nTsa

NATIONAL TRAINING AND SIMULATION ASSOCIATION

Army

Training 2015
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Acknowledgements

Once again, NTSA is proud to have sponsored an effort which has resulted in a comprehensive assessment of future needs in the training and simulation markets. This year's effort was especially difficult because of the increased security and extensive budget changes.

The effort required many hours of hard work and dedication. I personally commend the NTSA members, government organizations, and commercial companies who contributed to the success of this venture.

I extend special thanks to Dr. Linda Brent, of The ASTA Group, LLC, who chaired the *NTSA Training 2015*. We could not have completed this high quality product without her leadership and organizational skills.

Army Training 2015 presents information to assist industry's support of the US Army current and future training needs. The information provided was gleaned through personnel interviews, government documents, and other source material obtained through internet research. More than a dozen senior, key training individuals across the Army, from Training and Doctrine Headquarters (TRADOC), Forces Command (FORSCOM), several of the major training centers and the Program Executive Office Simulation, Training, and Instrumentation (PEO STRI) were interviewed. The Army Training Committee members are listed below:

- Lee Barnes, Jr., Northrop Grumman Corporation (Co-lead)
- Mike Genetti, Rockwell Collins (Co-lead)
- Charles Bartel, Moog Inc.
- Thomas "Tobe" Ehmann, Moog Industrial
- Doug Foster, PLEXSYS Interface Products Inc
- Don Kemper, Wegmann USA
- Cindy Kurt, United Space Alliance LLC
- Peter Swan, MAK Technologies
- Jeff Wilkinson, MYMIC, LLC

It is with much gratitude that I thank the government individuals and organizations, who participated in the *NTSA Training 2015*. Once again, those responsible for developing requirements, and acquiring and using training and simulation systems and products were most forthcoming with their perspectives.

RADM Fred Lewis (U.S. Navy Ret.), President

National Training Systems Association

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Army Training 2015

The Army's mission is to fight and win our Nation's wars by providing prompt, sustained land dominance across the full range of military operations and spectrum of conflict in support of combatant commanders. We do this by:

- *Executing Title 10 and Title 32 United States Code directives, to include organizing, equipping, and training forces for the conduct of prompt and sustained combat operations on land.*

- *Accomplishing missions assigned by the President, Secretary of Defense and combatant commanders, and Transforming for the future.*

http://www.army.mil/info/organization/

1.0   Introduction

Army Training 2015 presents information to assist industry's support of the US Army current and future training needs. The information provided was gleaned through personnel interviews, government documents, and other source material obtained through internet research. More than a dozen senior, key training individuals across the Army, from Training and Doctrine Headquarters (TRADOC), Forces Command (FORSCOM), several of the major training centers and the Program Executive Office Simulation, Training, and Instrumentation (PEO STRI) were interviewed.

The Army, with its sister Services, has been conducting sustained operations around the globe for almost 10 years. There are no credible predictions of adequate funding for the Services to "get well" while maintaining their current operational tempo. In this nebulous and contentious environment, training requirements for the future (2015) will be developed, challenged, refined, campaigned for, and approved by National leaders. With incomplete knowledge of the future but a good understanding of the challenges and missions ahead of us, the respondents have put forth anticipated needs of the Army in 2015 to train the next generations of soldiers and leaders.

1.1   Army Organization Overview

The Army is composed of two distinct and equally important components: the active component and the reserve components. The reserve components are the United States Army Reserve and the Army National Guard. The Army conducts both operational and institutional missions. The operational Army consists of numbered armies, corps, divisions, brigades, and battalions that conduct full spectrum operations around the world. The institutional Army supports the operational Army. Institutional organizations provide the infrastructure necessary to raise, train, equip, deploy, and ensure the readiness of all Army forces (http://www.army.mil/info/organization/).

1.2   ARMY Organizations Responsible for Education and Training

The U.S. Army Training and Doctrine Command (TRADOC) is the lead organization for Army training. TRADOC trains more than 500,000 soldiers at 32 schools.

> *TRADOC develops the Army's Soldier and civilian leaders and designs, develops and integrates capabilities, concepts and doctrine to build a campaign-capable, expeditionary and versatile Army in support of joint warfighting commanders through Army Force Generation (ARFORGEN); provides support to the Army's Human Capital Enterprise. (http://www.tradoc.army.mil/about.htm)*

TRADOC priorities are:

1. Leader Development
2. Initial Military Training
3. Concepts and Capabilities Integration
4. Human Capital Enterprise
5. Army Training and Learning Concept
6. Doctrine

TRADOC is transitioning to six Centers of Excellence (CoEs) organized by the command's six warfighting functions.

- Fires CoE at Fort Sill, OK is combining the Field Artillery Center/School, Fort Sill, Okla., and Air Defense Artillery Center/School, formerly at Fort Bliss, Texas.
- Maneuver CoE at Fort Benning, Georgia is combining the Armor Center/School, Fort Knox, KY., and Infantry Center/School, Fort Benning, GA
- Maneuver Support CoE at Fort Leonard Wood, MO consists of the Chemical, Engineer and Military Police Schools.
- Sustainment CoE at Fort Lee, VA will combine the Ordnance School, Aberdeen Proving Ground, MD.; OMEMS, Redstone Arsenal, AL.; Soldier Support Institute (Adjutant General and Finance Schools), Fort Jackson, SC, Transportation School, Fort Eustis, VA.; and Quartermaster School, Fort Lee, VA.
- The new Mission Command CoE will be established as part of CAC at Fort Leavenworth, KS, and will encompass the Intelligence CoE at Fort Huachuca, AZ, and the Signal CoE at Fort Gordon, GA.
- Intel CoE retains its identity as the sixth warfighting function.

Figure 1-1 presents TRADOC organizational structure, and the new CoEs are highlighted in green.

