

A Stryker NBCRV vehicle is shown in a field, with a large, stylized title 'Stryker NBCRV' overlaid on the image. The vehicle is a large, multi-wheeled military vehicle with a complex structure on top, including what appears to be a sensor or weapon station. The background shows a hazy, outdoor environment with some trees and a cloudy sky.

Stryker NBCRV

By Mr. Bruce Baldwin

Dragon Soldiers are spearheading the path in testing, training, and fielding the new Stryker Nuclear, Biological, and Chemical Reconnaissance Vehicle (NBCRV). The Stryker NBCRV can detect and identify chemical, biological, radiological, and nuclear (CBRN) hazards on the battlefield. It is the last configuration of the infantry carrier vehicle (ICV) being fielded in the Army's Stryker platform; and it has similar survivability, mobility, communication, lethality, and transportability characteristics as the base ICV, including a platform remote weapon station (RWS) with an M2 .50-caliber machine gun.¹

The Stryker NBCRV is a complex, robust vehicle system. It provides a capability not previously available to the infantry brigade commander. The Stryker NBCRV is a mounted CBRN reconnaissance system with specialized sensors that are used to support the intelligence preparation of the battlefield. It integrates chemical and biological detection with identification capabilities. Previously, detection and identification operations were performed in separate vehicles operated by Dragon Soldiers with military occupational specialties 74D and 74A (with additional skill identifiers [ASIs] L5 and L4).

The onboard package of CBRN sensors allows Dragon Soldiers to perform conventional CBRN reconnaissance missions and sensitive-site assessments. It does this with a suite of sensors that are integrated into the vehicle platform through the nuclear, biological, and chemical sensor processing group (NBCSPG). Individual sensors provide data to the NBCSPG (laptop computers), which manages and displays the data. Simultaneously, the sensors process the data for use in nuclear, biological, and chemical (NBC) reports that are passed to the Force XXI

Battle Command—Brigade and Below (FBCB2). The sensors enable the system to conduct—

- Rapid, on-the-move standoff chemical-agent detection and class identification.
- On-the-move chemical vapor and liquid point detection and identification.
- Biological surveillance, point detection, and presumptive identification.
- Stationary and on-the-move nuclear and radiological detection.
- Solid, liquid, and vapor sample collection.
- Hazard, warning, marking, and reporting operations.

The NBCRV will fortify a sensor network that provides real-time digitized data through radio frequencies and satellite links at the Stryker brigade combat team (SBCT) headquarters. Dragon Soldiers will be able to provide operational CBRN situational awareness and detailed hazard analysis using detect-to-warn (for the detection and identification of chemical and radiological hazards) and detect-to-treat (for the detection and presumptive identification of biological hazards) capabilities. In addition to detecting and identifying CBRN hazards, operators will be able to collect, store, and transfer samples of chemical and biological agents using strict chain-of-custody protocols as evidence of first use. The system can identify chemical liquid and vapor hazards, toxic industrial chemicals (TIC), and toxic industrial material (TIM). It can also provide presumptive identification of biological agents for later confirmatory analysis and to assist medical personnel with immediate treatment

protocols. These capabilities will increase the combat power of the deployed force and minimize the degradation of force effectiveness under CBRN conditions.

The core of the NBCRV is its onboard CBRN sensor suite. The sensor suite is composed of ten integrated, networked sensors, including the—

- **Joint-Service, Lightweight, Standoff Chemical-Agent Detector (JSLSCAD).** The JSLSCAD provides stationary and on-the-move automated detection and identification of nerve-, blister-, and blood-agent vapors using a passive infrared detector. The scanner can be operated and displayed from the JSLSCAD operator display unit or the primary surveyor's NBCSPG interface.
- **Joint Biological Point Detection System (JBPDS).** The JBPDS provides stationary point detection of biological aerosols. The system continuously monitors the outside ambient air for changes consistent with biological agents. The JBPDS automatically detects, collects, and provides presumptive identification while preserving a sample for further laboratory analysis. The JBPDS can be operated and displayed using its own local control station interface or monitored using the primary surveyor's NBCSPG interface.
- **Chemical-Biological Mass Spectrometer, Block II (CBMS II).** The CBMS II can detect persistent nerve and blister agents and TIC on the ground. It can be operated by the primary surveyor using the operator display unit or operated and monitored using NBCSPG interface.
- **M22 Automatic Chemical-Agent Detector and Alarm (ACADA).** The ACADA provides point detection and identification of chemical vapors. The ACADA has a standard communication interface to send data to the NBCSPG and can be operated by the surveyor as a stand-alone unit (using built-in controls and displays).
- **AN/VDR-2 Radiac Set.** The AN/VDR-2 uses point radiological detection to identify beta and gamma radiation. It is mounted in the vehicle and controlled and monitored by the surveyor using the NBCSPG. It can also be used as a handheld, battery-operated device.
- **AN/UDR-13 Radiac Set.** The AN/UDR-13 uses point radiological detection to measure and display gamma dose rates and total gamma and neutron cumulative dose rates on the battlefield. The AN/UDR-13 is mounted in the vehicle and controlled and monitored by the surveyor using the NBCSPG. It can also be used as a handheld, battery-operated device.
- **Chemical-Vapor Sampling System (CVSS).** The CVSS can collect and store chemical warfare agents and TIC vapor samples for confirmatory analysis by a lab. The CVSS can be operated using a control panel or by the surveyor using NBCSPG interface.
- **Double-Wheel Sampling System (DWSS).** The DWSS is used to transfer chemical agents from the ground to a heated probe head. It consists of two arms and two wheels, extending from the rear of the vehicle, which can alternately be raised and lowered to capture ground samples for analysis by the CBMS II. The system is capable of operating on primary, secondary, and cross-country routes. The system can be operated manually or automatically by the surveyor using a control panel.
- **Meteorological Sensors.** Meteorological sensors provide ground temperature, relative humidity, barometric pressure, and wind speed and direction information. They also measure the ground temperature using temperature probes. The data is sent to the NBCSPG and used to populate weather data in NBC reports.
- **Improved Chemical-Agent Monitor (ICAM).** The ICAM is used to detect and identify nerve and blister agents. It is stored inside the NBCRV and is used to monitor air for possible CBRN hazards.



