

## Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV)

### Executive Summary

- The Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV) is operationally effective for chemical reconnaissance on primary and secondary roads, and operationally suitable when equipped with slat armor. The NBCRV is not operationally effective for reconnaissance of cross-country terrain, chemical surveillance, and biological surveillance.
- The NBCRV provides limited biological detection and on-the-move chemical standoff detection capability with more rapid reporting than the M93 series Fox Nuclear, Biological, and Chemical Reconnaissance System that it will replace.
- Initial testing of the NBCRV, equipped with Stryker Reactive Armor Tile II (SRAT II), indicates the added weight of the armor kit negatively affects NBCRV mobility in steep terrain, such as Afghanistan. The Army needs to conduct additional developmental testing to characterize factors and conditions that lead to component failures that negatively affect mobility.
- The NBCRV provides protection against the threshold requirement threats with limitations. Live fire testing indicates potential performance deficiencies in the protection provided by the SRAT II configuration. The details are classified.

### System

- The NBCRV is one of eight configurations of the Infantry Carrier Vehicle variant of the Stryker family of vehicles. Chemical, biological, and radiological sensors and communications systems are integrated into the Stryker vehicle to perform chemical, biological, radiological, and nuclear (CBRN) detection, identification, marking, sampling, and reporting of these hazards.
- The NBCRV provides the four-member crew with levels of protection against small arms, fragmenting artillery, mines, and rocket-propelled grenades. Rocket-propelled grenade protection is currently provided by add-on slat armor (high hard steel arranged in a spaced array). SRAT II, an alternative add-on reactive armor kit intended to provide additional protection, is undergoing developmental and live fire test and evaluation.
- The NBCRV is equipped with a filter and over-pressure system that provides its crew protection from CBRN threats.
- The CBRN Mission Equipment Package includes the following:
  - Joint Biological Point Detection System
  - Joint Service Lightweight Standoff Chemical Agent Detector



- Chemical and Biological Mass Spectrometer II
- Chemical Vapor Sampling System
- NATO standard markers and deployment system
- Automatic Chemical Agent Detector Alarm
- AN/VDR-2 and AN/UDR-13 radiological detectors
- An NBCRV team consists of a Stryker NBCRV and a four person crew.
  - The Stryker Brigade Combat Team (BCT) has one platoon of three NBCRV teams.
  - The Heavy BCT has one squad of two NBCRV teams.
  - The Division or Corps Chemical Company has six NBCRV teams.

### Mission

CBRN reconnaissance units, equipped with the NBCRV, conduct reconnaissance and surveillance to determine the presence and extent of CBRN contamination using the CBRN reconnaissance techniques of search, survey, surveillance, and sampling. A CBRN reconnaissance unit, as part of an early entry combat force, conducts limited independent operations.

### Major Contractor

General Dynamics Land Systems – Sterling Heights, Michigan

## Activity

- In IOT&E phase one, conducted from September to October 2006, the NBCRV experienced numerous operation mission failures. The program undertook a reliability improvement program and made a number of changes to the system configuration tested in IOT&E phase one. The Army Test and Evaluation Command conducted IOT&E phase two at Dugway Proving Ground, Utah, from September 20 to October 1, 2010. The test was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan and test plan.
- The Army Test and Evaluation Command conducted SRAT II qualification testing, ballistic hull testing, a second phase of follow-on controlled damage experimentation, and four additional full-up system-level events in July 2011 to support the final NBCRV survivability assessment; testing was conducted in accordance with DOT&E-approved test plans.

## Assessment

- The NBCRV is operationally effective for chemical reconnaissance on primary and secondary roads due to its ability to collect chemical agents from improved road surfaces using the dual-wheeled sampling system. The NBCRV is not operationally effective for area reconnaissance of cross-country terrain due to the inability of the dual-wheeled sampling system to maintain wheel contact with rough terrain.
- The NBCRV is not operationally effective for chemical surveillance due to poor performance in detecting chemical warfare agents.
- The NBCRV is not operationally effective for biological surveillance when employed in two-vehicle squads or three-vehicle platoons because of the limited coverage by point sensors. The NBCRV provides limited biological detection and identification capability when employed as a larger array of biological sensors.

- The NBCRV is operationally suitable when equipped with slat armor. During operational testing, the NBCRV demonstrated improved base vehicle reliability and exceeded the Army's reliability requirement during developmental testing.
- Initial testing of the NBCRV, equipped with SRAT II, indicates the added weight of the armor kit negatively affects NBCRV mobility in steep terrain, such as Afghanistan. During a 3,090-mile NBCRV reliability test with the SRAT II, the system experienced multiple driveline failures, including three broken differentials and multiple broken axle half-shafts. Driveline failures negatively affect mobility by limiting the speed of travel and the vehicle's ability to traverse steep terrain.
- The NBCRV provides protection against the threshold requirement threats with limitations. Live fire testing indicates potential performance deficiencies in the protection provided by the SRAT II configuration. The details are classified.
- The NBCRV provides limited biological and on-the-move chemical standoff detection capability, and more rapid reporting than the M93 series Fox Nuclear, Biological, and Chemical Reconnaissance System that it will replace.

## Recommendations

- Status of Previous Recommendations. The Army has not conducted the additional testing recommended in FY10 and should complete the planned additional developmental testing with the SRAT II kit to characterize the factors and conditions that lead to broken axle half-shafts and the resulting mobility impacts.
- FY11 Recommendation.
  1. The Army should resource an adequate T&E program to characterize potential performance deficiencies with SRAT II, as well a plan to correct any performance deficiencies identified in test.