



# BIOLOGICAL DEFENSE

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## Advanced Planning Briefing to Industry

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## Biological Detection System Family



JBTDS



# Overarching Goals



- **Improve current capabilities:**
  - **Effectiveness**
    - Increase capability for traditional & non-traditional threat agents
    - Increase selectivity and reduce interference
  - **Supportability**
    - Reduce logistics foot print
    - Reduce operations and support costs
  - **Science**
    - Threat agent science and dissemination
    - Sensor performance and capability
- **Products of Interest:**
  - **JBTDS**
  - **JBSDS**
  - **JBPDS**
  - **CLS**



# Outline



- **Overview**
- **S&T and Warfighter Needs**
- **Technical Challenges**
- **Acquisition Strategy/ Funding/ Schedule**
- **Upcoming Business Opportunities**
- **Contacts**



# S&T Overview



## Joint Biological Tactical Detection Systems (JBTDTS)

- **Overall Objective - Develop science and technology to detect, identify, quantify, map, and track the presence of chemical and biological warfare agents**
  - **Fundamental development of signatures**
  - **Understand the interactions of the signatures with the environment**
  - **Develop physics based models enhanced with system engineering principles to provide a virtual system**
    - **War-gaming to develop optimal system capabilities, needs, and requirements**
    - **Virtual proving ground to optimize T&E requirements**



# S&T Overview



## Joint Biological Standoff Detection System (JBSDS)

- **Demonstrate mature technology concepts for augmenting or replacing the current technology being pursued under Increment 1 of the JBSDS program**
- **Assess the merit/maturity of selectively integrating some of these technologies into a hybrid system that meets a broader subset of the Increment 2 specifications.**
- **Potential Resources Include Existing and Future:**
  - **Laser Induced Fluorescence**
  - **Elastic Scatter Depolarization**
  - **Differential Elastic Scattering**
  - **Algorithm Development**
  - **Technology Modeling**
  - **Signature Measurements**





# S&T Overview



## Joint Biological Point Detection System (JBPDS) Build II

- **Demonstrate mature technology concepts for augmenting or replacing the current technology being pursued under Build I of the JBPDS program**
- **Assess the merit/maturity of selectively integrating some of these technologies into a hybrid system that meets a broader subset of the Build II specifications.**
- **Potential Resources Include Existing and Future:**
  - **Immunoassays - multiplex**
  - **PCR Assays**
  - **Aerosol sampling and collection**
  - **UV-LIF – multi-frequency**
  - **Technology Modeling**
  - **Signature Measurements**



# Program Overview



## Joint Biological Tactical Detection Systems (JBTDS)

- **System of Systems / Family of Systems approach:**
  - Multiple detection and sampling systems optimized for cost, weight, and power
  - Range of capability across the family:
    - Speed: Time to detect 1 min – 30 min
    - Information: Bio/non-bio, class-based ID, presumptive ID
    - Sensitivity
    - Confidence
    - Breadth of threat detected: 1 agent – many traditional and non-traditional agents





# Program Overview



## Joint Biological Standoff Detection System (JBSDS)

### Increment 2

- **Will be employed to provide on the move and day/night detection of biological hazards employed by various means and will provide early warning via the Joint Warning and Reporting Network (JWARN).**
- **Reduce False Positives**
- **Essential Resources Include Existing and Future:**
  - **Mobile Detectors (Vehicles, Ships, Unmanned Platforms)**
  - **Fixed Site/Static Detectors (Buildings, Vehicles)**



# Program Overview



## Joint Biological Point Detection System (JBPDS)

### Build II

- **Demonstrate mature technology concepts replacing the current technology integrated into the JBPDS Build I**
- **Upgraded components must be backwards compatible to Build I Line Replaceable Units (LRUs) with regard to form, fit, and function**
- **Potential Areas of Improvement:**
  - **Increased Identifier Sensitivity**
  - **Reduction in lifecycle costs; specifically reduced dependence on consumables**
  - **Reduced power requirements**
  - **Reduced weight**
  - **Improved reliability**
  - **Ability to identify more agents**