Source: http://www.tradoc.army.mil/images/pao/TRADOC%20organization.jpg
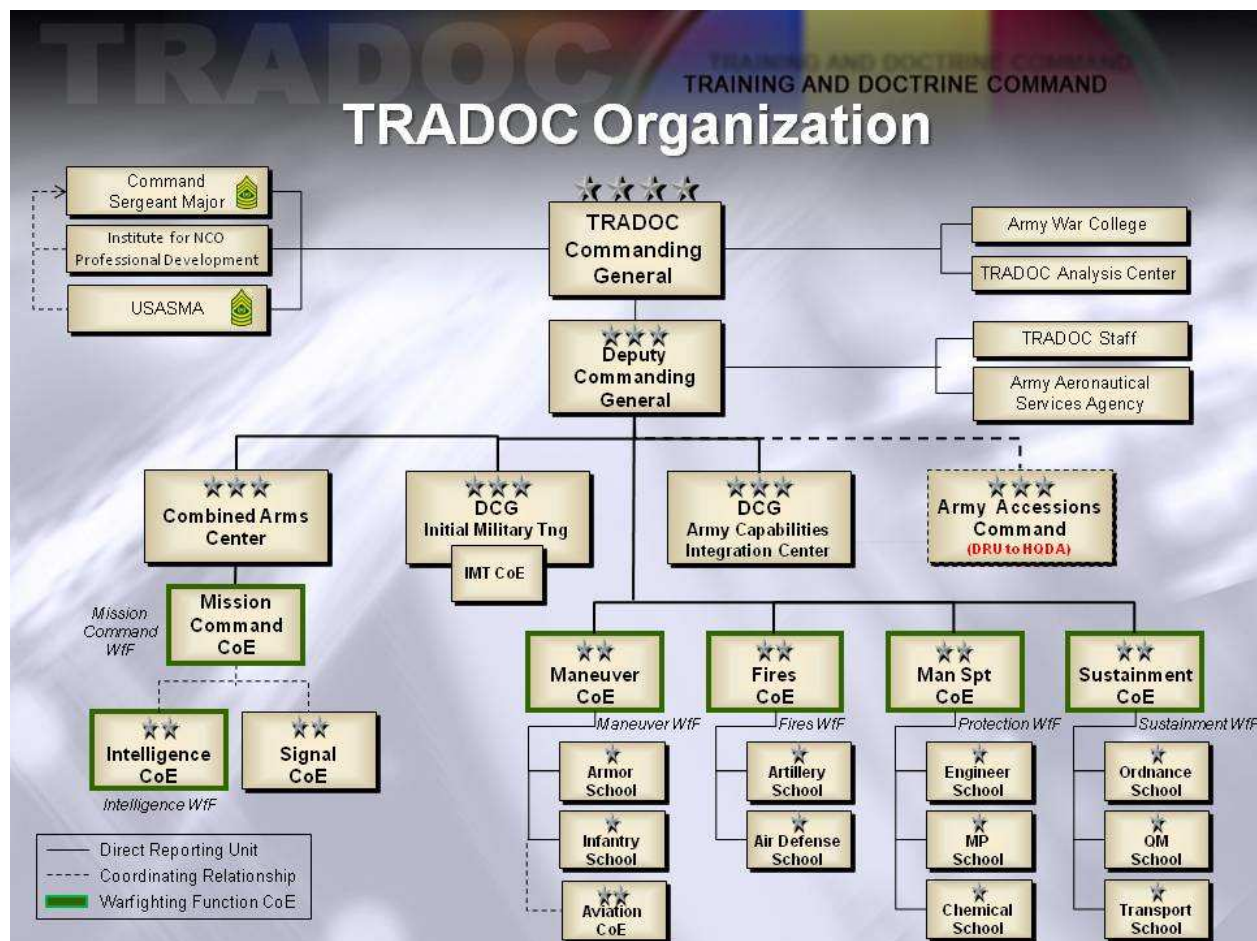
Figure 1-1: TRADOC Organization

The U.S. Army Program Executive Office for Simulation, Training, and Instrumentation (PEO-STRI) is another Army organization of particular importance to the simulation, modeling, and training community. PEO-STRI provides simulation, training, and testing solutions to support the warfighter. It works closely with other military organizations, industry, and academia to meet Army training requirements through simulation and testing, and provide contracting and acquisition services. PEO-STRI is organized into six programs supported by an Acquisition Center. The six programs are:

1. Combined Arms Tactical Trainer
2. Constructive Simulation
3. Instrumentation Targets and Threat Simulators
4. Field Operations
5. Future Force (Simulation)
6. Training Devices

The full catalog of PEO-STRI products and services is available at http://www.peostri.army.mil/PRODUCTS.

2.0 Market Description

Requirements for national infrastructure upgrades, health care improvements, reducing the National debt, and other Federal programs compete directly with the need to rebuild armed forces and equipment worn down (or worn out) over the years of combat in Afghanistan and Iraq. Many seek to gain "peace dividends" from the stand-down of combat operations in Iraq-- moving the funding for our armed forces to other domestic priorities; however, as the FY 2011 budget request illustrates, leaders still seek to support training and sustainment activities, and look toward M&S technologies to achieve more effective training.

The operational environment of today is dynamic; our service men and women are involved in a broad spectrum of peacekeeping operations and conflict. The future warfighter must have the ability to adapt, think outside the box and apply technologically advanced skills. The Army will look toward M&S to simulate the dynamic circumstances of modern engagements.

2.1 Market Value (Budget)

The budget reflects four Army priorities for FY 2011:

1. Sustain soldiers, families, and Army civilians in an era of persistent conflict;
2. Prepare soldiers, units, and equipment for success in the current conflict;
3. Reset returning soldiers, units, and equipment to rebuild readiness consumed in operations; and
4. Transform to improve the ability to meet the needs of combatant commanders.

The budget includes $1.9B for the Science and Technology (S&T) program to develop technology relevant to both the Army and the Joint Team. The S&T program leverages the work of other services, defense agencies, private industry, and the international community. By synchronizing operational concept development with transformational business practices, technologies are fielded faster to Soldiers. This investment strategy enables the pursuit of technologies and opportunities that will enhance future force capabilities concurrent with support of the current engaged force while ensuring flexibility to develop solutions that are responsive to changing warfighter needs (http://asafm.army.mil/Documents/OfficeDocuments/Budget/BudgetMaterials/FY11//abr.pdf).

