UNCOMPROMISING INTEGRITY ✦ RESPECT FOR ALL ✦ COMMITTED TO EXCELLENCE ✦ ALWAYS READY ✦

JPEO-CBRND

JPL CBRN INTEGRATION "DEVELOPING PHYSICAL CAPABILITIES TO ADDRESS CBRN THREATS "

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PROGRAMS EXECUTED ON BEHALF OF THE CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM

AGENDA

Joint Project Lead for Chemical, Biological, Radiological, and Nuclear Integration (JPL CBRN INT) Panel Brief

- Strategic Target

- Organization

- Integrated Layered CBRN Defense

- JPL CBRN Integration Capabilities
  - CBRN Support to Command and Control (CSC2)
  - Joint Effects Model (JEM)
  - Joint Warning and Reporting Network (JWARN)
  - Chemical, Biological, Radiological, and Nuclear Defense Information System (CBRN IS)

EVOLVING TODAY FOR TOMORROW'S BATTLESPACE

Here's where we are today

- **CBRN capabilities need to be better connected, networked**
  - Do not "talk" to each other or to other non-CBRN systems/capabilities
  - Do not operate on a common standard or data format

- **Some CBRN capabilities connect to non-CBRN systems and feed data automatically**
  - Limited in overall number
  - Limited in types of systems that can receive data

- **CBRN capabilities are often an afterthought**
  - They're an "add-on" dependent upon the risk of encountering a "CBRN environment"

Here's where we will be tomorrow

- **INTEGRATED**
  - Data can be combined from multiple sources in a single view like a non-CBRN Common Operating Picture
  - Sensors send signals that can be used immediately, without additional processing or amplification
  - Sensors are "ready to use"

- **INTEROPERABLE**
  - Interoperability will result in a shift/transition from CBRN data to CBRN information
  - Systems can use AI/ML to exchange, interpret, and present shared data in a way that is understood by other systems and can leverage AI/ML
  - Adoption of common standards enables transmission of meaningful information that is independent of any particular system or therefore without restrictions

- **INTERDEPENDENT**
  - CBRN Commodities will be aligned with Services Networks and interfaces
  - CBRN Commodities will be aligned with Joint All Domain Command and Control (JADC2)

HOW DO WE EVOLVE?

Identify and/or develop enterprise services that achieve the following:
- Integration of all CBRN capabilities and data with existing user systems across the Services to Achieve JADC2
- Interoperability of CBRN data and non-CBRN data to create a holistic picture that includes CBRN information
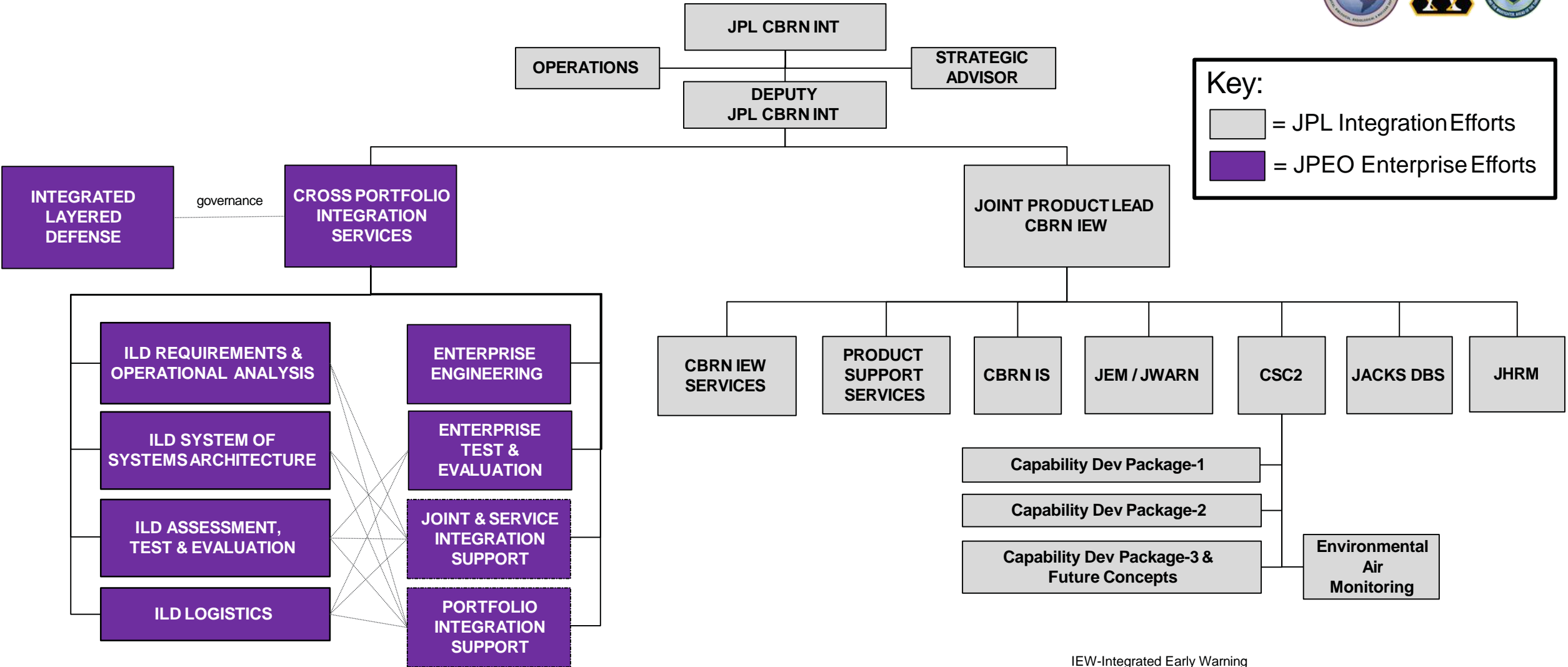
JPL CBRN INTEGRATION – FUNCTIONAL ORGANIZATION STRUCTURE

