Joint Biological Tactical Detection System (JBTDS)

In July 2023, DOT&E published an operational assessment (OA) report on the Joint Biological Tactical Detection System (JBTDS) to support the Milestone C (MS C) decision in August 2023. The JBTDS demonstrated satisfactory progress toward operational effectiveness in detecting and identifying some biological warfare agents (BWAs) to support timely force protection decisions. Additional development is required to optimize detection and identification performance against other agents. The JBTDS demonstrated operational suitability challenges that prevent it from currently meeting operational requirements.

SYSTEM DESCRIPTION

The JBTDS consists of an integrated man-portable BWA aerosol detector and sample collector, a base station, a meteorological station, a GPS receiver, a sample extraction kit, and a handheld BWA identifier with consumable assays. The detector and sample collector can be connected to the base station using a Service-provided, closed, or restricted local area wired or wireless network to enable remote monitoring and reporting.

MISSION

U.S. Army, Marine Corps, and Navy units will deploy JBTDS during major combat, stability, and strategic deterrence operations where an adversary's employment of BWAs could severely disrupt military operations or cause

hazardous exposure to warfighters or civilians. Service units equipped with the JBTDS will conduct biological surveillance missions to detect the presence of, collect samples, identify, and warn forces of the BWA threat. The JBTDS is intended to support commanders' force protection actions, support medical planning, and provide information to enable consequence management. The Special Operations Command will employ the JBTDS identifier to identify BWA in samples to support intelligence gathering and forensics analyses.

PROGRAM

JBTDS is a joint Acquisition Category II program which was authorized in August 2023 to enter the production and deployment phase of acquisition. DOT&E approved the MS C Test and Evaluation Master Plan (TEMP) in September 2023. As reported in the FY22 Annual Report, system performance updates will be tested and will occur post-MS C in accordance with the updated TEMP. The multi-Service operational test and evaluation is scheduled for July 2025 and the full-rate production decision is targeted for May 2026.

» MAJOR CONTRACTORS

- Chemring Sensors & Electronic Systems – Charlotte, North Carolina
- Biomeme – Philadelphia, Pennsylvania

TEST ADEQUACY

DOT&E based the July 2023 JBTDS OA report on live agent testing in the laboratory, observed developmental testing, a multi-Service OA, integrated developmental and operational testing, cyber survivability testing, and modeling and simulation conducted from December 2020 to September 2022. Testing was conducted in accordance with DOT&E-approved test plans and was found adequate to support the MS C decision. DOT&E made several recommendations in the FY22 Annual Report based on the series of tests conducted prior to the MS C decision. The program office is continuing to address these recommendations. Efficacy of their corrective actions will be assessed during testing planned post MS C.

In FY23, updates were made to the built-in-test algorithm, and improvement to the JBTDS leg stand design. The internal pump design was reconfigured to address flow issues. Post-MS C testing will identify the impact of these changes. The other FY22 recommendations remain valid as the program is developing their test strategy with low-rate initial production articles. Future tests in the production and deployment phase of testing will use low-rate initial production units to verify system improvements.

PERFORMANCE

» EFFECTIVENESS

The JBTDS demonstrated satisfactory progress toward achieving operational effectiveness. The system provides actionable information needed to mitigate casualties for most required BWAs. JBTDS did not meet detection and identification performance requirements for some agents and demonstrated significant variability between prototype units. When JBTDS provides actionable information, casualties can be reduced by masking quickly after detection and administering post-exposure prophylaxis after identification.

» SUITABILITY

JBTDS operational suitability is at risk due to poor reliability and a high false alarm rate in one environment. Warfighters rated JBTDS training and usability as acceptable. Unit-to-unit variability on prototypes is a concern.

» SURVIVABILITY

Testing identified JBTDS vulnerability to threats, to include cyber, and electromagnetic effects in certain operating environments. Additionally, warfighters sometimes responded to cyber threats as they would a system malfunction because they could not distinguish between the events. Details are included in the classified annex to the July 2023 JBTDS OA.

RECOMMENDATIONS

The Joint Product Manager should:

1. Mitigate identified vulnerabilities to electromagnetic effects.
2. Add cyber-specific topics to the training curriculum to better enable operators to recognize cyber threats and to protect, mitigate, and recover from hostile cyber actions.
3. Address recommendations found in the July 2023 JBTDS OA report and classified annex.
4. Improve the identifier assays to meet performance requirements.