Table 2-1 summarizes the FY 2011 budget request according to appropriations categories.

Table 2-1: Army FY2011 Budget, by Appropriations Category

Appropriation Category ($B)	FY10 Base Enacted	FY11 Base Request
Military Personnel	57,892	59,050
Operation and Maintenance[1]	40,118	43,868
Procurement	19,260	21,333
Research, Development, Test, and Evaluation	11,415	10,333
Military Construction	4,503	5,271
Army Family Housing	797	610
Base Realignment and Closure/HAP[2]	5,068	1,103
Army Working Capital Fund	38	55
Chemical Demilitarization	1,712	1,592
Joint Improvised Explosive Device Defeat Fund	121	216
Totals	140,924	143,432

1. *Includes Environmental Restoration, Army*
2. *Homeowners Assistance Program*

Numbers may not add due to rounding.

Source: http://asafm.army.mil/Documents/OfficeDocuments/Budget/BudgetMaterials/FY11//abr.pdf, pg.1.

The Army's FY 2011 base budget request was $143.4B, with an additional $102.2B requested to support Overseas Contingency Operations (OCO). The category *Operation and Maintenance* (illustrated below) funds, among other things, Soldier and unit training. According to the FY 2010 Army Posture Statement,

> *"The OCO portion of the request includes $628 million for the training and sustainment of the temporary wartime increase in personnel – an increase of $242 million from FY 10. The budget request works to restore balance to the force by recognizing $587 million of enduring requirements for training and depot maintenance in the base rather than in OCO. The base funds home station training for 59 brigade combat teams, 24 rotations through the Army's combined arms training centers, and an increased investment of $154 million in scholarships, language and individual training...The OCO request will fund the day-to-day cost of the wars, training to prepare units for deployment, force protection, in-theater maintenance and repair, drawdown of equipment from Iraq, and reset of Army Prepositioned Stocks and equipment returning from deployment."*

Base Request

OCO Request

Base Request legend:
- Operations & Maintenance
- Military Personnel
- Procurement
- RDTE
- Other

OCO Request legend:
- Operations & Maintenance
- Military Personnel
- Procurement
- Afghanistan Security Forces Fund
- Other
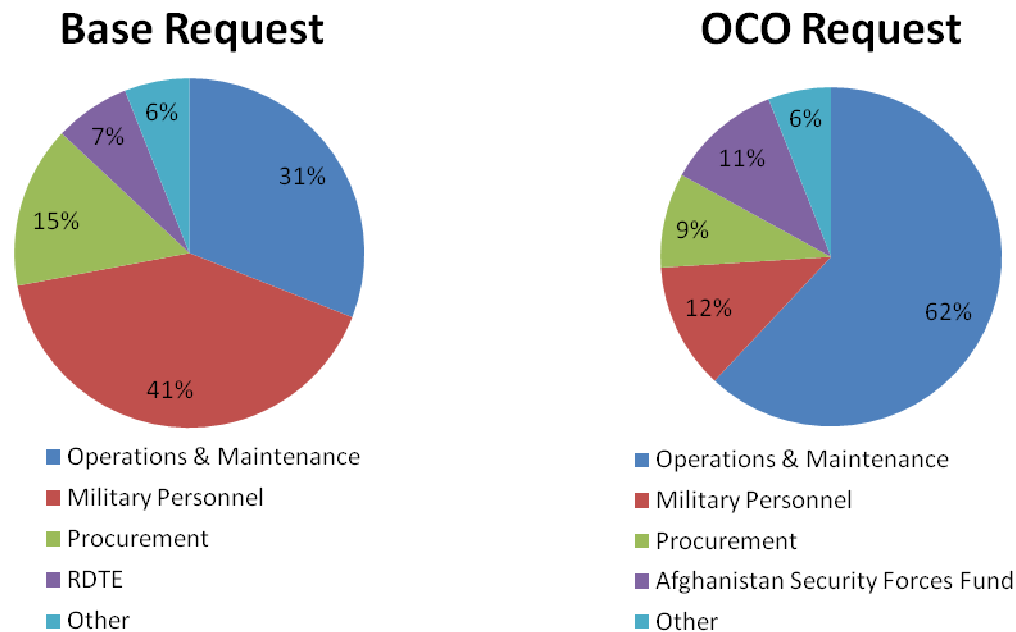
Source: 2010 Army Posture Statement, Addendum D: The Fiscal Year 2011 President's Budget, (adapted).
https://secureweb2.hqda.pentagon.mil/vdas_armyposturestatement/2010/addenda/Addendum_D-The%20Fiscal%20Year%202011%20Presidents%20Budget.asp

Figure 2-1: FY 2011 President's Army Budget: Comparison of Base and OCO Funds Requested

2.2   Training Priorities/Products

2.2.1   *Simulation*

The Army relies on simulation for training due to three fundamental factors.

1. Some things can be trained only with simulation because of danger, cost, or simple inability to replicate the training scenario any other way; simulations (e.g., Multiple Integrated Laser Equipment System (MILES) and similar Individual Weapons System simulations) provide feedback that is not possible in a combat situation.
2. When training of perishable skills and/or frequent training are/is required, there is a significant cost benefit to the use simulations over alternative forms of training.
3. Environmental concerns and constraints frequently dictate that within training systems, simulations should be favored in comparison with live training.

Constructive simulations replicate live assets, providing needed stimulation to adjacent units/higher headquarters practicing command and control. The focus of new constructive simulation training systems needs include Capacity Building and Partnership Building. Enable soldiers to understand the needs of the community and then take appropriate action. Low overhead scenario drivers require much fewer support personnel but must be adaptable to meet the training audiences' objectives.

Cost of simulation is prohibitive. Training simulation capabilities must be obtained with low overhead. The costs have decreased, but must decrease more substantially. Current constructive systems are not affordable; this limits their implementation. Subsequently, those that are implemented are have limited availability due to heavier trainee demand.

