. The Army must train as it fights. This means using the same mission command networks and sensors for reconnaissance, surveillance, and target acquisition in combat configurations or accurately emulated in all of our training and institutional education venues. The Army must be able to portray for its training exercises and leader development the complexity of the operational environment and the very latest enemy tactics, techniques, procedures, and materiel.
4. DARPA's key role in support of training is showcased in the blue boxes at enclosure, figure 1. Historically, Army exploitation of DARPA's innovation has not always been adroit. As an example SIMNET, which took the Army's existing training technique, Tactical Engagement Simulation, to a new level of cost effectiveness, waited nearly 2 years for Army procurement. It was even longer before it was fielded. This is a gap we cannot afford in today's dynamic environment, and I want you to know I will do all in my power to prevent recurrence of such a failure.
5. I am sure you are familiar with the Army's Force Generation (ARFORGEN) cycle. From my perspective, there are two major technology gaps limiting the effectiveness of ARFORGEN:

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a. Inability to prepare units pre-deployment for the exigencies of ongoing combat in complex and dynamic environments against enemies who have proven to be more adaptive than us.

b. Inability to prepare leaders for mission command by replicating their access to data and information about the environment and the enemy.

6. Using its own resources, the Army is unlikely to close those gaps, for doing so will require nothing less than a revolution in the Army's current methods of preparing leaders and units for war.

7. I am sure you know that the capstone event in ARFORGEN unit training is the Mission Readiness Exercise (MRE) at one of our Combat Training Centers (CTC). However, experience has demonstrated that ARFORGEN cannot be paced efficiently with CTC scheduling for an adequate MRE. The alternative is to equip our key garrisons with CTC-quality training instrumentation to support MRE at home station. TRADOC has been working to that end for years with the Army S&T and Acquisition communities, but we do not have much to show for our efforts. The still prospective Home Station Integrated Training System (HITS) is a miniature, transportable version of legacy CTC instrumentation: fixed towers that derive vehicular locus from RF trilateralization, transponders and other infrastructure, including upgraded versions of the venerable (TRADOC-developed) Multiple Integrated Laser Engagement System (MILES)--old wine, new skins. A visualization of HITS is at enclosure, figure 2.

8. Even more important than training instrumentation is the design of tasks, conditions, and standards for collective readiness. That design should involve the migration of lessons learned in combat into units preparing to deploy. Today, that awareness transfer is time-consuming and expensive in dollars and manpower. There is a critical time lag between understanding in theater of *current* environmental changes including enemy tactics, techniques, and procedures (TTPs) and ARFORGEN's staging a training event that reflects such enemy behaviors whether that event is intended to challenge a would-be commander, build teamwork within a command group, or provide a context for training whole units. That lag is such that any unit preparing for deployment is almost always training against yesterday's challenges, and it leads to flawed operational effectiveness when that unit first arrives in theater. (It is certainly true that most units experience the preponderance of their casualties in their first 90 days in combat.)

9. With the assistance of JIEDDO, TRADOC has set up a Joint Training Counter-IED Operations Integration Center (JTCOIC) which has demonstrated a nascent ability to capture real-time CPOF data direct from theater, to process that data to allow its transmission over NIPRNet, and to repurpose it for use in instruction. For instance,

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JTCOIC has demonstrated that within hours of the event it could illustrate for students at Fort Leavenworth the circumstances of a successful ambush in the Korengal Valley of Afghanistan. But, we do not yet have ways and means to capitalize on such a capability for ARFORGEN, either for leader development or for collective training within ARFORGEN.

10. Neither the CTC today, nor HITS when fielded, can record for after action reviews (AAR) the performance of dismounted units. Yet, these are pivotal to BCT maneuver and wide-area security alike. Nor can HITS facilitate the use of UAS in relatively restricted air space. HITS anticipates that OCs will derive MRE tasks, conditions, and standards from doctrine and dated reports, not from data fresh from operational theaters.

