

# Joint Tactical Radio System (JTRS) Handheld, Manpack, and Small Form Fit (HMS) Rifleman Radio

## Executive Summary

- In January 2011, the Army conducted a Verification of Correction of Deficiencies (VCD) test with a redesigned version of the Rifleman Radio. During the VCD test, Soldiers demonstrated that the redesigned Rifleman Radio corrects most of the radio's deficiencies and provides some improvement to reliability.
- In May 2011, the Joint Tactical Radio System (JTRS) Handheld, Manpack, and Small Form Fit (HMS) program received a Milestone C Low-Rate Initial Production (LRIP) decision based upon the improved performance the Rifleman Radio demonstrated during the VCD. The Defense Acquisition Executive (DAE) approved the Rifleman Radio LRIP quantity of 6,250 radios.
- In November 2011, the Army conducted a Rifleman Radio IOT&E intended to support a Full-Rate Production decision as a part of the Network Integration Evaluation 12.1. DOT&E assessed the Rifleman Radio to be operationally effective with poor reliability.
- From February through April 2012, the Army conducted Governmental Developmental Test (GDT) 2.3 and GDT 2.3a to complete developmental testing normally completed prior to IOT&E. During GDT 2.3, the Rifleman Radio demonstrated new failures not observed in IOT&E. The program performed a software update and demonstrated fixes during GDT 2.3a. The Rifleman Radio showed improvement but did not meet its reliability requirement.
- In May 2012, the DAE decided to pursue a competitive Full-Rate Production decision and approved a second LRIP decision for 13,077 radios.
- The JTRS HMS program is schedule-driven and did not complete developmental testing prior to IOT&E to support an aggressive operational test schedule. Operational testing has continued to reveal problems that should have been discovered and fixed during developmental testing.

## System

- JTRS is a family of software-programmable and hardware configurable digital radios intended to provide increased interoperability, flexibility, and adaptability to support numerous tactical communications requirements.
- The JTRS HMS program provides handheld and two-channel Manpack radios supporting Army, Marine Corps, Navy, and Air Force operations. The program develops Small Form Fit (SFF) radio configurations that include the stand-alone Army Rifleman Radio and embedded SFF variants that serve in



Army host platforms such as the SFF-B (Shadow Unmanned Aerial Vehicle), SFF-B (V)1 (Nett Warrior), and the SFF-D (Small Unmanned Ground Vehicle).

- The program strategy has two phases of HMS production. The JTRS HMS program developed the Rifleman Radio as part of its Phase 1 effort to provide software programmable radios with National Security Agency (NSA) Type 2 encryption of unclassified information that could operate a networking waveform. Phase 2 consists of developing the Manpack radio to provide software programmable radios with NSA Type 1 encryption of classified information.
- The Rifleman Radio is a one-channel radio with commercial GPS that:
  - Is capable of operating at various transmission frequencies using the Soldier Radio Waveform (SRW)
  - Operates at 5 watts maximum power output
  - Allows Soldiers to participate in Army doctrinal voice networks and transmit Position Location Information

## Mission

Army leaders and Soldiers use Rifleman Radios to communicate and create networks to exchange voice, video, and data using the SRW during all aspects of military operations.

