Joint Biological Point Detection System (JBPDS)

SUMMARY

- Multi-Service Operational Test Evaluation (MOT&E) Phases II, III, and V took place at Eglin Air Force Base, Florida, in November 2003.
- Despite test and evaluation limitations, the Joint Biological Point Detection System (JBPDS) may provide capability to detect and identify biological warfare agents.
  - Results from MOT&E indicate that detection and presumptive identification of simulants are available within 20 minutes, with confirmatory analyses depending on the location of the laboratory, in an average of 12 hours after encountering a biological cloud. This may support timely prophylactic treatment decisions for biological warfare agents except for toxins.
  - Emerging results from the component-level laboratory testing of biological warfare agents and their simulants has provided useful data, but the performance relationships between agents and their simulants is not adequate to predict the performance of JBPDS to detect and identify biological warfare agents in the field. Consequently, valid estimates of field JBPDS probabilities of detection and identification are not available.
- The significant test and evaluation limitation is not to challenge the JBPDS with realistic threats in the field due to safety and environmental issues. Whole-system live agent testing is required to characterize the JBPDS agent to simulant relationship.

Despite test and evaluation limitations, JBPDS may provide capability to detect and identify biological warfare agents.

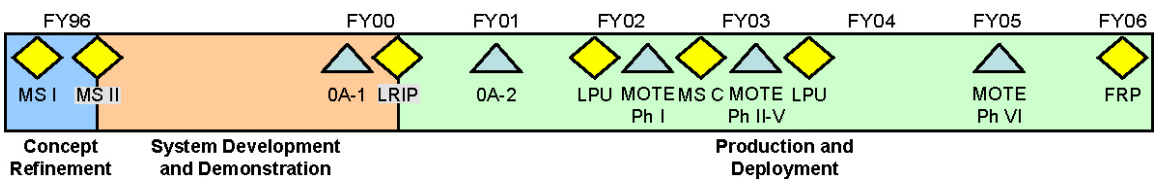
SYSTEM DESCRIPTION AND MISSION

The Services intend the JBPDS to provide early detection and identification of biological warfare agents in order to treat affected forces. It will provide biological agent point-detection, identification, and sampling capability for both fixed-site and mobile operations. The system must automatically detect and identify up to ten biological warfare agents simultaneously in less than 15 minutes.

The Services intend the JBPDS to be integrated into the Joint Services Light Nuclear, Biological, and Chemical Reconnaissance System and the Stryker Nuclear, Chemical, and Biological Reconnaissance Vehicle.

In December 1996, the JBPDS transitioned into the engineering and manufacturing development phase. DOT&E placed the JBPDS on oversight in January 2000. The JBPDS-Block 1 entered low-rate initial production (LRIP) in October 2000. A JBPDS LRIP Expansion decision followed in 2002. The Army submitted an Urgent Need-fielding request for JBPDS in February 2002 due to the heightened threat to deployed forces. A Milestone C LRIP for 409 systems was held in for 4QFY04.

TEST AND EVALUATION ACTIVITY



MOT&E Phases II, III, and V took place at Eglin Air Force Base, Florida, in November 2003. Phase II supported the Air Force Urgent Need request and included the man-portable and trailer variants. Phase III, run concurrently with Phase II, was a cold weather operational test at McKinley Climatic Laboratory, Eglin Air Force Base. Phase V was a follow-on test for the Army to confirm that changes made as a result of Phase I had not degraded the performance of the JBPDS. For testing efficiency, one portion of Phase V occurred concurrently with the Air Force Phase II and Phase III testing at Eglin while a second portion of the Phase V testing took place at Fort McClellan, Alabama, in conjunction with a training exercise. The Navy conducted Phase IV in January 2004 onboard the USS *The Sullivans* (DDG 68). Plans for Phase VI call for repeating previous phases with production articles if necessary. Component level testing took place in laboratories at Dugway Proving Ground using live biological agents and their simulants.

TEST AND EVALUATION ASSESSMENT

Despite test and evaluation limitations, JBPDS may provide capability to detect and identify biological warfare agents. Results from MOT&E indicate that detection and presumptive identification of simulants are available, with confirmatory analyses depending on the location of the laboratory, in an average of 12 hours after encountering a biological cloud. Early detection and identification of biological warfare agents provides the opportunity for prophylactic treatment, depending on the agent (three biological agents do not have a prophylactic treatment). However, because of the rapid onset of the effects of toxins, 12 hours is not timely enough to effect prophylactic treatment for the one toxin for which such a treatment exists. JBPDS information produced at any time can be used to quarantine, decontaminate, and plan for impact on forces. Actions to reduce the full effects of exposure by donning protective equipment, isolate exposed personnel, and restrict troop movement would be effective in reducing causalities.

To estimate the JBPDS field probabilities of detection and identification, simulants were chosen to represent each of four classes of biological warfare agents: toxins, viruses, vegetative bacteria, and spore bacteria. The evaluation methodology is to relate the JBPDS performance to detect and identify biological agents in a controlled environment to its performance to detect and identify their respective simulants. Emerging results from the component-level laboratory testing of biological warfare agents and their simulants has provided useful data, but the performance relationships between agents and their simulants is not adequate to predict the performance of JBPDS to detect and identify biological warfare agents in the field. Whole-system live agent testing (WSLAT) is required to characterize the JBPDS agent to simulant relationship. The infrastructure to conduct such a test does not currently exist. A Requirements Capability Document for WSLAT was generated to identify key parameters and capabilities. A Committee from the National Research Council, sponsored by the Joint Program Executive Office – Chemical, Biological Defense Program, reviewed a feasibility study prepared for WSLAT, assessed the risks associated with WSLAT execution, and made recommendations, which need to be addressed. At present, the Joint Project Manager is developing a methodology that accommodates the National Research Council's recommendations. Adequate whole-system testing, along with operational field test data, will be the basis for characterizing JBPDS biological warfare and simulant detection performance in support of a full-rate production decision.

The Air Force man-portable and trailer variants did not meet many of the evaluation criteria for effectiveness and suitability during the MOT&E at Eglin Air Force Base. Major system failures included a high false-positive rate and communication failures. All variants experienced a high machine false-positive rate. Following the MOT&E, the Joint Project Manager conducted system-level demonstrations of corrective actions for communication and machine false-positives, which indicated that the issues were resolved. Additional testing will assess the corrective actions in an operational environment.