Army Network Modernization

The FY16 National Defense Authorization Act directed the DOD to conduct a comprehensive assessment of the current and future capabilities and requirements of the Army's air-land, mobile tactical communications and data networks, including technological feasibility, suitability, and survivability. Taking into account the study findings, the Army conducted a comprehensive review of the entire network to assess the processes, reduce system vulnerabilities, redefine capability gaps, and improve the equipment needed in the force to "fight and win" today and to innovate to develop future systems.

The Army made the following decisions as a result of their comprehensive review:

- Cancel the Mid-tier Networking Vehicular Radio (MNVR).
- Cancel Command Post of the Future (CPOF).
- Limit procurement and fielding of Warfighter Information Network – Tactical (WIN-T) Increment 2.
- Rewrite the request for proposals for the Handheld, Manpack, Small (HMS) Form Fit Leader Radio to allow for competition of a more capable system.
- Establish an Information Technology Oversight Council to oversee integration of all network-related efforts in the Army.
- Designate lead organizations for network requirements and Army information technology integration.

- Propose an "adapt and buy" acquisition approach for network capabilities.
- Create and enforce a standards-based open architecture to include a unified transport layer and unified mission command suite of systems and applications.

NETWORK INTEGRATION EVALUATION (NIE)

The purpose of the NIEs is to provide a venue for operational testing of Army acquisition programs, with a particular focus on the integrated testing of tactical mission command networks. The Army intended the NIEs to serve as a venue for evaluating emerging capabilities. These systems, termed by the Army as "systems under evaluation," were not intended to be acquisition programs of record, but rather systems that may offer value for future development. That intent has evolved such that acquisition programs of record are using NIE as a venue for risk reduction testing of capabilities prior to formal operational test. The Joint Warfighting Assessment, which has replaced the second annual NIE, has become the primary venue for experimentation.

The Army's intended objective of the NIE – to test and evaluate network components in a combined event – remains sound. The NIE events allow for a more comprehensive evaluation of an integrated mission command network than is possible through piecemeal evaluations of individual network components. However, the benefit is predicated on aligning multiple operational tests with a single, annual, schedule-based event. This limits the flexibility of programs to adapt to schedule delays. Delays are amplified when a program must wait for the next scheduled NIE.

NIE 17.2

During NIE 17.2, the Army conducted an FOT&E for WIN-T Increment 2 Network Operations Security Center – Lite and Tactical Communications Node – Lite. The article providing an assessment of WIN-T can be found on page 129.

NETWORK MODERNIZATION ASSESSMENT

As a result of internal and external reviews, the Army decided to adjust its Network Modernization strategy by instituting cohesive governance, revamping its acquisition approach, halting select programs of record, and realigning the funds to more promising technology. Frequent program restructuring and program delays have translated into very few radios fielded to date. The timing for the change was opportune as three major tactical radio programs, MNVR, HMS Manpack Radio, and HMS Rifleman Radio (now Leader Radio), have re-entered source selection to allow for full and open competition. At a high level, the Army has developed the first principles, characteristics, requirements, and attributes to define the network it needs to operate in a congested and contested environment against current and future peer threats. This approach of defining the overarching

characteristics of the network represents a paradigm shift in what has been to date an overly prescriptive requirements process focused on technical specifications of individual systems. To realize the benefits of this approach the Army must flow down these concepts as threshold capabilities and critical operational issues in validated program requirements documents.

The Army defined the desired network as one that enables the warfighter to fight, shoot, move, communicate, protect, and sustain. The current network components, including mission command systems and elements of the transport layer, are very complex to use. The current capability of an integrated network to enhance mission command is diminished due to pervasive task complexity. It is challenging to achieve and maintain user proficiency. Units remain dependent upon civilian field service representatives to establish and maintain the integrated network. This dependency corresponds directly to network complexity of use. The Army defined its objective network as simple and intuitive with a single mission command suite. The Army desires the future state network to be operated and maintained by soldiers without need for civilian field service representatives. The Israeli Army does not support its communications with contractors deployed at every level. Simple and intuitive networks obviate the need for contractor support.

Governance. One significant change the Army made pertains to governance. The Army established the Information Technology Oversight Council, co-chaired by the Vice Chief of Staff of the Army and the Under Secretary of the Army. The Information Technology Oversight Council will integrate all activities across the network mission areas; warfighting, intelligence, enterprise information environment, and business. The Army Chief Information Officer/G6 was designated the lead integrator, responsible for establishing a standards-based architecture. The Mission Command Center of Excellence will be responsible for synchronizing all tactical network requirements. The Chief of Staff of the Army is the final approval authority responsible for reviewing and validating requirements with operational needs through the Army Requirements Oversight Council (AROC) process.

Acquisition Approach. Another significant change the Army proposed is to institute an acquisition approach for the network of "adapt and buy." The Army does not believe the acquisition process allows for "agile procurement" of the latest technology. The intent of the new approach is to leverage industrial, joint, or special operational forces (SOF) initiatives. The details of how this will be implemented are being developed.

