

# Technically shaping

By COL Mike Brownfield and MAJ Philippe Persaud

The Fort Gordon Signal Center of Excellence, Capability Development Integration Directorate, Experimentation Division, often referred to as the Network Battle Lab, has actively supported the bi-annual Network Integration Evaluation hosted at Fort Bliss, Texas since its inception as the Army Experimental Task Force.

The Lab provides operationally-based, "Green-Suit" technical support to the NIE through technical research, analysis, experimentation, assessment, SATCOM/network services and vendor mentorship. The Network Battle Lab's director, COL Mike Brownfield, works closely with the NIE TRIAD (Brigade Modernization Command, System of Systems - Integration and the Army Test and Evaluation Command), along with other Army lab

partners (Communications-Electronics, Research, Development and Engineering Center - Space and Terrestrial Communications Division, the Maneuver Battle Lab, and the Mission Command Battle Lab), to achieve a common goal of the Agile Process - integrating relevant Warfighter capabilities into a Brigade Combat Team capability set.

As the implementation of the Army's Agile Process matures, the Network Battle Lab continuously realigns its core competencies to properly configure, integrate, and assess network-related systems under evaluation prior to their operational assessment in the desert of the White Sands Missile Range. Many NIE SUE systems have already been combat-tested, but are not currently part of an acquisition program of record. These systems still need a doctrine, organization, training, materiel, leadership, personnel, and logistics impact analysis in order to properly integrate them into Army networks. Other networking SUEs are new, commercially-based systems that show potential to meet specific Army warfighting capability gaps. Given today's ever-changing technological advances associated with Moore's Law, the Army must now take a more pragmatic acquisition strategy that enables it to purchase less equipment more often. This new acquisition approach allows rapid procurement of the latest state-of-the-art equipment to align with a designated Army capability set schedule for deploying BCTs.

The Network Battle Lab provides operationally-based technical support across all seven phases of the NIE Agile Process shown in Figure 1. During each phase, the lab assists the NIE TRIAD by accomplishing key supporting tasks. Phase 0 begins with the capability needs assessment and prioritization of warfighting requirements to satisfy the Army's operational capability gaps. Working in partnership with SoS-I and the SIGCoE's Materials Requirements Branch, the Network Battle Lab helps refine capability gaps before and during Phase 0 by researching their technical requirements and desired specifications.

This research and follow-on analysis aids vendors in building and maturing their candidate solutions to better align with the Army's current and future communication needs.

In some instances, the Lab's research requires experimental excursions designed to shape and test a potential NIE candidate before formally evaluating its capabilities. Figure 2 (on the next page) shows



SFC Anthony Guler and SFC Margaret Movinsky set up a satellite terminal for NIE 12.2 Tech Assessment/Risk Mitigation Effort.

# the NIE battlefield

the Lab's iterative development cycle in preparing a candidate for NIE and Army procurement success. The technical results of these operational exercises conducted during the rehearsal step also inform the NIE solicitation process by providing valuable insights on a system's actual performance. One such excursion led by the Network Battle Lab was the 2011 Army Wireless Network - Tactical experiment sponsored by ARCICs Advanced Capabilities Directorate and conducted at Fort Bliss, Texas. The AWN-T experiment validated the use of Commercial-Off-The-Shelf mobile broadband wireless technology supporting expeditionary operations. This validation included the integration of commercial 802.16e WiMAX base stations into a WIN-T Increment 1A network. Voice, mission command, and video services were provided down to the rifleman-level using COTS 4G LTE cellular phones. This AWN-T experimental excursion shaped commercial 3G and 4G cellular phone technologies for immediate inclusion into NIE 12.1. Similarly, PM-Soldier Warrior joined the Battle Lab network experiments to conduct field tests on their soldier-based, network-enabled systems. Several of these systems subsequently also advanced directly into the next NIE. Other PM-SWAR systems were further evaluated during the Maneuver Center of Excellence's Army Expeditionary Warrior Experiment to determine their practical usability and squad-level integration requirements. As both PM and vendor SUEs prepare for the



The Signal Center of Excellence Network Battle Lab and NSC-T Hub Node Satellite Terminals.

NIE exercise, a risk-reducing configuration and WIN-T integration exercise at the Network Battle Lab provides a full-dress rehearsal in a controlled environment.

The Network Battle Lab mentors industry vendors on their development of candidate technologies destined to participate in NIE. Some of these vendors lack either the military operational experience or the direct access to the military network equipment necessary to properly configure and integrate their equipment into existing Army networks. The Lab's military networking engineers, chief warrant officers, and networking

noncommissioned officers leverage their technical military training and personal combat experience to recommend how emerging technologies can be improved or modified to better meet the needs of the Warfighter.

