

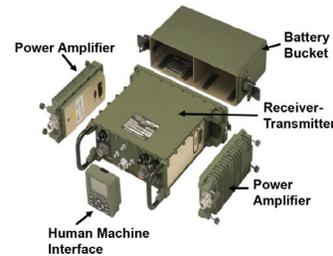
Manpack Radio

Executive Summary

- In December 2013, the Defense Acquisition Executive (DAE) approved an additional low-rate initial production (LRIP) lot of 1,500 Manpack radios. This brought the total number of Manpack radios procured through LRIP to 5,326.
- In April through May 2014, the Army conducted a Manpack radio FOT&E as part of the Network Integration Evaluation 14.2 at Fort Bliss, Texas, in accordance with a DOT&E-approved test plan. DOT&E assessed the Manpack radio as not operationally effective when employed in dismounted operations, operationally effective for mounted operations, and not operationally suitable.
- In May 2014, the DAE approved a new Manpack radio acquisition strategy. This strategy specifies that the Army will conduct a full and open competition, open to all industry vendors, for the full-rate production phase of the Manpack radio program. The Army is currently developing a Test and Evaluation Master Plan (TEMP) to support the new Manpack radio acquisition strategy.

System

- The Army's Handheld, Manpack, and Small Form Fit (HMS) program evolved from the Joint Tactical Radio System program and provides software-programmable digital radios to support the Army's tactical communications requirements. The two radios that comprise the HMS program are the Manpack radio and the Rifleman Radio. (Rifleman Radio is a separate program of record, with a separate article later in this Annual Report.)
- The Manpack radio is a two-channel software-defined radio capable of transmitting both voice and data communications.
- Manpack radio has an operating spectrum of 2 to 512 Megahertz with a 20-watt power output, or 512 Megahertz to 2.5 Gigahertz with a 10-watt power output.
- Manpack radio is capable of employing multiple waveforms:
 - Soldier Radio Waveform (SRW)



- Single Channel Ground and Airborne Radio System (SINCGARS) waveform
- Ultra-High Frequency Satellite Communications (UHF-SATCOM) 181B
- Demand Assigned Multi-Access UHF-SATCOM waveforms 182A and 183A
- The Services intend the Manpack radio to eventually host the Mobile User Objective Satellite waveform, which is still in development.

Mission

Army tactical units will use Manpack radios to provide networked voice and data communications during all tactical operations. The Manpack radio can operate in one of three modes: dismounted, vehicle mounted, or mounted in a kit for use in a Tactical Operations Center.

Major Contractors

- General Dynamics, C4 Systems – Scottsdale, Arizona
- Rockwell Collins – Cedar Rapids, Iowa

Activity

- In December 2013, the DAE approved an additional LRIP lot of 1,500 Manpack radios. This brought the total number of Manpack radios procured through LRIP to 5,326.
- In January through February 2014, the Army conducted Government Developmental Test 4 (GDT 4) at Fort Huachuca, Arizona.
 - GDT 4 tested corrective actions applied to the Manpack radio in response to deficiencies identified in previous test events, including the Multi-Service Operational Test and Evaluation conducted in May 2012.

- Among the previously identified deficiencies were both unsatisfactory SINCGARS waveform performance and poor reliability.
- The test was also designed to assess capabilities that had not been previously tested. These additional capabilities included route and retransmission and additional satellite communications waveforms (Demand Assigned Multi-Access UHF-SATCOM 182A and 183A). Route and retransmission refers to the radio function that enables traffic coming into the radio on one channel to be

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“cross-banded” within the radio and re-transmitted out on the other channel, either on the same waveform or on a different waveform.

- In April through May 2014, the Army conducted a Manpack radio FOT&E as part of the Network Integration Evaluation 14.2 at Fort Bliss, Texas, in accordance with a DOT&E-approved test plan. During this FOT&E, infantry and cavalry units employed the Manpack radio in executing both mounted and dismounted tactical operations. The purpose of this test was to evaluate in a realistic operational environment the correction of Manpack radio deficiencies identified in the Multi-Service Operational Test and Evaluation, as well as the additional capabilities that had yet to be demonstrated in an operational test.
- In May 2014, the DAE approved a new Manpack radio acquisition strategy. This strategy specifies that the Army will conduct a full and open competition, open to all industry vendors, for the full-rate production phase of the Manpack radio program.
- The Army is currently developing a TEMP to support the new Manpack acquisition strategy.

Assessment

- Based upon the results of the 2014 FOT&E, DOT&E made the following assessment:
 - The Manpack radio is not operationally effective when employed in dismounted operations. This assessment is the result of the SRW providing insufficient range to support dismounted company and platoon-level operations. SRW is the waveform the Army has selected for both voice and data communications at these tactical echelons. SRW demonstrates a shorter range vis-à-vis the legacy SINCGARS waveform it is replacing in this network. This result is not surprising given that SRW operates at a much higher frequency than does SINCGARS. Higher frequencies have shorter ranges and are more affected by terrain obstructions.
 - The Manpack radio is operationally effective for mounted operations. As tested, vehicular-mounted Manpack radios overcame the SRW range limitations due to higher vehicle antennas. Additionally, the mounted test unit had a higher density of radios, and hence a denser network, aiding communications in comparison to the dismounted test unit.
 - The Manpack radio is not operationally suitable. The radio’s weight hinders dismounted operations. For a

24-hour operation, the Manpack radio weighs—inclusive of batteries and antennas—approximately three times what the legacy SINCGARS Advance System Improvement Program radio weighs (35 pounds versus 12 pounds). The Manpack radio generates heat at a level, which, while technically meeting the Military Standard for prolonged exposure, adversely affected dismounted operators. During the FOT&E, SRW on the Manpack radio was reliable, exceeding its reliability requirement of 477-hour Mean Time Between Essential Function Failure. Although the SINCGARS waveform did not meet its reliability requirement, its reliability did not adversely affect the test unit’s ability to execute the mission. SATCOM waveform 183A also did not meet its reliability requirement. SATCOM waveforms 181B and 182A had insufficient operating time during the FOT&E to reach a conclusion as to their reliability.

- During GDT 4:
 - All Manpack waveforms performed satisfactorily with respect to voice quality and data speed of service.
 - The Manpack radio successfully demonstrated simultaneous dual-channel operations, with the exception of the SINCGARS-SINCGARS waveform combination, which demonstrated an unsatisfactory call completion rate and poor voice quality.
 - The Manpack radio successfully demonstrated its route and retransmission capability for both voice and data, with the exception of SINCGARS voice route and retransmission. SINCGARS voice was not tested due to radio interference emanating from unrelated testing nearby.
 - Manpack radio reliability was below the requirement, demonstrating a Mean Time Between Essential Function Failure of 217 hours versus the requirement of 477 hours.
 - Test scenarios were considerably less challenging than those experienced during the FOT&E. For example, radio operations were largely conducted from static positions with good line-of-sight.

Recommendations

- Status of Previous Recommendations. The Army addressed the FY13 recommendations.
- FY14 Recommendation.
 1. The Army should develop a TEMP that satisfactorily addresses the developmental and operational testing supporting the new Manpack radio acquisition strategy.