2.2.2 Instructor Led Training (ILT)

Instructors must still play a role in training, though fiscal pressures and technology are increasingly limiting their consideration in training systems.   According to one interviewee, "Our people really value and learn the most from interacting with the instructor." Distributed learning techniques can be used to make instructors available to off-site locations. Training systems must consider these blended solutions to make ILT less cost prohibitive.

2.2.3 Leader Development Training

Leader development training is a critical component of training, and this need will intensify, given Army reorganization, new technology, and officer attrition. Respondents see a need to train the trainers. The Army has prior combat-experienced Company Commanders and senior sergeants that have never held a training management meeting, as well as Battalion Commanders that have never developed a yearly training schedule. One idea is to use the National Training Center Leader Training Program as a model to solve this issue

Work being done by Joint Training Counter-Improvised Explosive Device (IED) Operations Integration Center (JCOIC) is leveraged by reusing scenarios from VBS2 training to train operational processes in BOLC and Captain Career Courses. The next iteration should be able to import the VBS2 into OneSAF and incorporate into higher level (BCT) scenarios.

2.2.4 Live-Virtual-Constructive (LVC)

The Army needs seamless Live-Virtual-Constructive (LVC) training available whether soldiers are deployed or at home station. Capabilities exist to tie training environments together, but the results are costly, time consuming, and difficult to repeat or duplicate. It is anticipated that the LVC Integrated Training Environment will address these issues, generating training events that takes advantage of seamless LVC components. The LVC Integrated Training Environment (ITE) was cited by several respondents as the Army's #1 training priority.

Live training must be refined to be smaller, lighter, and less battery dependent. What is used at the Combat Training Centers (CTCs) needs to be the same as used at home station, or deployed. It needs to feed into the Battle Command Systems, so command and control can be trained while the subunits are trained.

Presently, virtual trainers are required to offset live training requirements. Ranges are not always available; weather doesn't cooperate; and lanes only allow one training unit at a time. Ranges that resemble an actual village/terrain are difficult and expensive to build. Virtual training ranges allow the trainer to call up a scenario and the terrain, and run multiple iterations simultaneously, with little overhead.

Constructive Exercises will continue to be important and will need to be much lower footprint. These need to stimulate all staff at higher levels, using organic Command, Control and Communications systems. Trainers need the capability to set up Low overhead drivers (COTS or GOTS) instead of contractors or big teams brought to the site. This will enable persistent training capability at home stations using the LVC Instrumentation Architecture (IA) by 2012. The Army's move to Synthetic Environment (SE) Core as the data foundation standard for virtual trainers will ensure compatibility across training systems.

2.2.5 Part task Trainers (PTTs)

Cost, space, time restrictions, and instructor shortages drive PTTs needs. PTTs must be developed with some requirements in mind in order to maximize effectiveness. Training must be engaging--young soldiers are not motivated to play serious games with poor quality graphics, limited or repetitive scenarios. High quality visuals, responsive avatars, and challenging, competitive role playing will stimulate trainees. Training solutions need to train at every step of an operation. Part task virtual training via laptop is a good start towards 2015 training.

2.2.6 Professional Development and Education

Army professional development and education initiatives meet the needs of their workforce throughout careers by training personnel upon initial receipt of devices and new equipment, and by conducting other internal training. DAU certifications (Level 3 required) are being accomplished. However, greater interaction between Government personnel and Industry and Academia could be achieved through more Masters and PhD work in other schools.

The creation and maintenance of Professional rather than Social networks needs to be emphasized, such as supporting the Sustainment Knowledge Network as a community of practice, using AKO as the portal.

On the Job Training (OJT) will become more critical with the pending restructuring/downscoping of Basic Training. Job aides via mobile devices allow individuals to perform self OJT.

2.2.6.1 Acquisition Workforce Development

The acquisition community has come under severe scrutiny in the last several years. The Army has taken steps to address the unique workforce development and education needs of the acquisition workforce. The DAU and the Army Management & Staff College provide distributed learning and resident instruction. The DAU has also been consulted in developing a particular acquisition strategy in cases where no internal experience was available. Personnel are trained through formal Army courses such as the Capability Development Course, Simulation Operation Course and the Army Force Management Course at the Defense Acquisition University. Mobile training teams are brought in for refresher and sustainment training in Military Simulation Techniques and Technology. Technical personnel also have the opportunity to train and test for networking and security certifications.

2.2.6.2   Mentoring

Mentoring by senior individuals is used to supplement individual and team training. The mentors work as contracting officer specialists but a fully trained contracting officer signs the contracts they work on. However, the experience mix is almost a one-to-one ratio of experienced mentor to intern. This one-to-one ratio increases the stress on the senior staff to simultaneously execute the mission while guiding and developing the staff.

3.0   Goals & Challenges

The Army faces significant future challenges as it rises to meet demands of the current operational tempo (OPTEMPO) and battle environments of both peace and conflict, across a broad spectrum of engagements. In order to provide "well-led, trained and equipped forces" to fulfill operational objectives, the organization must successfully handle fiscal pressures, experience gaps, technological inadequacies in training devices, and problems encountered through rapid fielding of advanced technology, all the while promoting basic skill and leadership development and retention (Army Posture Statement, 2005).

3.1   ARFORGEN

ARFORGEN (Army Force Generation) is both a model and process that allows the army to provide well-trained, well-equipped, modular forces, in a timely manner with adaptability in delivery. ARFORGEN has changed deployment and training processes. It has been instrumental in "synchroniz(ing) the Army's organizing, manning, equipping, training, modernization, mobilization and deployment, and sustainment systems" (Hemmerly-Brown, 2009). However, ARFORGEN and its complementary acquisition initiatives (see section 4.1) create some challenges. Among these challenges, as part of its cyclical operation, ARFORGEN can create situations where institutions rapidly go from nearly empty to full, creating difficulty in planning of resources to support the training requirements.

3.2   Human Factors

The Army must balance moral, physical, and cognitive development with contributions from science and technology to enhance performance. In order to achieve the optimal balance, the Army must turn attention toward human dimension factors. Capabilities must address the broad range of human dimension actions necessary to prepare, support, and sustain. The Army must widen the community of practice in the human dimension to explore how to best recruit, train, and retain an all volunteer force that can operate across the entire range of military operations.

