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Joint Program Executive Office for Chemical and Biological Defense

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JPM IS Science & Technology



The Enterprise Architecture and How It Relates to Industry IRD Plans – Focus: Information Technology

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S&T Planning

Current

15-Year

30-Year

CBRN WARNING AND REPORTING / HEALTH SURVEILLANCE



- Key urban area exterior & interior models
- Missile intercept modeling
- False alarm reduction
- Multi-host platform & location operation
- Configurable for live, virtual, constructive simulation & exercises
- "First-hit" agent detection & confirmation
- Worldwide on-demand connectivity
- Correlated all-source information and real time displays
- Complex interior modeling database & tools
- On-demand human effects & agent-based models
- Rapid deliberative planning & analysis
- Composable, expandable on-the-fly toolset
- Automated, limited human-in-the loop required

- Advanced Warning / Real Time Reporting
- Accurate Hazard ID, Prediction, Depiction
- Planning and Analysis
- Rapid Decision-Aiding
- Consequence Management

Fully-Integrated Chemical, Biological, Radiological, and Nuclear Information Systems (CBRN IS)

DECISION ANALYSIS / MANAGEMENT

Continued integration with Joint, Service, Coalition and Civil C4I systems providing timely and relevant dissemination of CBRN/WMD data and information



Sources of S&T for JPM IS

- **DTRA J9 Research and Development Directorate**
 - **Chemical / Biological Technologies Department (a.k.a. the Joint Science and Technology Office for Chemical and Biological Defense)**
 - **Information and Analysis Office – S&T for Joint Effects Model (JEM) and Joint Warning and Reporting Network (JWARN)**
 - **Diagnostics, Detection, and Disease Surveillance Division – S&T for JWARN and Biosurveillance Portal (BSP)**
 - **Physical S&T Division – technology maturation of S&T products via ATDs and JCTDs**
 - **Nuclear Technologies Department**
 - **Nuclear Technologies Modeling Division – radiological / nuclear effects modeling**
 - **Nuclear Detection Technology Division – Smart Threads Integrated Radiological Sensors JCTD**
- **U.S. Army Research, Development, and Engineering Command, including Edgewood Chemical Biological Center, Picatinny Arsenal, and Natick Soldier Systems Center**
- **U.S. Army Research Institute of Environmental Medicine**
- **Armed Forces Health Surveillance Center**



How Does All of this Relate to Enterprise Architecture?

- **Good News: Proven Processes, Standards, Templates and Examples are in place:**
 - Guide Advanced Development
 - Increase Chance of Successful Transition
 - Minimize Change/Rework to Integrate and Test
 - Minimize Overall Cost to the Taxpayer
- **Reality Check:**
 - There are no silver bullets
 - Architectures into which JPM IS capabilities integrate change and we must track to those changes while employing best practices to reduce change/rework
 - Active engagement is required along the way with tailoring, as necessary, as a function of the specific capability under development and its intended target
- **Constant Goal:**
 - Continue to reduce the impact of external changes to CBRN capabilities... to the degree possible and practical

Components:

- **Coordination**
- **Framework**
- **Processes**
- **Standards**
- **Handbook**
- **Templates**



Coordination with Stakeholders

- **Coordinate the development and tracking of science and technology (S&T) to JPM IS acquisition programs and initiatives with**
 - **Joint Project Manager Information Systems (JPM IS) acquisition program managers and Common Services team leads**
 - **Defense Threat Reduction Agency (DTRA)**
 - **Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) Deputy Chiefs of Staff for Program Acquisition / Program Assessment and Policy & Strategic Initiatives**
 - **Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense (JRO-CBRND)**
 - **Non-DoD partners [e.g., Department of Homeland Security (DHS), Environmental Protection Agency (EPA)] – Technical Coordination Working Group**
 - **Other external stakeholders, as appropriate**
- **Provide APM stakeholder representation for advanced technology demonstrations (ATDs), Joint capability technology demonstrations (JCTDs), and experiments that mature JPM IS-targeted S&T products**
- **Assess whether product transition plans are executable**



Framework for Aligning to Architectures

- **Provide products & services – Regular Periodic Battle Rhythm**
 - **Develop and execute**
 - **Capability transition agreements**
 - **Technology transition agreements**
 - **Data transfer agreements**
 - **Participate in JPEO-CBD joint life cycle management reviews**
 - **Participate in JRO-CBRND Shape and Sense Integrated Concept Team activities**
 - **Provide JPM IS acquisition program capability gaps / S&T needs and priorities assessment to JPEO-CBD**
 - **Participate in DTRA processes**
 - **Transition quarterly reviews**
 - **Broad agency announcements**
 - **Work with JPM IS liaisons on cross-JPM issues**
 - **Improve S&T status, transitions, and documentation**
 - **Provide international support, as needed**