One concept suggested by the Army is to stand up a cross functional team (CFT). The CFT will consist of representatives from the Training and Doctrine Command; Army Materiel Command; Assistant Secretary of the Army for Acquisition, Logistics and Technology; and Army Test and Evaluation Command (ATEC). The Army intends the CFT to support streamlining and horizontal integration of requirements. The CFT will support experimentation and demonstrations of emerging capabilities. Experimentation will be used to further refine requirements and aid in system development. The idea of experimentation is similar to the original intent of the NIE, which was to evaluate emerging capabilities. The lack of new technology offered and the gradual shift to program of record evaluations reduced the benefit of this approach in the NIE.

The Army believes the pivot to a development operations (DevOps) model constitutes a major shift to the approach to modernization. The DevOps model uses continuous experimentation and user feedback to refine requirements and acquisition decisions. The Army will need to carefully define the process by which they will refine the requirements based on experimentation results.

The new acquisition approach poses some challenges the Army should consider.

- Much of the goal for a standards-based open architecture, a universal transport layer, and a unified mission command suite is predicated on the Army's ability to define these standards in light of dozens of programs of record spread across multiple Program Executive Offices.
- Experimentation and demonstration generally do not provide adequate data to make a determination of operational effectiveness and suitability. A comprehensive integrated test plan would outline the data requirements needed from experimentation through operational test and could be used to reduce the amount of duplicative testing required.
- Given the difficulty the Army is having resourcing operational tests with test units, resourcing multiple experimentation events could be a problem.
- The Army is seeking "reciprocity" for testing conducted by SOF and joint partners. If the Army plans and coordinates with SOF and joint partners to collect adequate data, this could be possible.
- As the Army selects systems to "adapt and buy," there may be a reduction in full and open competition.

Programmatic Changes. The Army asked Congress for the ability to realign funding for FY18. It intends to halt procurement of the MNVR immediately. At the Milestone C decision in November 2016, the Defense Acquisition Executive directed the Army to conduct an Analysis of Alternatives for MNVR prior to awarding a low-rate initial production (LRIP) contract. At the time, the Army decided to field the 478 MNVR radios already on contract to outfit 4 brigade combat teams for "experimentation." Operational test results demonstrated that MNVR using the Wideband Networking Waveform was not effective at providing reliable communications at doctrinally required ranges. Cancellation of this program will allow the Army to redefine the requirements for communications between battalion and companies to better meet their operational needs.

The Army announced its intent to halt procurement of CPOF as part of the new strategy. CPOF was already intended for divestiture. The Command Post Computing Environment part of the Common Operating Environment was the planned replacement.

The Army intends to halt procurement of WIN-T Increment 2 at the end of FY18. That does not constitute the end of WIN-T Increment 2 fielding. The Army will field the light versions of Network Operations Security Center and Tactical Communications Node tested during NIE 17.2, to Infantry Brigade Combat Teams. The Army will complete fielding of WIN-T Increment 2 to Stryker Brigade Combat Teams by cascading the heavy versions of Network Operations Security Center and Tactical Communications Node from the Infantry Brigade Combat Teams and procuring additional Stryker Enhanced Point of Presence. The major change in strategy is that the Army no longer plans to field WIN-T Increment 2 to Armored Brigade Combat Teams. Implementation of the WIN-T network into the Armored Brigade Combat Team was dependent upon successful development and fielding of the Armored Multi-purpose Vehicle Mission Command variant.

In advance of releasing the request for proposals for the Leader Radio, the Army revised the requirements to enable industry to offer more technologically capable radios. This represents a significant change from the original acquisition strategy. The original Leader Radio requirements specified Soldier Radio Waveform (SRW) and Single Channel Ground and Airborne Radio System (SINCGARS) as the two required waveforms for the system. This represented a change from the Rifleman Radio that only required SRW. The requirement for a two-channel radio was added because the limited range provided by SRW did not support divestiture of the legacy SINCGARS radio. A two-channel radio would obviate the need for soldiers to carry two radios. The requirement for SRW is 20 years old. Industry innovation has surpassed the capability inherent in the SRW waveform producing waveforms with routing protocols that are inherently more scalable and power efficient. It will be possible for vendors to compete with multiband radios as the Army transitions from a "lowest cost technically acceptable" to a "best value" approach.

The Army awarded a contract for test articles for the HMS Manpack in July 2017. Unlike the Leader Radio, the strategy does not allow for additional capabilities with the delivered radios for IOT&E. The Full and Open Competition Manpack Radios are required to weigh less than the LRIP versions tested in 2014. The radios have the same threshold waveform requirements of SRW and SINCGARS. The Mobile User Objective System on Manpack was tested during Multi-Service Operational Test and Evaluation (MOT&E) in 2016. The radios to be tested at IOT&E do not represent an improved capability over what has already been tested. If multiband Leader Radios are competed, they will only be interoperable with Manpack over SRW and SINCGARS.

