

JOINT BIOLOGICAL POINT DETECTION SYSTEM (JBPDS)



The primary purpose of the Joint Biological Point Detection System (JBPDS) is to limit the effects of biological agent attacks that have the potential for catastrophic effects on U.S. forces at the operational level of war. The JBPDS is intended to provide biological agent point-detection, identification, and sampling capability for both fixed-site and mobile operations. The system is intended to detect biological agents in less than one minute and identify the agents in less than 15 minutes. The Block I version, scheduled for fielding during FY03, is intended to identify ten agents. The follow-on Block II version, scheduled for fielding during FY07, will integrate advances in technologies to decrease size, weight, and power requirements, as well as to identify 26 agents. Both block versions are intended to interface with the Joint Warning and Reporting Network (JWARN).

The capabilities of JBPDS will be used by each of the Services. The Army's JBPDS platform, shown above, is the S788 lightweight multi-purpose shelter mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV) - Heavy Variant. The Marine Corps will deploy a stand-alone man-portable JBPDS configuration for employment by foot-mobile reconnaissance units. The shelter-mounted unit will also be integrated as a biological component suite installed on both HMMWV based and Light Armored Vehicle (LAV) based Joint Services Light NBC Reconnaissance Systems (JSLNBCRS). The Marine Corps is the lead Service for development of the JSLNBCRS.

The Navy's JBPDS will be installed on deployable surface ships and at high priority shore installations worldwide, while the Air Force will deploy the fixed-site, man-portable, and shelter-mounted JBPDS units for air base protection.

BACKGROUND INFORMATION

In June 1995, the Program Manager, Joint Program Office for Biological Defense approved the Milestone 0 transition of the JBPDS into the Concept Definition Phase for Block I. A Milestone I decision in June 1996 formalized and established JBPDS as an Acquisition Category (ACAT) III Program. In December 1996, the Program Manger approved the Milestone II decision for JBPDS, and the system transitioned into the engineering and manufacturing development phase. JBPDS was placed under DOT&E oversight in January 2000. In August 2000, JBPDS was re-designated an ACAT II program.

The Army is the lead materiel developer and developmental tester and evaluator for JBPDS, while the Air Force is the lead operational tester and evaluator.

In October and November 1999, AFOTEC conducted an Operational Utility Evaluation (OUE) of the JBPDS. The OUE was conducted during field trials sponsored by the Joint Program Manager. These trials were primarily designed to compare different trigger/detector technologies in side-by-side testing. The OUE also allowed AFOTEC to make an initial evaluation of the military effectiveness and suitability of JBPDS based upon observations and data collected during the test period.

In conjunction with MCOTEA and OPTEVFOR, AFOTEC conducted an OA in May-June 2000 of the man-portable, fixed-site, and shipboard versions of the JBPDS in support of a low-rate initial production decision. ATEC simultaneously conducted a Limited User Test (LUT) of the HMMWV-mounted version of the system. The shipboard version of the JBPDS was tested on the USS Comstock, while the other versions were tested at Dugway Proving Ground. The Dugway testing was conducted in conjunction with JBPDS Pre-Production Qualification Testing. The DOTE approved the OA/LUT Plan on May 15, 2000.

AFOTEC and ATEC evaluated the military effectiveness and suitability of JBPDS in a semi-operational field setting. JBPDS units were subjected to aerosol challenges using benign biological agent simulants and typical battlefield interferents. Sophisticated instrumentation was required to determine if and when the systems were exposed to the simulated contamination.

Military and civilian operators set up, replenished, monitored, and transported these units during the field trial events. The adequacy of the training program to support JBPDS deployment was evaluated, and RAM data were collected throughout the test effort. Fourteen JBPDS systems were evaluated during this testing: four HMMWV-mounted, four fixed-site, five man-portable, and one shipboard.

In addition to the field testing of JBPDS with biological agent simulants, Dugway Proving Ground personnel conducted live biological agent testing of the system inside a specially sealed biohazard-safe chamber.

