AN/PRC-117G

Executive Summary

- The Army has fielded the AN/PRC-117G radio to combat units in Afghanistan. Testing of the full capabilities in a realistic operational environment was not conducted on the AN/PRC-117G radio prior to fielding. DOT&E placed the AN/PRC-117G radio on oversight on October 4, 2012, and directed the Army to conduct an operational test in calendar year 2013.
- The Army Test and Evaluation Command conducted operational testing of the AN/PRC-117G as part of the Network Integration Evaluation (NIE) 14.1 at Fort Bliss, Texas, in November 2013.
- During the operational test, a Threat Computer Network Operations Team consisting of members from the Army Research Laboratory/Survivability Lethality Analysis Directorate and Threat Systems Management Office (TSMO) conducted cybersecurity assessments on the AN/PRC-117G radio. The TSMO conducted an electronic warfare campaign including direction finding and open-air jamming of both the Soldier Radio Waveform (SRW) and Adaptive Networking Wideband Waveform (ANW2).
- As a result of the OT&E conducted in November 2013, DOT&E recommended the Army evaluate the overall network architecture to improve the range, reliability, and survivability of the network and simplify network management.

System

- The AN/PRC-117G radio is a single channel voice and data radio that is capable of operating in a frequency range of 30 Megahertz to 2 Gigahertz. Operational configurations include manpack, vehicular-mounted, or base-station operations.
- The primary AN/PRC-117G waveform is the ANW2, which is a Harris Corporation proprietary waveform.
- The AN/PRC-117G is capable of simultaneously transmitting both Voice over Internet Protocol and digital data on a single channel. Digital data include file transfers, chat, streaming video, and position location reports.
- The Army procured and fielded the AN/PRC-117G as a tactical satellite radio and to provide a networking radio bridge capability until the Manpack Radio and Mid-Tier Networking Vehicular Radio (MNVR) programs of record are available.

Mission

- The Army intends for tactical units to employ the AN/PRC-117G as a data radio. Specifically, the ANW2 allows units to use Internet Protocol routing to transmit medium to high bandwidth data traffic over tactical Very-High Frequency, Ultra-High Frequency, and L-band radio networks.
- AN/PRC-117G will be an interim commercial off-the-shelf solution until the MNVR is developed and fielded. The Army intends for the MNVR to replace the cancelled Joint Tactical Radio System Ground Mobile Radios program.

Major Contractor

Harris Corporation – Rochester, New York

Activity

- The Army is purchasing the AN/PRC-117G as a commercial off-the-shelf item to fill a capability gap for a tactical digital radio. With the October 2011 cancellation of the Joint Tactical Radio System Ground Mobile Radio program, the Army sought an interim solution to fill Brigade Combat Teams as a part of Capability Set 13. The Army used an existing General Services Administration contract to purchase the AN/PRC-117G.
- In 2011, the Army placed a $63 Million order for 16,000 AN/PRC-117G radios.
- The Army has fielded the AN/PRC-117G radio to combat units in Afghanistan. Testing of the full capabilities in a realistic operational environment was not conducted on the AN/PRC-117G radio prior to fielding. DOT&E placed the AN/PRC-117G radio on oversight on October 4, 2012, and directed the Army to conduct an operational test in calendar year 2013.
- The Army Test and Evaluation Command conducted operational testing of the AN/PRC-117G as part of the

Army's NIE 14.1 at Fort Bliss, Texas, in November 2013, in accordance with a DOT&E-approved test plan.
- As part of the operational test, a Threat Computer Network Operations Team, consisting of members from the Army Research Laboratory/Survivability Lethality Analysis Directorate and TSMO, conducted cybersecurity assessments on the AN/PRC-117G radio. The TSMO conducted an electronic warfare campaign including direction finding and open-air jamming of both the SRW and ANW2. All threats portrayed during operational testing were in accordance with the accredited Threat Training Support Package for the AN/PRC-117G radio.
- DOT&E published an Operational Assessment report on the AN/PRC-117G in September 2014.

Assessment

During the NIE, problems with the network architecture contributed to the communications problems experienced by the test unit. The AN/PRC-117G-hosted networks were able to support some stationary missions, such as base and area defense at short ranges and for a fraction of the users. Mobile missions at longer ranges presented a challenge to the radio networks. A majority of Soldiers reported that voice communications were acceptable.
- The operational ranges for AN/PRC-117G data transfers were too short to support their combat missions at echelons above platoon; as designed, the network cannot support battalion- and company-level communications as tactical units require.
- No requirements document exists for the AN/PRC-117G because it is not a program of record. The operational test conducted during the NIE, along with the assessment conducted in Afghanistan, demonstrated the radio could not meet the MNVR Wideband Networking Waveform requirement of 80 percent "connection availability" at 6-10 kilometers.
- The operational range of the legacy Single Channel Ground and Airborne Radio System (SINCGARS) waveform on the AN/PRC-117G did not meet Soldiers' mission needs. A range of 300 meters was reported for dismounted Soldiers, and 2 kilometers when communicating between a dismounted Soldier and a vehicle-mounted AN/PRC-117G. For comparison, a legacy SINCGARS radio demonstrated a 20-kilometer range during the Manpack radio Multi-Service Operational Test and Evaluation.
- The AN/PRC-117G demonstrated a long Mean Time Between Essential Function Failure (497 hours for the SRW and 1,054 hours for the ANW2), which indicates a low failure rate.
- During the NIE, the Soldiers reported the following:
  - The size and weight of the radio made it portable.
  - There were numerous instances of the radio falling out of its vehicle mount.
  - The training and materials provided were not sufficient for them to use to troubleshoot and repair the systems.
- Cybersecurity vulnerabilities on the AN/PRC-117G permitted access to networks by the cyber Red Team. These networks contained information critical to Blue Force operations. During the operational test, the Opposing Force Commander used electronic detection of Blue Force radios to provide situational awareness of the Blue Force locations. The Opposing Force Commander used electronic jamming to disrupt the Blue Force scheme of maneuver. Test unit Soldiers received no training on how to identify and respond to electronic warfare or cybersecurity attacks.

Recommendations
- Status of Previous Recommendations. The Army addressed the previous recommendation.
- FY14 Recommendations. The Army should:
  1. Harden the radio against unauthorized use in order to prevent the cybersecurity vulnerabilities.
  2. Increase the transmission range of ANW2 to support operations at the company and above echelons by using a lower transmission frequency, increasing antenna size, and/or increasing output power.
  3. Improve the range and reliability of the SINCGARS waveform. The performance of the waveform on the AN/PRC-117G radio should be comparable with the performance of the legacy SINCGARS radio.
  4. Provide operations and maintenance manuals for the AN/PRC-117G and adequate training to enable unit Soldiers to operate and maintain the radio under normal operational conditions without the use of Field Service Representatives. Training should include procedures for identifying and responding to adversarial electronic and cybersecurity attacks.
  5. Improve the design of the AN/PRC-117G vehicle mount to prevent the radio from falling out of the mount during vehicle operations.
  6. Evaluate the overall network architecture to improve the range, reliability, and survivability of the network and simplify network management.