Recommendations may range from changing hardware components for reliable operation in a harsh field environment to standardizing system interfaces that reduce the length of new operator training. By partnering with the vendors early, the Network Battle Lab helps shape their design and system configurations to better meet the Army's operational

Agile Phase	Task	In Partnership with:
Phase Pre-0 & 0- Define Gaps and Near-Term Requirements	Technology and Communication Concept Development/Refinement at AEWE	MCoE/MBL/SIGCoE
	Support Development of the Technical Aspects of Capability Gap Requirements	SoS-I, BMC, SIGCoE MRD, SIGCoE TCMs
	Tasked Vendor Mentorship	SoS-I, BMC, Select Vendors
Phase I - Solicit Potential Solutions	Support Development of BAA Solicitation Document	SoS-I, BMC, CERDEC S&TC
	Tasked Vendor Mentorship	SoS-I, BMC, CERDEC, Select Vendors
	Lab-Based Assessment/Risk Mitigation of Carryover SUEs as Needed	SoS-I, BMC, CERDEC
Phase II - Candidate Assessment	White Paper Review	SoS-I, BMC, CERDEC, SIGCoE MRD
	Tech Selection Board Member (TBM)	SoS-I, BMC, CERDEC, SIGCoE MRD
	Tasked Vendor Mentorship	SoS-I, BMC, CERDEC, Select Vendors
	Lab-Based Assessment/Risk Mitigation as Needed	SoS-I, CERDEC, BMC

Agile Phase	Task	In Partnership with:
Phase III - Evaluation Preparation	Tasked Vendor Mentorship	SoS-I, BMC, Select Vendors
	SATCOM Engineering	SoS-I, BMC
	Data Service Provisioning	SoS-I, BMC
Phase IV - Integrated Rehearsal	Lab-Based Assessment/Risk Mitigation as Needed	SoS-I, BMC
	Provide SATCOM Transport Service	SoS-I, BMC
	Provide Data Services	SoS-I, BMC
Phase V - Integrated Evaluation	Support Network Baseline Assessment and Troubleshooting	SoS-I, BMC
	Provide SATCOM Transport Service	SoS-I, BMC
	Provide Data Services	SoS-I, BMC
	Support Network Baseline Assessment and Troubleshooting	SoS-I, BMC
Phase VI & Post-VI - Network Implementation Plan	Conduct DOTMLPF Assessments of Select Candidates	SoS-I, BMC, ATEC, SIGCoE
	Complete DOTMLPF Assessment Reports	SoS-I, BMC, ATEC, SIGCoE
	Tasked Vendor Mentorship	SoS-I, BMC, Select Vendors
	Deferred NIE Tech Development/Refinement of Select Candidates at AEWE	SoS-I, BMC, Select Vendors

Figure 1 - The Network Battle Lab Execution Support Tasks for the NIE Agile Process.

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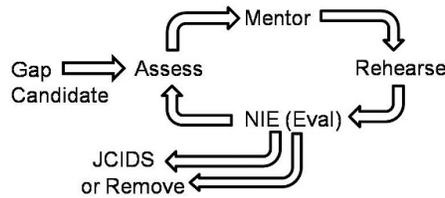
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requirements. This relationship also increases the return value of time, money, and effort invested by all parties throughout the remaining phases of the NIE process.

In addition to research, the Network Battle Lab conducts a detailed analysis of NIE candidates' white papers during Phase two of the Agile Process. The most recent NIE 12.2 white paper review consisted of a detailed technical review of several dozen different technologies, looking specifically at their technical specifications and capabilities, to ensure they met all necessary operational and technical requirements. The results of the review are used during a eight-day Technical Integration Meeting hosted at Aberdeen Proving Grounds, MD, to provide recommendations to the technical selection board. The Network Battle Lab's Live Experimentation branch chief, MAJ Philippe Persaud, actively participates in



**CW3 James Milby conducts performance tests on a Company Command Post System Under Evaluation.**



**Figure 2 - The Laboratory Lifecycle Model for an NIE SUE candidate.**

the SUE selection and evaluation processes. As a result of this selection board, a candidate technology will either be deferred or selected to participate in NIE.

The extent of the Battle Lab's technical analysis effort goes well beyond reviewing white papers and into actual analysis of a candidate's technology. After the post-phase 1 SUE selection Decision Point 1, CERDEC - S&TCD conducts lab-based, SUE candidate validation assessments.

The Network Battle Lab partners with CERDEC - S&TCD to review these lab-based assessments and further validates them against the SIGCoE's operational requirements. The results of this review are used by the General Officer Steering Committee during their DP2 selection process.

Once the candidates pass the second phase of SUE selection, the SoS-I, CERDEC, and Network Battle Lab consortium conducts a risk reduction experiment and lab-based assessment on each of them. A successful example of this risk reduction process was the NIE 12.1 integration of ITT's GNOMAD mobile command post system. ITT brought the equipment to the Fort Gordon Lab and worked with its network engineers to configure and fully integrate the system into the actual satellite network used during NIE. The Network Battle Lab also owns the WIN-T JNN and CPN tactical communications networking systems which fully replicate the surrounding tactical networks to ensure full operational system compatibility. BG Randal

A. Dragon, the BMC commander, later stated that the GNOMAD's system was one of the easiest systems to integrate during the network rehearsals of NIE Phase four. This lab-based assessment provides the Triad with technical performance data such as throughput, latency, jitter, and processor utilization that would be difficult to collect during the actual phase five operational tests conducted in a tactical field environment. In most cases, the labs create harsher network conditions than the actual field environment.