Data and insights gained from the OA, LUT, and the live agent testing were used to support the Joint Program Manager for Biological Defense two-phase LRIP decision on October 2, 2000. Under this plan, during the first LRIP phase, nine systems were built for First Article Testing (FAT) and a second operational assessment (OA2).

TEST & EVALUATION ACTIVITY

OA2 was conducted in late September and early October 2001. After FAT and OA2 are completed, the Service Operational Test Agencies will advise the Joint Program Manager if the system meets specific criteria addressing detection, identification, and system reliability. The Joint Program Manager will then decide in late November 2001 if the system can proceed to the second LRIP phase. During this phase, up to 16 additional systems will be constructed for an IOTE scheduled to be conducted in late FY02.

DoD Regulations state that a TEMP must be submitted to OSD within 90 days after being placed on oversight. However, because the program was involved in planning, executing, and evaluating

operational assessments when the program was placed on oversight, DOTE has extended the deadline for TEMP submittal to the end of CY01. The TEMP is currently under revision.

TEST & EVALUATION ASSESSMENT

The results of the OUE, OA, LUT, and live agent testing are still emerging. Early live agent test results indicate that JBPDS shows substantial promise for detecting biological agents in a sealed chamber under closely controlled environmental conditions. However, field test results of JBPDS variants have not demonstrated that these systems meet the requirement that they must detect biological agents at least as well as currently fielded interim systems. (The exact requirement is classified.) During field testing, the systems experienced a large number of false detections; i.e., the systems indicated the presence of biological agents when no agents were known to be present.

Given that a detection has occurred, JBPDS must have a probability of 98 percent or better of correctly identifying the detected agent within 15 minutes. Preliminary indications are that the JBPDS did not meet this requirement for all simulants under field conditions.

The system fell well short of the requirement for Mean Time Between Operational Mission Failures of 144 hours. The estimate of reliability for the fixed site configuration is 43 hours, for the man-portable configuration 70 hours, and for the shelter configuration 92 hours. Numerous hardware and software deficiencies were encountered.

The systems demonstrated significant human factors deficiencies. Operators in protective gear experienced difficulties, particularly in assembling and disassembling the system. The set-up time for the man-portable units often exceeded requirements. The systems have numerous sharp edges that can injure users and puncture protective gear. The man-portable units are so heavy that the four-man crews experienced difficulties in transporting them. Generator exhaust hose leaks can allow generator exhaust to seep into the closed JBPDS shelter, which is a safety issue that must be resolved.

DOT&E requires an end-to-end test to demonstrate that the JBPDS can collect, detect, identify, and package a live biological warfare agent sample adequate for laboratory testing. This test must also include the capability of the supporting force to transport the sample to a rear-area laboratory where the identity of the BW agent can be confirmed. To date, no facility has been identified that is large enough to accommodate collection, detection, and identification testing on an entire JBPDS unit.

The Program Office has proposed that live agent testing performed on key JBPDS subsystems can meet this requirement; however, DOTE and the Service operational test agencies are skeptical of this approach as adequate for operational test purposes. The Service OTAs are working with Dugway Proving Ground to either locate a private facility that can accommodate such testing, or identify potential workarounds that can be implemented at the Dugway live agent test facility.

CONCLUSIONS

The JBPDS Program Office has studied the results of the OA and the LUT, and is implementing an aggressive program to correct the deficiencies observed during this testing. Modifications of the system variants include an enhanced capability for detecting and identifying biological agents under field conditions, reduction of false detections, improved system reliability and software performance, and correction of demonstrated human factors deficiencies.

The lack of hardware maturity evidenced during the OUE/OA/LUT puts the Program Manager's ambitious schedule in jeopardy. However, this risk is at least partially mitigated through the two-phase LRIP approach and the provision for a second Operational Assessment prior to the Initial Operational Test.