# Program Overview

## Warfighter Needs



### Contractor Logistics Support (CLS)

- **Warfighter requirements for CLS:**
  - **Lifecycle Logistics support for Joint Portal Shield (JPS) and the Pre-Planned Product Improvement (P3I) Biological Integrated Detection Systems (BIDS)**
    - Until system retirement (P3I BIDS FY12-FY14 / JPS TBD)
  - **Interim Logistics Support (ILS) for the Joint Biological Point Detection System (JBPDS) and the Joint Biological Stand-off Detection System (JBSDS)**
    - JBPDS CLS for Reserves indefinitely
    - JBPDS Organic transition for Active Army in FY09
    - JBSDS Organic transition may occur in FY09
  
- **System Definitions & Requirements:**
  - **JPS**
    - Stationary arrayed detection system requiring both contract operators and maintainers (currently in place)
    - Locations in South Korea and South West Asia
  - **P3I**
    - Mobile Biological Integrated Detection System (BIDS) requiring deployable contract maintainers (currently in place)
    - Locations CONUS (limited)



# S&T Needs



## Joint Biological Tactical Detection Systems (JBTDs)

- **Development of new sources and detectors**
  - Optimal performance at room temperature
  - Low cost, solid state
  - Low power
- **Development of physics based models enhanced with system engineering principles to provide a virtual system**



# S&T Needs



## Joint Biological Standoff Detection System (JBSDS)

- **Algorithm development**
  - Improvement of detection and discrimination algorithms
  - False alarm rate improvements
- **Spectral vs. narrow band fluorescence data**
- **Biological signature data collection and background data collection**
- **Prototype/test bed development**



# S&T Needs



## Joint Biological Point Detection System (JBPDS)

- **Automated multiplex assays**
  - Improvement on sensitivity
  - Increase number of detectable agents
- **Improved trigger**
  - Reduce false alarm rate
  - Increase component lifetimes





# Warfighter Needs



## Joint Biological Tactical Detection Systems (JBTDS)

- **Rapid, automated detection of biological events**
- **Organically deployable, employable, and supportable**
  - **Reduce size and weight of systems/components**
  - **Reduce logistical footprint**
  - **Modular components for flexible integration**
  - **Simplified operation for unrestricted Military Occupational Specialties (MOS)**
- **JBTDS MS A (Apr 07) will be based on the CBRN Sensors for Unmanned Applications ICD signed February 23, 2006**



# Warfighter Needs



## Joint Biological Standoff Detection System (JBSDS)

- **Ability to safely operate, survive and sustain operations in a biological agent threat area**
- **Defense from worldwide proliferation of biological warfare capabilities**
- **Detection of biological threat agents to provide early warning capabilities at mobile and fixed operating locations, mobile dismounted forces, naval and air platforms, during both day and night operations**



# Warfighter Needs



## Joint Biological Point Detection System (JBPDS)

- Provide rapid, automated detection, presumptive identification, and warning of biological agents
- Ability to collect and produce a sample of the presumptively identified biological agent for gold standard laboratory testing
- Provide the ability for human interfaced or automated detect-to-warn capability
- Assist in the facilitation of command decisions on response and protective posture requirements to limit personnel exposure to maximize combat effectiveness
- Capability to array systems to protect point, line and area critical nodes to include:
  - Reconnaissance troops
  - Airbase infrastructure
  - Naval fleets
  - C<sup>2</sup> nodes
  - Logistic nodes and lines of communication



# S&T Technical Challenges



## Joint Biological Tactical Detection Systems (JBTDS)

- **Low cost, solid state replacement for photomultiplier tubes**
- **Enhance component life on excitation sources**
- **Direct electron pumped excitations sources (below 300nm)**



# S&T Technical Challenges



## Joint Biological Standoff Detection System (JBSDS)

- **Decreasing system size, weight and power while increasing detection and discrimination sensitivities**
- **Algorithm development**
  - Decreasing false alarm rates
  - Robustness to handle I-2 requirements and future capabilities
- **Modeling promising and future technologies**



# S&T Technical Challenges



## Joint Biological Point Detection System (JBPDs)

- **Decreasing system logistical cost while increasing system performance**
  - Higher sensitivity
  - Reduce false alarm rate
  - Increase number of detectable agents
  - Maintain system response times
  - Reduce number of consumable
  - Reduce frequency of maintenance





# Program Technical Challenges



## Joint Biological Tactical Detection Systems (JBTDS)

- **Operationally significant capability within tactical constraints**
  - Sensitivity and False Alarm Rates
  - Size/Weight/Power tradeoffs
  - Rugged design for full range of environments and operational temperature range
  - Life cycle cost
  - Next-generation battery technology to extend mission life
  - Built-in-Test / Confidence checkers to increase availability