Chemical Soldier with a JSLSCAD scanner



A Stryker NBCRV dropping a chemical marker

The NBCRV also has integrated, stand-alone capabilities, including—

- **Sample Vial Box and Tubes.** A sample vial box inside the NBCRV consists of 24 sealed, nonstick vials that are passed through a glove port and filled by the operator using tongs (located on the rear deck). Surveyors collect samples and store them in the rear of the vehicle for postmission laboratory analysis. It is not necessary for personnel to exit the vehicle to collect these samples.
- **CBRN Marking Material.** CBRN marking flags conform to the guidelines defined in North Atlantic Treaty Organization Standardization Agreement (STANAG) 2002 for marking contaminated areas. The markers are weighted flags that surveyors can deploy outside the vehicle using the marker port in the rear. The flags may be deployed while the NBCRV is stationary or moving.

The NBCRV is a unique reconnaissance vehicle in a new unit organization. Essentially, it is a rolling, armored laboratory in an infantry brigade, capable of detecting and identifying a wide range of CBRN hazards and then forwarding automated alerts to provide improved situational awareness. It provides the commander with the freedom of movement on the battlefield while preserving the combat power required to locate CBRN hazards.

The Army is in the process of standing up seven SBCTs and fielding NBCRVs in each of the reconnaissance, surveillance, and target acquisition (RSTA) squadrons. The NBCRV systems are low-density, mission-specific specialized platforms. They are manned by trained Dragon Soldiers with military occupational specialties 74D and 74A (ASI L6 [NBCRV Brigade Combat Team Course]).

There are three NBCRVs (manned by a crew of four) in each RSTA squadron. The platoon leader, platoon sergeant, and squad leader are the vehicle commanders for these systems. Each system has a Chemical operations noncommissioned officer (surveyor 1) and two Chemical operations specialists (surveyor 2 and the driver). The crew operates the system from inside an overpressure compartment that provides collective protection from environmental hazards. The platoon conducts CBRN operations as part of reconnaissance missions that support the commander's scheme of maneuver (according to the tactics, techniques, and procedures found in Field Manual [FM] 3-11.19).

After completing 10 weeks of operator training and 2 weeks of doctrine and tactics training, Dragon Soldiers from Fort Lewis, Washington, conducted an 8-week sustainment training session at Fort Lewis and Dugway Proving Ground, Utah. On 19 October 2006, the unit completed its initial operational test and evaluation period, consisting of two 9-day exercises in which the unit operated


in the realistic environment of an SBCT area of operation. The unit conducted a full range of mission sets against active opposing forces that employed chemical and biological agent simulants. The test results are still pending, but the unit was commended by visiting officials for their outstanding efforts and dedication to duty. In February 2007, Dragon Soldiers stationed in Germany completed training and fielding on the NBCRV. The next training and fielding is scheduled for Hawaii. The U.S. Army Chemical School (USACMLS), Fort Leonard Wood, Missouri, is scheduled to receive four NBCRVs in support of the L6 institutional training course.

The USACMLS and the product manager for NBC reconnaissance have partnered with the Software Engineering Directorate at Redstone Arsenal, Alabama, to create a robust package of computer simulation hardware and software that mimics many of the NBCRV onboard sensors. The program has proven to add great training value during classroom instruction. A virtual collective NBCRV crew trainer has also been developed and is scheduled for fielding with the vehicle. The virtual crew trainer provides sustainment training on operator and crew drill tasks and provides real-time playback capability (critical in after-action reviews). Additionally, the USACMLS and SBCTs with fielded vehicles will receive a common driver trainer/Stryker variant (CDT/SV). The CDT/SV consists of a Stryker cab with three visual-display units mounted on a six-degree-of-freedom (pitch, roll, yaw, heave, surge, and sway) motion platform. The CDT/SV includes instructor operation and after-action review stations that support unit sustainment and institutional training requirements for the NBCRV. The computer scenarios support instructional goals for individual driver orientation and mission completion tasks.

The armor and the RWS-mounted M2 give the new vehicle the same survivability and lethality as other Stryker vehicles, but the NBCRV has the added capability of detecting and identifying a wide range of CBRN hazards. The improved detection, collection, identification, warning,



JBPDS biological intake stake

and reporting capabilities of the NBCRV will considerably increase a commander's situational awareness and allow Dragon Soldiers to "*Elementis, Regamus, Proelium.*" 

Endnote:

¹The Stryker family of vehicles consists of two basic variants: the ICV and the Mobile Gun System. The ICV has nine SVs, each fitted with different mission equipment packages to match the required roles of SBCTs. Additional configurations of the ICV include the medical evacuation vehicle, M1127 reconnaissance vehicle, engineer squad vehicle, mortar carrier, command vehicle, fire support vehicle, and antitank guided-missile vehicle.

References:

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