11. Thanks to DARPA, I am now convinced the technology is at hand to revolutionize ARFORGEN training. I propose TRADOC partner with DARPA to develop ways rapidly to repurpose actual combat data and to adapt such systems as DARPA's ARGUS-IS, HART, and RDA for MRE instrumentation. Interaction among such systems should be able to detect and track surface movements of both dismounts and vehicles and provide videos of their behaviors, just the sort of information needed for AAR. HART, a system that tracks aerial surveillance platforms and depicts the coverage of their sensors, could not only aid control of the air space over the training area, but could also simulate specific platform/sensors unavailable for training. Networking the foregoing systems with RDA and other energy-efficient, low cost efficient UGS could be integral to determination of locus for ground truth.

12. Clearly, the Army will want to transition such systems for operations. But if we could also with DARPA's help, adapt them for training instrumentation, we could capitalize on cost-avoidance by canceling some or all of HITS. Moreover, we would be training the force prior to deployment to use them to advantage in combat. (A contract has yet to be awarded for HITS, but when let, that contract will draw resources that could be used to facilitate transition into the Army better technology already developed by DARPA.)

13. What I have been describing up to now could go a long way toward closing the gap in training a unit for the present wars. The clinching step would be a means to guarantee that unit a well prepared commander, a leader whose perceptions, sensing, notions, and intuition have been tuned through experiential learning to understand mission command in all its complexity, to anticipate exigencies, and to remain proactively adaptive under stress. I believe if DARPA can show us how to repurpose actual combat data to devise events for unit training, we can use the same source data to develop a cognitive development environment for present or prospective

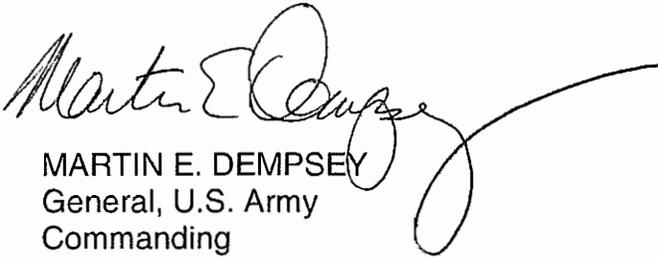
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commanders. I would hope DARPA could bring to such a development all its skills and experience with perceptual and encephalic analyses.

14. Finally, I would hope that DARPA could extend its creative work on empowering the individual Soldier via TIGR and its Transformative Apps program. While up to now DARPA has focused on operational enhancements for the Soldier, these are also by their nature instructive. Under the educational theory that "learning is best done at point of need," there is probably a case for moving training for specific military occupation specialties from TRADOC schools and training centers into units, depending upon PDAs to convey to each Soldier, on demand, information relevant to his duty performance and reflective of his experience. If the Apps are cogently developed, they could also assist first-line supervisors and TRADOC in evaluating individual skill levels, providing remedial training where indicated, and helping to identify particularly effective Soldiers for promotion and further training.