## Major Contractor

General Dynamics, C4 Systems – Scottsdale, Arizona

## Activity

- The JTRS HMS program completed a redesign of the Rifleman Radio hardware and improved its software to address deficiencies identified during the 2009 Limited User Test. The redesigned Rifleman Radio features improvements in size, weight, battery life, and increased radio frequency power output.
  - In January 2011, the Army conducted a Rifleman Radio VCD test at Fort Benning, Georgia, to demonstrate improvements in the redesigned radio.
  - In May 2011, the DAE approved a Milestone C LRIP decision to procure 6,250 Rifleman Radios of a total acquisition objective of 193,279 radios.
  - From October to November 2011, the Army Test and Evaluation Command conducted the Rifleman Radio IOT&E at White Sands Missile Range, New Mexico, as part of the Army's Network Integration Evaluation 12.1. The test was conducted in accordance with a DOT&E-approved test plan. Operational units tested the Rifleman Radio using the Soldier Radio Waveform Network Manager (SRWNM) to plan and load SRW network configurations into the radios. Two platoons of infantry engaged in a variety of mission scenarios employed the Rifleman Radio. An additional baseline infantry platoon, equipped with legacy radios, completed similar missions for comparison purposes.
  - February through March 2012, the Army conducted the Rifleman Radio GDT 2.3 at the Electronic Proving Ground at Fort Huachuca, Arizona. The Army conducted this GDT to complete developmental testing that the Army should have completed prior to IOT&E.
  - In April 2012, the Army conducted a follow-on developmental test, GDT 2.3a. The Army used this follow-on event to confirm fixes to deficiencies observed during GDT 2.3.
  - On May 23, 2012, the DAE approved a second LRIP for an additional 13,077 Rifleman Radios to increase the total LRIP procurement to 10 percent of the total acquisition objective.
  - The Army continues preparation for a future Rifleman Radio IOT&E-2 that will include competition of Program of Record and alternate radio vendors.
- Transmission range met the radio's requirement of 2,000 meters in an urban setting and 1,000 meters in dense vegetation.
  - Radio battery life exceeded the radio's revised 8-hour requirement.
- During the 2011 Rifleman Radio IOT&E, the production-representative radio demonstrated the following:
    - Usefulness in supporting combat leaders and Soldiers in a wide variety of missions.
    - Enhanced ability for Soldiers to execute mission command and communicate using voice and data.
    - Increased effective radio transmission range relative to legacy radios.
    - Reduced reliability of 161 hours MTBEFF compared to the requirement of 477 hours. This translates to an 86 percent chance of completion of a 24-hour mission compared to a requirement of 95 percent.
    - Vulnerabilities in Information Assurance and electronic warfare.
  - During the 2011 Rifleman Radio IOT&E, the SRWNM did not support the unit's mission in planning and loading radios in a timely manner due to cumbersome software and poor training provided to Soldiers.
  - During the 2012 GDT 2.3, the Rifleman Radio demonstrated reliability of 157 hours MTBEFF. This reduced reliability was due to new failures (not observed in IOT&E) that included spontaneous reboots, loss of the ability to transmit, or loss of the ability to receive. The program attributed these failures to software updates. The JTRS HMS program updated the software and performed GDT 2.3a to demonstrate fixes.
  - The Rifleman Radio during the GDT 2.3 and 2.3a demonstrated the following results:
    - Estimated reliability of the Rifleman Radio is 310 hours MTBEFF, which is a 93 percent chance of completing a 24-hour mission against a 95 percent requirement.
    - Message completion rate of 84 percent and a call completion rate of 95 percent. The Army's requirement for both is 90 percent.
    - The radio met its requirements for Position Location Information updates, size, weight, power, and retention of cryptographic information.
  - The Rifleman Radio program is schedule-driven. As a result, the Army did not perform the necessary developmental testing required to ensure success during the Rifleman Radio IOT&E. Although the first developmental test event was conducted prior to IOT&E, the Army conducted the remaining two developmental test events several months after the operational test.

## Assessment

- During the 2009 Rifleman Radio Limited User Test, DOT&E assessed the radio as useful during mission preparation, movement, and reconnaissance activities. The radio demonstrated poor performance during combat operations and poor reliability.
- During the 2011 Rifleman Radio VCD test, the redesigned radio demonstrated the following improvements:
  - Operational reliability of 277 hours Mean Time Between Essential Function Failure (MTBEFF) compared to the revised requirement of 477 hours. This translates to a 92 percent chance of completing a 24-hour mission compared to a requirement of 95 percent.

## **Recommendations**

- Status of Previous Recommendations. The JTRS HMS program did not address the previous recommendations to perform adequate developmental testing prior to operational testing and to complete necessary documentation to support future developmental and operational testing.
- FY12 Recommendations. The Army should address the previous recommendations and:
  1. Ensure that adequate developmental testing is performed prior to future operational tests.
  2. Complete necessary Rifleman Radio documentation to support future developmental and operational testing.

# DOD PROGRAMS