# Program Technical Challenges



## Joint Biological Standoff Detection System (JBSDS)

- **Suitable detection and discrimination sensitivities and ranges based on validated threat assessment**
- **Low false alarm rate**
- **Day/night capability**
- **System robustness to handle future biological threats**
- **Integration into future platform and systems - Modular Design**
- **CONOPS for future biological standoff**
- **Comprehensive testing of future systems**



# Program Technical Challenges



## Joint Biological Point Detection System (JBPDS)

- Improve sensitivity without increasing false alarms
- Reduce power consumption of individual LRUs
- Reduce life-cycle costs
- Reduce the dependence on consumables and consumable controlled storage
- Improve system reliability
- Identify more agents
- Reduce or eliminate the requirement for contracted logistics support
- Reduce collection-identification cycle time



# Technical Challenges



- **The most significant CLS challenge**
  - **Tasked with assisting the Government in tackling obsolescence issues that arise from Legacy Systems (Life-Cycle Logistics) and providing innovative and cost effective solutions**
  - **Keeping a high Operational Readiness Rate while keeping costs in check.**



# S&T Capability Strategy



- **JBTDS**

- Solid state components for excitation sources and detector elements
  - LEDS below 300nm
  - Direct electron pumped sources below 300nm
- Molded plastic optics
- Virtual models based on first principles linked with system engineering concepts

- **JBSDS**

- Development of signatures for exploitation
- Algorithms to take advantage of signatures
- Maturing promising technologies
- Virtual models based on first principles linked with system engineering concepts

- **JBPDS**

- Multiplexed Assays
- High performance capabilities from JBTDS



# Program Acquisition Strategy



## Joint Biological Tactical Detection Systems (JBTDS)

- **Overview**
  - 700-800 systems
  - FY07 New Start
    - Market survey on FedBizOpps released Dec 06 (15 respondents)
  - Technology Readiness Evaluation (TRE) Planned 3rd-4th Qtr FY08
    - RFP expected 1<sup>st</sup>-2<sup>nd</sup> Qtr FY08
  - May adopt a Family of Systems approach
- **Expeditionary Biological Detection (EBD) Advanced Technology Demonstration (ATD) supports JBTDS by:**
  - Developing Concepts of Operations for tactical biological detectors
  - Clarifying requirements and systems engineering tradeoffs
  - Conducting Military Utility Assessment (MUA) of emerging technologies
  - If ATD demonstrates utility, USMC may purchase as interim capability
- **Spiral Development and Acquisition**
  - Field increments of capability for each family member as technology matures
- **Conduct ATD FY06-08 to reduce JBTDS risk**
- **Conduct TRE to identify technology for MS B (2QFY09) System Development and Demonstration phase.**





# Program Acquisition Strategy

## Joint Biological Standoff Detection System (JBSDS)

- **S&T Funding for next 2 years**
  - FY 10 Program start for increment II
- **Award competitive SDD contract to integrate improvements/other technologies with LRIP and production options**

## Joint Biological Point Detection System (JBPDS)

- **Upgrade JBPDS build II**
  - FedBizOpps released-TRE in Oct 07 with downselect
  - FRP contract for JBPDS



# S&T Funding



<b>(\$M)</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>TOTALS</b>
<b>6.2</b>	<b>0.0</b>	<b>2.0</b>	<b>16.0</b>	<b>14.0</b>	<b>12.0</b>	<b>9.0</b>	<b>9.0</b>	<b>62.0</b>
<b>6.3</b>	<b>0.0</b>	<b>1.0</b>	<b>6.0</b>	<b>8.0</b>	<b>6.0</b>	<b>6.0</b>	<b>6.0</b>	<b>33.0</b>
<b>TOTAL</b>	<b>0.0</b>	<b>3.0</b>	<b>22.0</b>	<b>22.0</b>	<b>18.0</b>	<b>15.0</b>	<b>15.0</b>	<b>95.0</b>

## Notes:

1. Funding represents only Unobligated dollars planned for “programs of interest” (does not include entire S&T Detection POM)