Chemical and Biological Defense Program (CBDP) Technology Transition Handbook

- Framework for transitioning technologies from the Joint Science and Technology Office (JSTO) to advanced development.
- Guidance applicable to all potential S&T providers.
- Technical Readiness Level (TRL) and Manufacturing Readiness Level (RML) Assignment and Definitions
- Templates for
 - Technology Transfer Agreements (TTAs)
 - Data Transfer Agreements (DTAs)
 - Capability Transfer Agreements (CTAs)
 - Transition Memorandum
 - Transition Agreement Termination Memorandum (TATM)

***Framework: Used and Tailored Based on
Capability Target***



Example from the Joint Effects Model (JEM) Program

- **Joint Effects Model (JEM) Common CBRN Model Interface (CCMI)**
 - Set of components that utilize industry standards to provide an open architecture for 3rd party developed components
 - Components are primarily developed by the Science and Technology (S&T) community and are intended to satisfy JEM functional requirements.
 - The CCMI Auto-generated Test Tool (CATT) is an application developed by the JEM PMO that enables interactive testing of CCMI components.



CCMI Requirements

- **CCMI guidance documentation includes:**
 - **Component Deliverable Items Requirements**
 - **Component Architecture Requirements**
 - **Component Uniformity Requirements**
 - **Component Exception-Handling Requirements**
 - **Component Build Requirements**
 - **Component Logging Requirements**
 - **Schema Naming and Design Rules**
 - **Component Runtime Packaging Requirements**
 - **Component Versioning / Deprecation Requirements**
 - **Component testing Requirements**
 - **Component Embedded Documentation Requirements**



CCMI Guidance

- Separation of model development from system architecture
- Plug and Play of S&T models
 - Utilizing Open Service Gateway Initiative (OSGI) OSGi bundles
 - OSGi – specification for a modular system for Java
- Non-invasive component architecture
- S&T models are independent of host system architecture
- Programmatic discovery of model capability and dependencies
 - OSGi manifest used to advertise capability
 - XSD schemas used to define model inputs and outputs
- Component dependencies identified at the data level
- V&V and accreditation can be performed prior to system integration without requiring the development of a user interface
 - Utilizing the CCMI Auto-generated Test Tool (CATT)
- Standardized delivery of S&T component tests
 - Utilizing CATT workspace to define, run, and capture the output of coverage tests
- Standardized delivery of documentation at the component level
 - SVD, V&V Test Documentation



CCMI Standards and Tools

- **Java as the component API interface**
- **OSGi for component modularization**
- **XSD Schemas for defining component inputs/output and dependencies**
- **Organization for the Advancement of Structured Information Standards (OASIS) Genericcode specification for externalizing code list from XSD schemas**
- **Log4J for all logging including native code**
- **Eclipse guidelines for source code versioning**
- **Maven for build automation**



CCMI Standards and Tools

- **JEM Increment 2 Specific:**
 - Ozone Widget Framework
 - OGC WMS web services
 - WSDL for external web services
 - REST for internal web services
 - Common Map API OWF standard for communication with the map
- **Not Yet Implemented:**
 - Google Web Toolkit (GWT) for user interface generation
 - Java Messaging Service (JMS)
 - JDBC for database access
 - RDBMS for data storage



Targeted JPM IS Capabilities

- **JEM**

- Enhanced modeling to support biological and medical events
- Urban dispersion modeling improvements
- Modeling CBRN effects of threat missile intercept
- Higher fidelity weather, including support for littoral modeling requirements
- Advanced industrial facility modeling
- Improved agent fate predictive modeling
- **Common CBRN Model Interface to facilitate a better plug-and-play architecture**
- Source term estimation
- Improved CBRN analyst support

- **BSP**

- Interoperability with biosurveillance analytical tools
- Interoperability with consequence management tools

■ = S & T Support and Transition



Targeted JPM IS Capabilities

- **JWARN**
 - Sensor connectivity
 - Sensor data fusion for improved source term estimation
 - False alarm reduction
 - Optimal sensor placement
 - Enhanced CBRN route planning, including shelter-in-place / evacuation decision aiding
 - Increased automation of message handling and improved workflow
 - CBRN support for missile defense planning and control
 - CBRN for U.S. non-military partners [DHS, Department of Transportation (DOT), etc.]
 - Keep pace with evolving standards for data format and warning and reporting (Allied Tactical Publication 45, Emergency Response Guide, etc.)
- **CBRN IS**
 - 30-year strategic planning / long-range investment requirements analysis
 - Material solutions capability assessment

■ = S & T Support and Transition

***The BEST Technology and Equipment
At the RIGHT PLACE
At the RIGHT TIME
At the RIGHT COST***



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Find this briefing at:

<http://www.jpeocbd.osd.mil/Packs/Default.aspx?pg=410>