Through sponsorship from SoS-I and CERDEC-S&TCD, the Network Battle Lab recently conducted a technical evaluation and risk reduction exercise on seven different small Company Command Post systems destined for NIE 12.2. The experimentation required individual evaluation of all seven of the systems using highly detailed criteria and integration into the Warfighter Information Network-Tactical network. The Network Battle Lab's Network Service Center-Training satellite hub and the Defense Research and Engineering Network connected the Company Command Post systems located at Fort Gordon to the Mission Command servers located at Aberdeen Proving Grounds, MD. This distributed network facilitated concurrent testing and integration into the wider NIE lab-based risk reduction network. Through the rapid delivery of the detailed technical evaluation results, SoS-I and CERDEC-S&TCD were able to make an informed decision on the viability of candidate technologies and their suitability for further assessment in a field environment at Fort Bliss.

One of the most significant capabilities that the Network Battle Lab brings to NIE is its WIN-T regional hub node,

the Network Service Center-Training. For each NIE cycle, the Network Battle Lab's NSC-T provides commercial Ku band satellite transport service and extends required SIPR/NIPR services to NIE participants during phases four and five. This effort requires a highly detailed satellite communication architecture plan which the NSC-T engineers develop in direct coordination with a technical working group led by the BMC. Additionally, a team of Network Battle Lab satellite and network engineers provide 24/7 technical support to the NIE during phases four and five to ensure that the WIN-T network operates effectively during the experiment. Cost-sharing efficiencies created by the other NSC-T satellite training, fielding and experimental missions reduce the expense of providing satellite service to the NIE by more than \$1.8 million annually.

In addition to supporting the actual NIE, the NSC-T also provides WIN-T satellite support to many of the pre-NIE experiments which include pre-experimental assessments, risk mitigation experiments, and configuration testing.

The Network Battle Lab is proud to serve as a supporting cast member to the BMC, SoS-I, ATEC, and CERDEC-S&TCD. The Lab's technically-

focused, operationally-grounded perspective and full complement of tactical and global communications assets replicating the entire network bring tremendous value to the NIE Agile Process throughout all phases. As the Army's Agile Process evolves, the Network Battle Lab will continue adapting to maintain its quality technical research, analysis, experimentation, assessment, rehearsals, SATCOM/network services and vendor mentorship support to the NIE team.

**COL Michael Brownfield** is the Director of the Network Battle Lab, Fort Gordon, Georgia. Mike earned degrees in Electrical Engineering from the United States Military Academy, Stanford University, and Virginia Tech. Starting his career as an enlisted tactical radio repairman at Fort Sill, OK, Mike has served in a wide variety leadership and staff positions throughout the Army. He deployed from Germany for Operations Desert Shield and Storm with the 93rd Signal Brigade, VII Corps, commanded in the 101st Airborne Division (Air Assault!), and deployed during Operations Enduring Freedom and New Dawn in Iraq. His most recent assignment included III Corps Chief Network Engineer

and the Director of the Joint Network Operations Control Center, U.S. Forces - Iraq. Mike taught Electrical Engineering, Computer Science, and Military Science to the cadets at the U. S. Military Academy, West Point. He is a senior member of the Institute of Electrical and Electronics Engineers, a licensed professional engineer in the Commonwealth of Virginia, a certified information systems security professional, a Cisco certified network associate, and a PMI-certified project manager.

**MAJ Philippe Persaud** is a five-year prior enlisted, year-group 96 basic-branch Aviation officer who graduated the Telecommunications Systems Engineer Course in 2004. MAJ Persaud has served as the brigade telecommunications engineer for both the 11th and 3rd Signal brigades. Most recent assignments include serving as the network management division chief for the 442d Signal Battalion at Fort Gordon and chief of Live Experimentation at the Network Battle Lab. MAJ Persaud possesses a Bachelor of Science in Electrical and Computer Engineering from the University of Wisconsin - Madison and a Master of Science Degree in Telecommunications Management from the University of Maryland.

## ACRONYM QuickScan

**APG** - Aberdeen Proving Grounds  
**AEWE** - Army Expeditionary Warrior Experiment  
**ATEC** - Army Test and Evaluation Command  
**AWN-T** - Army Wireless Network - Tactical  
**BCT** - Brigade Combat Team  
**BMC** - Brigade Modernization Command  
**CDID** - Capability Development Integration Directorate  
**CAN** - Capability Needs Assessment  
**CERDEC - S&TCD** - Communications-Electronics, Research, Development and Engineering Center - Space and Terrestrial Communications Division

**FOC** - Force Operating Capability  
**DOTMLPF** - Doctrine, Organization, Training, Material, Leadership, and Education, Personnel, and Facilities  
**GOSC** - General Officer Steering Committee  
**MRB** - Materials Requirements Branch  
**NIE** - Network Integration Evaluation  
**NSC-T** - Network Service Center-Training  
**SOSI** - System of Systems - Integration  
**SIGCoE** - Signal Center of Excellence  
**SUE** - Systems Under Evaluation