# Program Funding

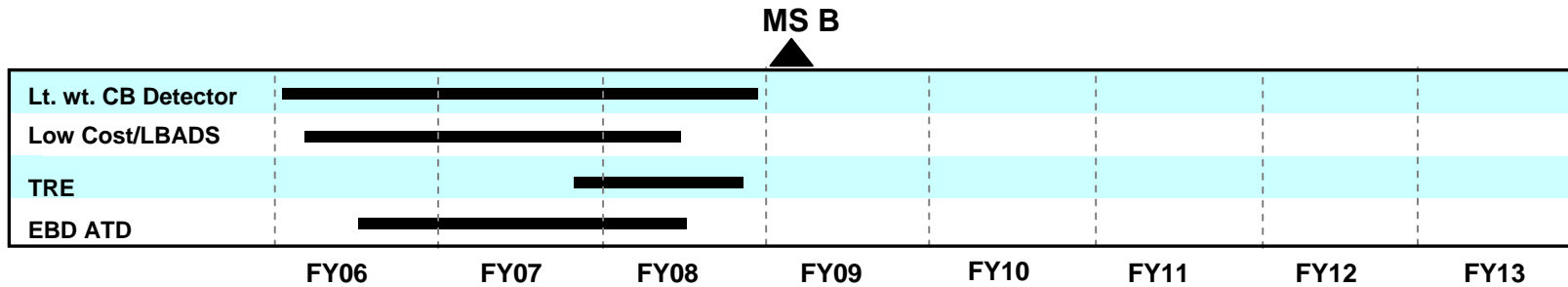


<b>(\$M)</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>TOTAL</b>
<b>6.4</b>	<b>0.9</b>	<b>3.1</b>	<b>3.1</b>	<b>16.1</b>	<b>7.5</b>	<b>0</b>	<b>0</b>	<b>30.7</b>
<b>6.5</b>	<b>14.5</b>	<b>0</b>	<b>2.1</b>	<b>13.1</b>	<b>26.1</b>	<b>47.1</b>	<b>18.4</b>	<b>121.3</b>
<b>Proc</b>	<b>105.3</b>	<b>77.7</b>	<b>76.4</b>	<b>112.0</b>	<b>120.4</b>	<b>113.9</b>	<b>145.9</b>	<b>751.6</b>
<b>O&amp;M</b>	<b>39.5</b>	<b>30.8</b>	<b>28.2</b>	<b>28.3</b>	<b>28.4</b>	<b>29.0</b>	<b>31.5</b>	<b>215.7</b>
<b>TOTAL</b>	<b>160.2</b>	<b>111.6</b>	<b>109.8</b>	<b>169.5</b>	<b>182.4</b>	<b>190.0</b>	<b>195.8</b>	<b>1119.3</b>

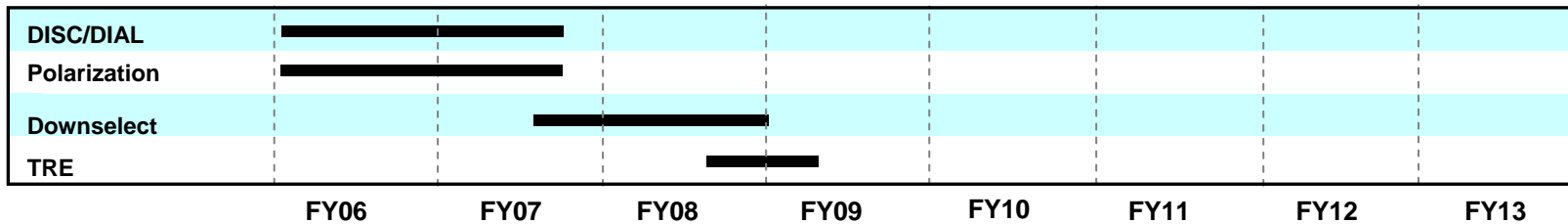


# S&T Schedule

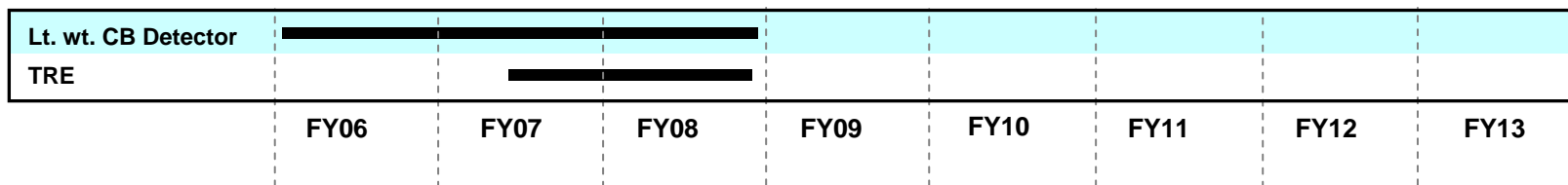
## Joint Biological Tactical Detection Systems (JBTDS)