3.3   Fiscal/Budget

Fiscal pressure affects training. As operational budgets decrease, some expect training budgets to increase. That may not be the case. A common misconception is that if the U.S. is not using its armed forces in combat, the cost "savings" can be put to use elsewhere. This is a dangerous viewpoint. Skills remain sharp when OPTEMPO is high; as that tempo decreases, training must replace operational experience in order to sustain skills. As units redeploy home,

training need will remain with an increase in demand. The drawdown of deployed forces will drive much higher densities of units at most home stations. This will increase demand on finite resources and drive contracting actions (budget allocation).

Budget reductions may result in decreased funded training time and under-funding of training technology R&D. This emphasizes the need to accelerate projects out of R&D. Reductions in live training budgets will drive increases in demand for immersive technologies.

3.4   Leadership/Experience

While the Army is producing experienced leaders for sustainment and support operations and small unit combat operations (aka, Wide Area Security), leaders note atrophy in traditional warfighting skills required for combined arms maneuver. Leaders recognize the danger of allowing this trend to continue. Changes in leader development and training will allow soldiers to maintain skills gained on the battlefield, while improving their capabilities to conduct combined arms maneuvers.

Training programs have not substituted for experience. The staff of many Army organizations is comprised of two extremes: brand new soldiers with less than 3 years experience and very senior staff with over 25 years of experience. This experience base creates a skill mix problem.

3.5   Concurrency with the prime weapon system

Concurrency comes in the form of accurate replication of control systems, "switchology" (location, operation, functional response), optical representation (external, and for sights, the optical view), and weapons dynamics and effects. Concurrency with the Prime Weapon System is a real issue, particularly with aviation trainers but increasing in ground systems and unmanned systems as well. Based upon the current charter of PEO STRI and agreements with weapon system PEOs, this requirement is increasing in importance.

With the extension of the expected lifecycle of current weapon systems, such as the Abrams Tank, Bradley Fighting Vehicle and Army Aviation platforms, the change in configuration as new capabilities are added will increase the importance of concurrency of training systems. We will see few new systems in the near future and more increased capabilities added to current systems, which need to be incorporated into our training systems.

The Ground School XXI (GSXXI) approach may be successful model to keeping training systems current. This approach includes studies and assessments of simulations against current and probable future requirements, including where these simulations fit across the spectrum of operations and the ability to network to related training systems. A major goal of GSXXI is to identify gaps where training solutions are missing.

3.6   Remedial Training

Remedial training remains an unresolved issue. Remedial training requires more than just re-running a training event. Individual or leader task failure identification and partial task focused retraining is key to remedial training.

3.7   Other Goals

Total cost of ownership is an important consideration. The use of commercial off the shelf (COTS) systems, non-development items (NDI) and gaming technology are expected to reduce the cost of ownership; but these solutions are not expected to provide ready-made training solutions. The contractor and the customer must make sure that the final solution is not just COTS, NDI or gaming, but is tailored to meet the training requirements and meets the need of the user. Minimizing operating and maintenance costs while maximizing reliability remain foci.

True low overhead drivers provide for both supportability and maintainability. The goal is to achieve abilities to operate and maintain training equipment with minimal training.

3.8   Challenges in Workforce Development and Education

Army training has diverse needs that include STEM capabilities at the undergraduate and graduate levels. The local military commands have representatives on several STEM councils, and also have some budget to support qualified STEM activities (e.g., Robotics competitions).

There is limited time to fit training into employee schedules—and the schedules continue to get tighter. Conferences, Defense Acquisition University (DAU) and similar resident courses take the employee away from their office and current program. Distance learning can help alleviate scheduling problems. It requires, less travel, shorter on-site courses and provides the opportunity to learn at one's own pace.

Attempts to meet requirements lead to a loss of concurrency and relevancy to the rapidly changing current operational environment. Distributed learning has a catalogued backlog.

The double-tasking of Instructor/Writers in Army schools is here to stay. The utilization of active duty experts for both training and doctrine/tactics development is not sustainable without doubling up the workload of available experts. One possible remedy would be to change the current responsibility matrix and share capabilities between the institutional base and operational force.

3.9   Other Challenges

A significant and recurring challenge is to be aware of what others are doing with simulation, and to leverage those investments across the Army's training needs.

Recruitment and retention continue to be challenging. In training, fidelity issues stem from expectations of new recruits due to their previous experience with video games. New recruits expect high fidelity, ease of use, and quick feedback.

The use of Reserve and Guard forces in operations has a significant effect on training. Challenges include how to use to forces in the operation as operational duties are not necessarily part of their "daily job." One strategy is to activate Reserve and Guard forces prior to deployment, utilizing them stateside prior to deployment.

Force-on-Force live training is a significant challenge. The Army requires a technical upgrade/refresh to get beyond MILES– many weapon system technologies are not accurately represented in the current live training systems. An integrated MILES-Instrumentation package, or better - embedded capabilities in current weapons platforms and C4I systems – is desirable.

4.0   Organizational Acquisition Strategies

PEO-STRI conducts acquisition through the PEO-STRI Acquisition Center (http://www.peostri.army.mil/AcquisitionCenter/). The Acquisition Center utilizes three primary contract tools (described below in Section 4.2):

1. Simulation and Training Omnibus Contract (STOC II)
2. Warfighter Field Operations Customer Support Contract - (Warfighter FOCUS)
3. Systems Engineering and Technical Assistance Services (SETA) Contract

The PEO-STRI Business Opportunity web site is located at http://www.peostri.army.mil/BusinessOpportunities.jsp.