Encl



MARTIN E. DEMPSEY  
General, U.S. Army  
Commanding

## DARPA's Key Role in Support of Training

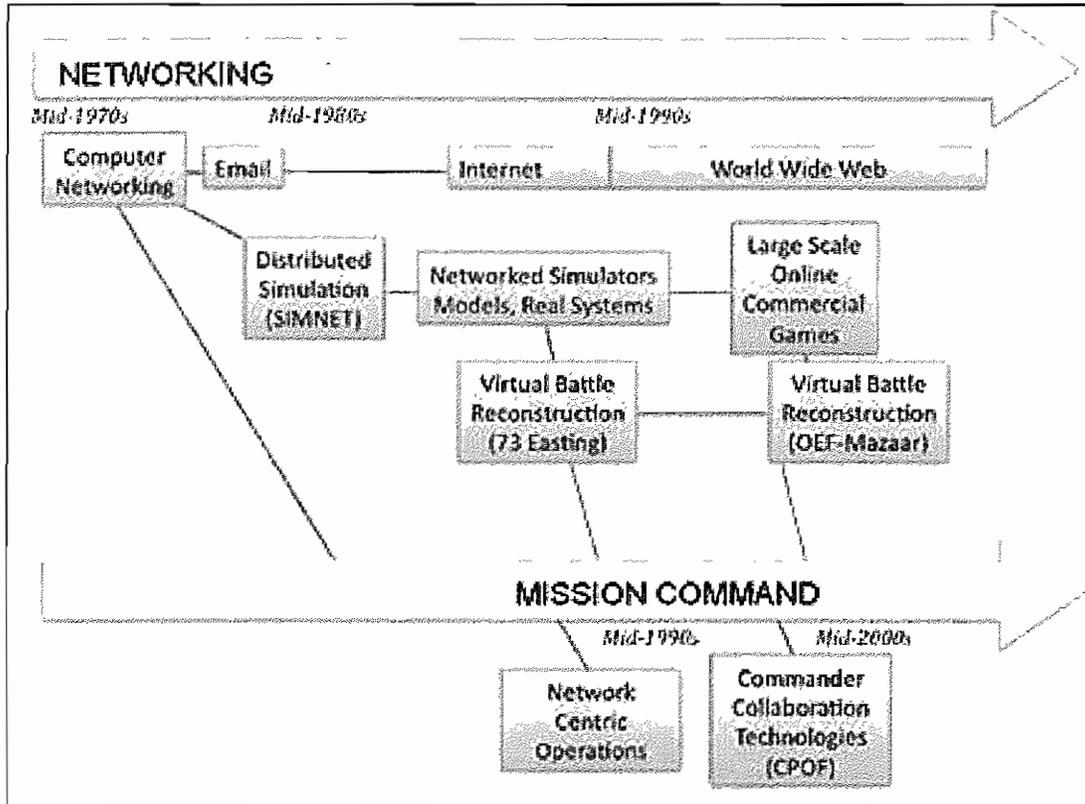


Figure 1

## Visualization of HITS

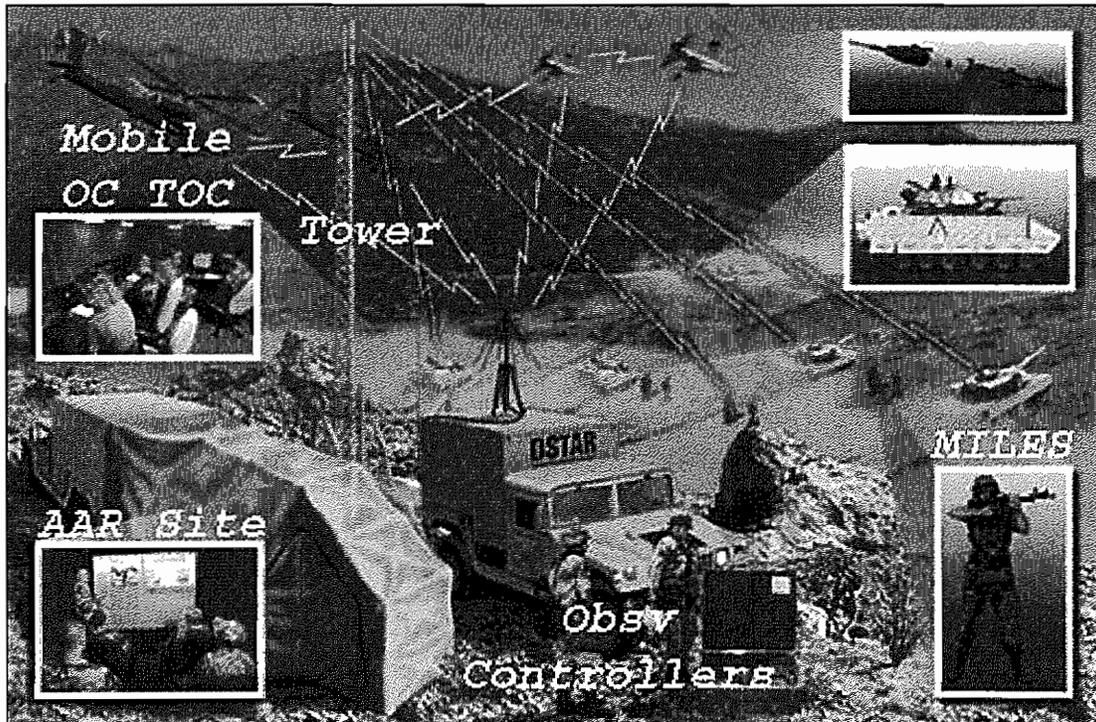


Figure 2