## Joint Biological Standoff Detection Systems (JBSDS) Incr 2



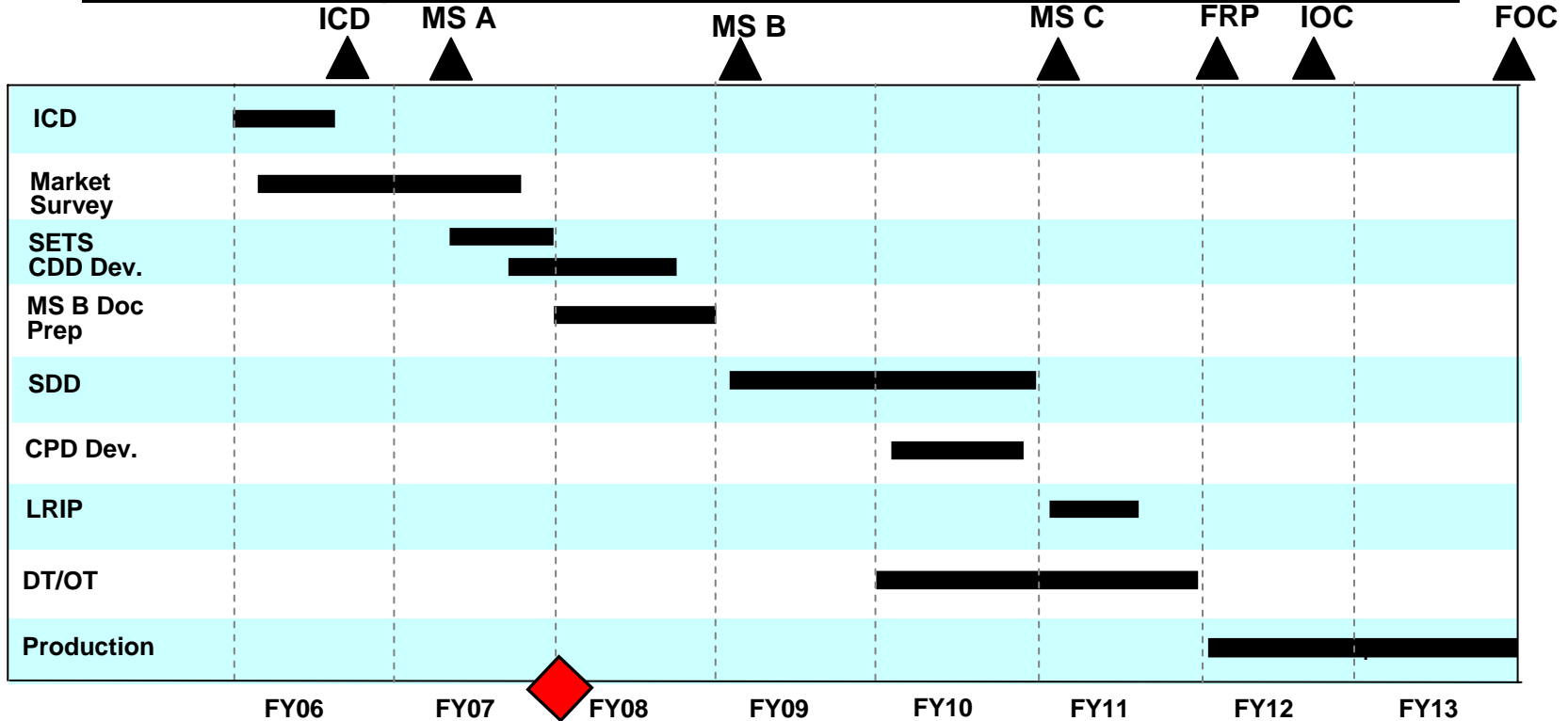
## Joint Biological Point Detection Systems (JBPDS)