4.1   Rapid Fielding Initiative (RFI)

The Rapid Fielding Initiative was established to reduce acquisition time to get needed tools and weapons into Soldiers' hands faster. As explained by the Department of the Army, 2009 Army Posture Statement:

> *"The RFI leverages current procurement programs, commercial-off-the-shelf technology, and lessons learned from ongoing operations in Iraq and Afghanistan to enhance the survivability, lethality, and mobility of Soldiers deployed in support of Overseas Contingency Operations....*
>
> *RFI has shifted its focus from unit-based fielding to role-based fielding which considers each Soldier's function and each unit's mission when planning and executing pre-deployment fielding. This focus prioritizes available resources to equip the Deployment Expeditionary Forces in the Army Force Generation (ARFORGEN) force pool. This distribution process ensures the Army's ability to meet near-term equipping requirements of deploying forces while it implements the ARFORGEN cycle for sustained capabilities over time."*

Current rapid fielding processes bypass well defined processes and checks in the system. When a training need is identified, users expect a solution in days and not years. This puts greater emphasis on getting a solution, even a partial solution, in the field quickly, creating many concerns in training and operation. Rapid fielding can lead to multiple solutions developed and fielded for the same problem or capability gap. Though a rapidly fielded solution fulfills a short term need, it does not ensure long-term sustainment. System fielding must include plans for "complete lifecycle" support. Unit commanders can buy "stuff" without sustainment in the plan. There is no provision for lifecycle support to Non-Programs-of-Record as it is impossible for the Army to sustain all the systems that are purchased out of discretionary accounts.

4.2   Major Contract Vehicles Used for Training

The contracting OPTEMPO is continually increasing. For PEO STRI, part of this increase is directly related to an increased emphasis on "adjacent lines of business." In addition to procuring live, virtual constructive and instrumentation systems and services for the Army, PEO STRI is moving toward a line of business that provides training to other groups and federal agencies. The move has resulted in an increase of external customer funding over traditional mission funding.   PEO STRI has settled on three major Indefinite Delivery, Indefinite Quantity (IDIQ) contract vehicles to provide the bulk of support to their customers (from http://www.peostri.army.mil/AcquisitionCenter/):

Simulation and Training Omnibus Contract (STOC II) – Awarded in January 2009, STOC II provides the Warfighter with the next generation of simulation and training devices to meet the challenges of the joint operational environment. STOC II is not only a continuation but an evolution of its predecessor, STOC I. The omnibus contracting vehicle awarded a total of 142 contracts spread over two lots: Lot I, Full and Open Lot (consisting of small and large businesses), and Lot II, Small Business Set-Aside. These awards resulted in multiple-award, indefinite delivery/indefinite quantity contracts that will provide troops with simulation, training and instrumentation products and services beginning with concept development and continuing through life-cycle support.

Warfighter Field Operations Customer Support Contract - (Warfighter FOCUS) – Warfighter FOCUS is a contract that fully integrates the live, virtual and constructive training services at Army installations worldwide. As the Army continues to field an increasing number of interoperable training systems, the Warfighter FOCUS contract provides a fully-integrated contractor workforce to operate and maintain them. Furthermore, the contract will allow PEO STRI to provide a more rapid response to Department of the Army requests.

Systems Engineering and Technical Assistance Services (SETA) Contract – An indefinite delivery/indefinite quantity contract for SETA services was awarded in August 2009, with a period of performance of five years (basic and options). The SETA contract provides systems engineering and technical support services for PEO STRI and other federal agencies worldwide. The services include activities in support of all aspects of providing responsive integrated and interoperable infrastructure for simulation, training, testing, and instrumentation solutions and acquisition services for the Warfighters and the Nation.

Each acquisition goes through a strategy development phase that leads to a determination of which contract vehicle to us or to use another strategy (Open, Sole Source, SB Set-Aside, etc.). Each Program Manager can use whatever type of award is determined best for his/her organization.

STOC II is not mandated for use within PEO STRI, but it is a preferred contracting vehicle for the Army and other Services and Federal Agencies.

The current Warfighter FOCUS (WFF), IDIQ, single-award contract for support of fielded systems is many years away from its ceiling. WFF has resulted in the integration of the

supporting workforce in a manner that increases efficiency by merging employees across many companies, and cross training them on areas of responsibility so they are now more agile and cost effective. However, the cost of using the contract, responsiveness, and use of subcontractors were some factors that were seen as issues with the WFF model among those interviewed.

There are significant benefits from having WFF's broad contracting language in place. It has allowed better use of contractors at one site for all types of support requirements. It has allowed PEO STRI to quickly put in place and provide training to Afghan soldiers under the existing contract language.

WFF has created concern about funding cut-backs on Army National Guard and Reserve training. Some funding has been redirected from the Guard and Reserve to the WFF contract; however, this is not a cut, but more of a loss of control by the end user.

4.3 Projected Future Acquisition Strategies

The Vice Chief of Staff of the Army has directed Capability Reviews (CR) on requirements for training readiness, initially focused on big systems. The result of these CR's may be reflected in Training Support Plans and in Combined Arms Training Strategies.

Software acquisition standards need to be tailored and separate from current hardware focused standards. There also needs to be a more streamlined process that takes advantage of the rapid/periodic upgrades in software.

5.0 Training System Capability Trends

Interview participants identified several trends in Army training, in addition to TRADOC DCS-T's five guiding principles for Future Training Support Systems (below):

1. Mobility-- Today, the capacity to base training on mobile devices (e.g., laptops, handheld devices) makes embedded training solutions and job aides that can also be used to train more feasible. The need for this capability in training solutions is now and expected to increase. Job aides and professional networking tools should be designed with this in mind. Portable/mobile facility capabilities in the future should include a design allowing them to be moved by standard Army trailers to be included for deployment.
2. Interoperability-- Scenario standards for interoperability across different gaming engines or virtual worlds will be an increasing need as the use of these tools increases.
3. Integration-- Simultaneous, integrated training, both horizontally (across platoons in a company) and vertically (individual training at the same time and in the same scenario as leader training), is critical.
4. Reconfiguration-- With the extension of the expected lifecycle of current weapon systems, new capabilities are added to training systems. Fewer new systems in the near future will be acquired and instead, increased capabilities will be added to current systems, necessitating reconfiguration. There will be a need to develop more instances of—not just replacement for—home training capabilities. Part of this need will be

reconfigurable simulators across the board – using appended devices to stimulate real systems is adequate, and the real systems won't always be available due to the ARFORGEN deployment cycles, refurbishment, etc.