New Technology. The Army intends to use some of the reprogramed funds for experimentation with mature joint and SOF solutions. These include capabilities for coalition and joint radio gateways with access to a tactical datalink aimed at improving joint and Army interoperability with close air support. As mentioned previously in this article, the key to successful integration of these technologies into an overarching, cohesive strategy will be dependent on development and enforcement of open architecture standards for a unified transport layer and mission command suite.

NIE ASSESSMENT

NIE 17.2 was the eleventh such event conducted to date. NIEs have been an excellent venue for conducting operational tests of network acquisition programs.

Dedicated Test Unit. For the first time since NIE inception in July 2011, a dedicated test unit did not conduct the event. Having a dedicated test unit stationed at Fort Bliss, Texas, has been a critical element in successful operational testing conducted during NIEs. It has made the planning and execution of complex brigade-sized operational tests of Army networks much more effective than would be the case if new test units were selected for each event. Past experience demonstrates that having a dedicated test unit enables good operational testing. Due to its experience and the organizational learning that occurred over time, the dedicated NIE test brigade has shown that it is more attuned to incorporating new systems into its formation for testing than has been the case with one-off test units. As a result, the system undergoes efficient operational testing and receives a thorough evaluation.

A dedicated test unit is desirable in that it relieves the stress on the U.S. Army Forces Command (FORSCOM) to designate a test unit of appropriate size each time an operational test is on the schedule for a given program. Some tests require large-scale units, up to brigade in size and, in cases where the Army is testing command and control systems, sometimes even requiring a division headquarters element. Having a dedicated test unit of a mixed composition enables all of those requirements to be met at one place. FORSCOM has struggled resourcing the force requirements for several upcoming operational tests. For example, FORSCOM did not task a company-sized unit to conduct the Joint Light Tactical Vehicle MOT&E until 3 months before the planned execution. The delay has affected ATEC's ability to develop operationally relevant missions and ensure that the unit is trained, equipped, and manned to execute these missions.

The 2nd Brigade Combat Team, 101st Airborne Division conducted NIE 17.2 and provided frank feedback on the systems under test. As an airborne unit, it conducted sling load operations in a realistic manner. The systems being tested, Network Operations Security Center – Lite and Tactical Communications Node – Lite, did not represent a significant new capability over the heavy versions. As such, the expected benefit of a dedicated test unit's experience was not required.

The 2nd Brigade Combat Team, 101st Airborne Division recently returned from deployment and had finished its reset so many of

the personnel were new to that unit. The NIE was their first field exercise as a brigade since returning from deployment. As such, some soldiers were not familiar with the unit or the equipment. This might be mitigated by sending a unit after their combat training center rotation.

Another aspect of good operational testing is a capable opposing force (OPFOR). The dedicated test brigade has been very proficient in creating this OPFOR. Good operational testing requires an aggressive, adaptive threat unit intent on winning the battle in order to adequately stress the system under test and to fully understand its capabilities. A realistic demanding OPFOR requires capabilities that are not easily assembled and integrated. These capabilities include electronic warfare and cybersecurity threats as well as a mix of heavy and light forces.

One of the most significant benefits of NIEs has been the extensive incorporation of threat information operations, such as electronic warfare and computer network operations. The integration of electronic warfare and cyber capabilities into an OPFOR requires practice and is not easily replicated by new units tasked to portray the OPFOR in operational testing. The units permanently assigned to conduct the NIEs have, over time, demonstrated the ability to employ an effective OPFOR with a variety of combat multipliers. This OPFOR capability has grown increasingly sophisticated and can be readily adapted to reflect new real-world threat capabilities. As a result, NIEs have provided numerous insights with respect to operations in this type of threat environment. The Army has initiated efforts to enhance the cyber and electronic warfare capabilities of the OPFOR at the combat training centers. Lessons learned from NIE could be used as a model to employ those capabilities.

The OPFOR unit (1st Battalion, 502nd Infantry Regiment) was deployed from Fort Campbell, Kentucky, to support operations at Fort Bliss. It was able to overcome these challenges due to the discipline, skill, and motivation of its soldiers and leaders and the presence of an exceptionally competent electronic warfare non-commissioned officer in their tactical operations center (TOC). However, it was not until the middle of the record test that the majority of TOC personnel had a full understanding of all the systems, their capabilities, and how to effectively integrate them into both current and future OPFOR operations.

To provide realistic assessments of new capabilities, the Army should maintain a robust threat during network experimentation and testing. The shift from a single annual NIE event to multiple smaller events will increase resources required to bring these enablers to each venue.

Instrumentation and Data Collection. The Army should continue to improve its instrumentation and data collection procedures to support operational testing. ATEC should devote increased effort towards developing instrumentation to collect network data for dismounted radios, such as the Manpack radio. The Army needs to place greater emphasis on the use of Real-Time Casualty Assessment instrumentation – an essential component of good force-on-force operational testing – such as that conducted at NIEs. A Real-Time Casualty Assessment is intended to accurately simulate direct and indirect fire effects for both friendly and threat forces. Finally, the Army should continue to refine its methodology for the conduct of interviews, focus groups, and surveys with the units employing the systems under test.