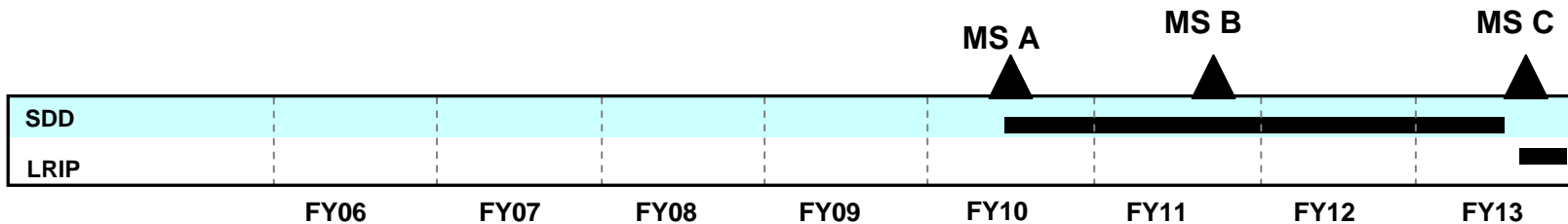
# Program Schedule

## Joint Biological Tactical Detection Systems (JBTDSD)



FedBizOpps RFP for TRE Oct 07 (Q1FY08)

## Joint Biological Standoff Detection Systems (JBSDS) Incr 2





# Upcoming Business Opportunities



## S&T Opportunity

## Time-Frame

**CB Defense Physical Science and Technology (annual) BAA**

– For New Start Projects (FY09-13)

**December**

**CB Defense Small Business Innovation Research (SBIR)**

– <http://www.acq.osd.mil/sadbu/sbir/homepg.htm>

– For New Start Projects (FY08-13)

**Mid-Nov**

**Chem-Bio Defense Initiative Fund (CBDIF)**

– BAA for New Start Projects (FY08-13)

**December**



# Upcoming Business Opportunities



## Joint Biological Tactical Detection Systems (JBTDS)

- **Expeditionary Biological Detection (EBD) ATD**
  - RFP 4th Qtr FY06 completed
- **Joint Biological Tactical Detection System (JBTDS)**
  - Technology Readiness Evaluation RFP 1st Qtr FY08
- **Evaluate technologies consisting of aerosol triggers, detectors, and automated identifiers for the Joint Biological Tactical Detection System (JBTDS).**
  - Draft Schedule: FedBizOpps, October 2007  
TRE Testing, June-July 2008  
TRL Assigned, Sep 2008  
Report, Oct 2008
  - MS B SDD Phase source selection FY09

## Joint Biological Standoff Detection System (JBSDS) Increment 2

- **Technology Readiness Assessment FY09**
- **RFP for System Development and Demo FY10**



# Upcoming Business Opportunities



## Joint Biological Point Detection Systems (JBPDS)

- **JBPDS Full Rate Production Contract (Firm, Fixed Price)**
- **Contract Scope**
  - Continued production of approved system to maintain fielding schedule
    - Quantities include FY09 – FY13 end item procurement (~900)
    - Initial fielding packages
    - Engineering services (Upgrades, logistics & testing)
- **Two-stage proposal process**
  - Phase I: Submission of technical capability & approach
    - RFP release on or about 31 Mar 07, closes 30 Jun 07
  - Phase II: Full Proposal & Award
    - Response to RFP Phase II closes on or about 28 Feb 2008
    - Contract award 1QFY09





# Business Opportunities



- **JBPDS Build II identifier technology readiness evaluation (tre)**
- **Evaluate biological identifier technologies to replace the present subsystem embedded in the Joint Biological Point Detection System (JBPDS).**
- **Draft Schedule: FedBizOpps., Mar 2007**  
**TRE Testing, Oct 2007**  
**TRL Assigned, Jan 2008**  
**Report, Feb 2008**



- **Competition for Umbrella Contract in 2009 to last 5 option years**
  - **Systems**
    - P3I BIDS
    - JPS
    - JBPDS
    - JBSDS
  - **Subcontracts to include OEMs**
    - Lockheed Martin
    - GD-ATP
    - Battelle
    - Smith's Detection
    - Sentel
    - SESI



# Biological Detection Technology Readiness Evaluation



- **Point of Contact: Dan Nowak,**  
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# Program Points of Contact



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