5. Low Overhead -- Effective low overhead drivers, aiming towards a "one lap top" requirement, would likely eliminate most C2 training facility requirements. However, there some basic facility requirements for effectively training non-kinetic skills will always remain. Low overhead is a critical training system goal. Solutions for Battle Command Training Programs (BCTP) are needed.

5.1 Upgradeability

There is a trend toward more software-based systems rather than hardware-based systems, making them much easier to upgrade. Computers have become an expense rather than an investment. Consequently, some computer systems need to plan for obsolescence—replace the entire computer and loaded software at the same time.

There is a need to upgrade technology to take advantage of improvements/new abilities and to meet the most up to date set of requirements (every 2-3 years). Game-based training must change rapidly to reflect techniques and procedures (TTP) of evolving enemy TTP and battlefield conditions.

5.2 Ease of use

Ease of use is critical as training technologies evolve. Ease of use affects not only training implementation, but also sustainability of training. Furthermore, it has been identified as an important contributing factor toward reaching other Army training priorities including cost reduction, deploy-ability improvement, and training availability at multiple times and venues.

5.3 Organic Capability

The term "organic capability" is used by some to describe a capability historically described as "deploy-ability." This refers to training solutions and/or devices that are embedded within the operational unit, so the unit can take the training solutions with them, and use them when necessary. This capability also implies portability/mobility.

Embedded training is important, but must be designed into the weapon system; otherwise, it ends up being appended at best. The issue is that the weapon system developer usually treats the training capability as a low priority in comparison with the functioning of the weapon system. Future combat systems' programs should specify training/simulation as a key performance parameter, treated on par to other weapon system capabilities in new acquisitions.

5.4 Maintainability

Training system designs must be focused on maintainability. This includes cost factors, minimal maintenance training, and ease of maintenance in the field.

5.5   Standards and Compatibility

Standards, interfaces, interoperability, and encryption/multi -level security will provide the ability to quickly connect different systems, simulations, trainers, in hours rather than weeks or months. The trend is towards adopting common standards as long as they enable the users to best accomplish what they need to do.

5.6   Connectivity

Distance learning will continue to grow as a key training medium, but internet connectivity (wireless) must be made available to support soldiers' access to the training devices. The Army needs wireless access to support mobile training applications that can be pushed out to soldiers. Also, Soldiers are currently expected to do some training on their own time, while paying for their own access to commercial internet. As cloud computing becomes more prevalent for training, soldiers' personal cost access to the Cloud must be reduced or eliminated.

5.7   Infantry/Dismounted Training

More infantry training is needed. Dismounted soldier training is now getting emphasis because technology has started to catch up with the need. Virtual Battlespace 2 (VBS2) is available but there are limitations (e.g., the choice to turn a Soldier into a Medic) that need to be addressed. Infantry training is important but under-resourced. Respondents request solutions that are PC-based, tied into home station instrumentation, and inclusive of hands-on training.

The Army is working to stay linked with Joint Force Training Transformation and technologies, keeping an eye on the Future Immersive Training Environment (FITE) Joint Capability Technology Demonstration (JCTD) immersive and mixed reality training technologies. It is expected that this JCTD will chart the current status and likely best practices for continued efforts for infantry/dismounted training in the future.

6.0   Training Technology Needs

In addition to pressing future needs, training issues arise due to technology limitations and/or simulation deficiencies that need to be addressed in the future. For example, Army requires cultural training solutions, and the lack of improvement on 70's laser technology for live force-on-force training needs to be addressed.

Industry needs to partner in helping identify solutions to training technology needs and shortfalls. Technical answers to a known problem should be directed to the TRADOC Capability Managers (TCM), as they drive requirements for training systems.

6.1   Game Enhanced Training

Gaming technology can meet many of the requirements for training systems. However, today's COTS games do not constitute training systems – user capabilities must be improved, and the games must facilitate performance measurement and improvement through after-action-review

(AAR).   To be most successful, they need to leverage existing standards, and use open architectures.

The Army requires a clearer understanding of how and when to use games for training. For example, how to differentiate between learning how to shoot and enjoying shooting/winning? Currently, the integration of games into training simulations is a resource intensive, improperly documented and inconsistent process.

Games also need to be scaled into mobile solutions that take advantage of advances in hand-held technologies.

6.2   Virtual Training

Virtual training/trainers could become preferable to live training if virtual solutions could be shown to be more cost effective (i.e., yielding a higher readiness return on investment). Both the ability to achieve the training objective and cost savings must be demonstrated.

Modeling of the human dimension to produce virtual actors with good artificial intelligence, capable of using natural language and nonverbal communication – virtual actors that modify their behavior based on what they learned. They can be scripted to start from a certain "point of view" and change that POV based on actions taken during the simulation. They can "hear," use other "senses" and react, to include responding verbally.

Interviewees indicated a need to have Massive Multiplayer Online Gaming (MMPOG) systems that are persistent and input/output device independent (use on PC's, handheld devices, mobile phones.).   Capacity and timeliness issues must be solved. The challenge of these complex capabilities is that they must also be easy to access, dynamic, and easy to maintain and upgrade. Massive Multiplayer Online Gaming will be most effective if it is device agnostic.

6.3   Embedded Training

New technology will enable efficient use of the radio spectrum so embedded training and testing can be conducted over operational networks. Miniaturization and common batteries will enable embedded/live test and training, particularly for soldier-worn equipment.

6.4   Qualified Training Personnel

Battle Command Training Centers need tech-savvy trainers and training developers in order to move their capabilities to the next level. A critical shortage of several hundred training developers exists in the institutional training base. There is a similar shortage of training developers; for example, TRADOC is short several hundreds of training (combat) developers in the institutions. Training developers need recent, relevant experience in order to be credible. Training needs to employ more facilitators rather than rely on institutional trainers.

6.5   New Equipment and Training for Trainers

New equipment training must arrive with training for the trainers. When the "experts" leave, the people who will be conducting future training are left with little more than notes and limited

experience. The new equipment must contain training for preparation, set up, and use as well as how to employ the systems. Current trainer turnover is over 30%; train the trainer courses must result in certification.

