Joint Effects Model (JEM) Briefing to CBIS

January 2007

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Description

• JEM is an ACAT III Program that will provide a single, validated capability to predict the transport and dispersion of Chemical, Biological, Radiological and Nuclear/Toxic Industrial Hazard events and their effects.

• JEM will be accredited for all uses currently supported by the three interim accredited DoD S&T Hazard Prediction Models.

• JEM will be integrated with Joint and Service Command & Control Systems and will also be available as Standalone.
Core Capabilities

- Transitions HPAC, VLSTRACK, and D2PUFF technologies, and baselines the DoD hazard prediction capability
- Supports multiple deployment strategies
  - Operates on both UNIX and Windows operating systems
  - Common Operational Environment (COE) / Network Centric Enterprise Services (NCES) / GIG / Service C2 systems
  - Standalone, Networked, Distributed, or Web access
- Provides high fidelity hazard predictions to:
  - Joint Warning and Reporting Network (JWARN)
  - Joint Operational Effects Federation (JOEF)
  - Any system calling the JEM Web Services Interface
- Interoperates with meteorological data systems
  - Virtual Natural Environment Net Centric Services (VNE-NCS), METOC Data Service (MDS), Integrated Meteorological System (IMETS), Joint Weather Impact System (JWIS), and others
### JEM Increment 1 Schedule

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Service Oriented Architecture (SOA)

Web-based GUI

- Graphical User Interface
- User Interface Manager

Visualization Service

- Modeling Service Manager
- Problem Set Controller
- Terrain Service
- Data Services Access Manager
- COE Data Services
- Local Data Services
- Network Data Services
- Weather Service

Modeling Service

- ISM_1
- ISM_n
- T&D Engine
- Effect Modeler

JWARN, JOEF, JTT and other external systems enter here as well
JEM Increment 2

- Technologies for Increment 2:
  - Urban Modeling
  - Littoral/Coastal Effects Modeling
  - Missile Intercept Hazard Prediction
  - 10% Improvement in Speed & Accuracy of JEM Baseline
  - Source Term Estimation (Backtracking)
    - Uses data gathered from sensors
      - Estimate source term
      - Refine hazard prediction
    - Includes processing of sensor data received from JWARN
      - Calculate initial & delayed casualties and incapacitation for both civilian and military populations
      - Estimate effects from a 5,000 weapon strike in less than 90 minutes
      - Allow user to modify input parameters to accommodate population migrations
JEM Increment 2 Way-Forward

• Complete fielding of Increment 1
• Work with JRO/SHAPE ICT on Capability Development Document (CDD) in preparation for Milestone C
• Conduct Analysis of Alternatives (AoA) – JCIDS
  – Work through JSTO for identification and assistance in identifying and selecting appropriate technologies
    • Model Integrated Product Team (IPT)
    • Technology Transfer Agreements (TTA)
• Identify Government Agencies with additional capability
  – Lawrence Livermore National Laboratory (LLNL)
  – Missile Defense Agency (MDA)
  – Service research laboratories
• Issue Broad Agency Announcement (BAA) to fill gaps not covered by JSTO sponsored technologies
• Design, develop, test software FY08-FY10
Increment 3 Requirements

• Waterborne Hazards
• Complex structures, Building interiors
• Human performance degradation
• Contagious/infectious diseases
• Effects on aircraft at various altitudes/ships underway
JEM Technology Challenges

• Performance of Service Oriented Architecture (SOA) applications on CPU & memory constrained systems

• Incorporating urban hazard modeling and other advanced modeling into SOA
  – JSTO/DSTL successfully implemented UDM into JEM

• Maturity of advanced modeling capability
  – Nature of S&T development programs
  – Reliable data for supporting model technologies
  – Demand for the next best thing…but what about Verification Validation and Accreditation (VV&A)?

• Diverse Joint and Service specific weather models

• Evolving Joint and Service C4I system baselines

• Combining multiple CBRN hazard models, maintaining the integrity of the core technologies, and proving it
Pre-JEM Model Sequencing

VLSTRACK

Source Term → T&D Engine → Human Effects

HPAC

Source Term → T&D Engine → Human Effects

D2Puff

Source Term → T&D Engine → Human Effects
JEM IV&V Data Points

VLSTRACK
Source Term
IV&V Data

HPAC
Source Term
T&D Engine
Human Effects

D2Puff
Source Term
Material Files
Data Certification

IV&V Data
IV&V Data
IV&V Data
JEM Toxicity Factors – How do we model it?

Deadly Dose

Dose

Time
JEM Accreditation Challenges

- Reported Agent Characteristics
- Reported and Forecast Weather
- Protection Levels

JEM CBRN Hazard Modeling Software

Source Term → T&D Engine → Human Effects

- Simulant
- Field Trial Data
- Model Developer
- Lab Data
- Field Trials

Accuracy? Risk? Intended Use?
JEM Status

• Coordinating with JSTO on Increment 2 & 3 technologies

• Participating in International Task Force 49 (ITF-49) and Tech Panel 9 (TP-9) to increase interoperability between Canada, UK, US and other international partners

• Finalizing Increment 1 Verification, Validation and Accreditation (VV&A) activities for 3QFY07 review

• Preparing for Increment 1 Milestone C in 3QFY07

• Preparing for Standalone Operational Test in 4QFY07

• Continuing to work with Joint & Service C4I systems

• Preparing for Increment 2 Milestone B in 1QFY08
## Business Opportunities

### Time Period

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### Physical Science and Technology

- **Broad Agency Announcement (BAA)**
  - December each year
  - Other BAA solicitation occurs under the CBDIF program

### SPAWAR Knowledge Superiority (BAA)

- **JPM IS Technology Challenges/S&T Gaps**

### JWARN

- **JCID production (RFP)**
  - Block 2 Increment 1 Sustainment
  - Block 2 Increment 2 Design & Development

### JEM

- **JEM Lead Integrator (SEAPORT E)**
  - Sustain Block I
  - Integrate S&T Capabilities for Block II & Beyond

### JOEF

- **JSTO Technology Insertion Increment 1**
- **JSTO Technology Insertion Increment 2**
- **Software Development Increment 2 and beyond**
Questions?