6.6   Range Requirements

Live training requires space may not be readily available (e.g., Stryker training in Hawaii) and the only alternative is to develop training simulations to maintain training readiness.

6.7   Fire Support Training

Training of fire support operations is very rigid. Simulations need to be designed to be flexible enough to stress the full spectrum of operations. Currently, the trend is to be Counterinsurgency Operations (COIN) specific, but the real requirement is for something that spans the gamut from Stability operations to high intensity conflict.

Today, live fire testing and training targets are destroyed during exercises/tests. Technology must make this type of training more cost effective.

Area weapons scoring system technology is needed for live fire training, in order for air-ground aviation crews to assess student performance and provide feedback. Feedback is needed both for ground and airborne targets. Data collection and presentation for testing must be in a format that can be understood and not misinterpreted.

6.8   Full Spectrum Solutions

The ability to train for Full-Spectrum Ops in realistic immersion to include spherically realistic sound and the smells of the area needs to be developed. Replicate the actual environment with that the goal of replicating what affects decision making/behavior. For example, does heat from a certain source in the environment impact performance on the task being performed?

6.9   Team trainers

Leadership training is a priority. Tools for Basic Officer Leadership training are required. Training must place junior officers into situations where they are leading platoons and sections – not "training" groups comprised of their peers. Simulations should represent the actual types of organizations they will lead, with computer generated sergeants who act like sergeants, and computer generated enlisted people who act/react like enlisted people.

A critical need is constructive command and staff training, pushing down to lower levels. The respondents seek distributed technologies to get the training to the soldier. Various solutions at the Platoon level will develop individual skills in a constructive environment, and then integrated solutions could deliver higher levels of collective training. The desire is to train for full spectrum operations, including traditional combat combined arms maneuver, consensus building, nation building, incorporation of Other Government Agencies, etc. (aka, Wide Area Security).

The look and feel of a senior headquarters in theater needs to be replicated in the training environment. This can be accomplished by recruiting experienced senior staffers for rehearsal and practice.

6.10 Individual Trainers

The Army requires part task trainers and deployable job aides, particularly for combat service support specialties.

6.11 Networked Systems

Networked Army Battle Command Systems (ABCS) are critical to conduct of any large scale simulation. Simulation of any system must simulate the entire command and control network. Distributed multi-echelon After Action Reviews (AAR) are a clear requirement for systems in the future. Current challenges are, however, that large overhead systems are not deployable; and the bandwidth to conduct a distributed WARSIM exercise is not available to a deployed unit.

The Army should have a persistent capability in the BCTCs that spans all requirements – One Big Federation – by 2016. An Integrating Architecture that enables plug and play based on requirements is needed.

6.12 LVC Integrated Training Environment (ITC)

LVC ITE needs to be pushed to home stations as a first order requirement, with capability to conduct collective training at the same time as individual and crew training for newly issued equipment. The ITE program plans to field a functional architecture for LVC training up to BCT level at 10 installations prior to FY 2012; none of the combat training centers are scheduled to be fielded the ITE.

6.13 Capacity Building and Partnerships

A pressing need exists for local capacity building and partnership development simulations focused at Captain/Company level. These simulations need to include working with other government agencies, non-government agencies and non-government organizations.

6.14 Requirements Definition Process

Requirement identification is still very important, and the need exists to build requirements packages more quickly and online. Hand held devices that generate the Standard Form 44 (Purchase Order) during contingency operations are sought, along with similar devices for the contracting officer representative (COR) out on surveillance working with the contractor. More content would be available on the web, allowing access and input from the field in real-time. The current practice of awaiting unit computer/form access causes contracting action delays.

There are more than 100 specialties in Combined Arms Support Command (CASCOM). The Army needs help determining how to best focus training efforts, keeping in mind that fidelity in training is key for acceptance by soldiers. While Cyber-Warfare training is required, much of

what else is required remains unknown. The requirements determination process has not yet produced documentation, or it is classified and will be addressed through classified channels.

A better system for vetting of requirements is needed. The current process has caused a flood of requirements since it is much easier to create. An efficient system to vet and prioritize approved requirements has yet to be developed.

7.0 Summary

As the Army looks toward the training requirements for the next five years, it fully expects to integrate and utilize more technology into training programs. Lessons have been learned, however, about the benefits and costs of technology-based solutions, and the Army plans to maximize past and future investments in training.

Schedule expectations will continue to be very aggressive. Closer contact between the user and requirements developer is needed to get the right solution in the hands of those who need it more rapidly.

Cost effectiveness will be a driving force in future acquisitions. The Army will be seeking low overhead systems that not only cost less to produce, but also less to maintain and operate. Training systems need to consider less immersive training solutions when appropriate, as there may be more effective to train some tasks than simulators. For example, part task trainers (PTTs) have been proven to produce trained better trained individuals in less time for tasks such as welding.

Additionally, the Army will also be looking for training solutions that are easy to use across the board. This includes instructors and trainees, but also maintainers and repairers. Training systems that are portable will also be valued.

The Army is emphasizing interoperability, as are many DoD components. Interoperability applies at many levels, from basic software coding and system architecture standards, to the application of developed products (e.g., virtual world and/or scenario databases) across training applications.

As the use of simulation in training increases, it is expected that those simulations (including virtual and immersive environment) realistically replicate the operational environment. In particular, this need is in the area of human behavior, so trainee decisions and performance are responded to with realistic consequences.

Technology limitations needs to be addressed as well as future new needs developed. Simulation used in intelligence, medical, and logistics training systems also has measurable and obvious benefits over alternative forms of training, but these systems need to be significantly improved over those available today, in terms of cost, portability/mobility, ease of use, and realism.

Continued Collaboration is vital as training budgets tighten. The Army seeks collaborative partnerships from Industry. Partnerships will help the Army address its training needs by

providing cost-effective long-term solutions that can adapt to the ever-evolving operational environment. Cooperative efforts need to expand to avoid negative effects of "stovepipe" efforts by commands, institutions, and programs, and take advantage of what others are doing.

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