Key:
- ☐ = JPL Integration Efforts
- ☐ = JPEO Enterprise Efforts

JPL CBRN INT

OPERATIONS — STRATEGIC ADVISOR

DEPUTY JPL CBRN INT

INTEGRATED LAYERED DEFENSE — governance — CROSS PORTFOLIO INTEGRATION SERVICES

JOINT PRODUCT LEAD CBRN IEW

- ILD REQUIREMENTS & OPERATIONAL ANALYSIS
- ILD SYSTEM OF SYSTEMS ARCHITECTURE
- ILD ASSESSMENT, TEST & EVALUATION
- ILD LOGISTICS

- ENTERPRISE ENGINEERING
- ENTERPRISE TEST & EVALUATION
- JOINT & SERVICE INTEGRATION SUPPORT
- PORTFOLIO INTEGRATION SUPPORT

- CBRN IEW SERVICES
- PRODUCT SUPPORT SERVICES
- CBRN IS
- JEM / JWARN
- CSC2
- JACKS DBS
- JHRM

- Capability Dev Package-1
- Capability Dev Package-2
- Capability Dev Package-3 & Future Concepts
- Environmental Air Monitoring

Provide integrated layered CBRN defense capabilities across combined Joint All Domain Operations

IEW-Integrated Early Warning
ILD-Integrated Layered Defense
JHRM-Joint Health Risk Management
JEM-Joint Effects Model
JWARN-Joint Warning And Reporting Network
JACKS DBS-Joint Acquisition CBRN Knowledge System Defense Business System
CBRN IS-CBRN Information System
CSC2-CBRN Support to Command and Control

INTEGRATED LAYERED CBRN DEFENSE – FOCUS AREAS

Integrated Layered CBRN Defense (ILD) is the concept of using a system of systems (SoS) approach to develop capabilities against weapons of mass destruction for the Joint Force across combined **Joint All-Domain Operations**.

Focus areas of ILD include:

ILD Requirements and Operational Analysis
- Initial analysis point for new requirements to the JPEO-CBRND
- Reviews threat, gap, CONOPS, use cases, mission engineering, common requirements
- Identifies impact to ILD integration

ILD System of Systems Architecture
- Establishes governed products for ILD System of Systems integration including CBRN Reference Architecture, integration standards baseline, and interface requirements
- Maintains authoritative source of truth for architectures and specifications

ILD Assessment, Test & Evaluation
- Develops integrated test campaign plan
- Provides common test & evaluation opportunity to show portfolio capability improvements over time

ILD Logistics
- Plans and conducts unit set fielding to maximize efficiency in new capability deployments
- Supports integrated SoS New Equipment Training (In-Person, Virtual)
- Provides unified training architecture
- Leads campaign to plug CBRND into Services' operational training (NTC, JRTC, Synthetic Training Environments, etc.)
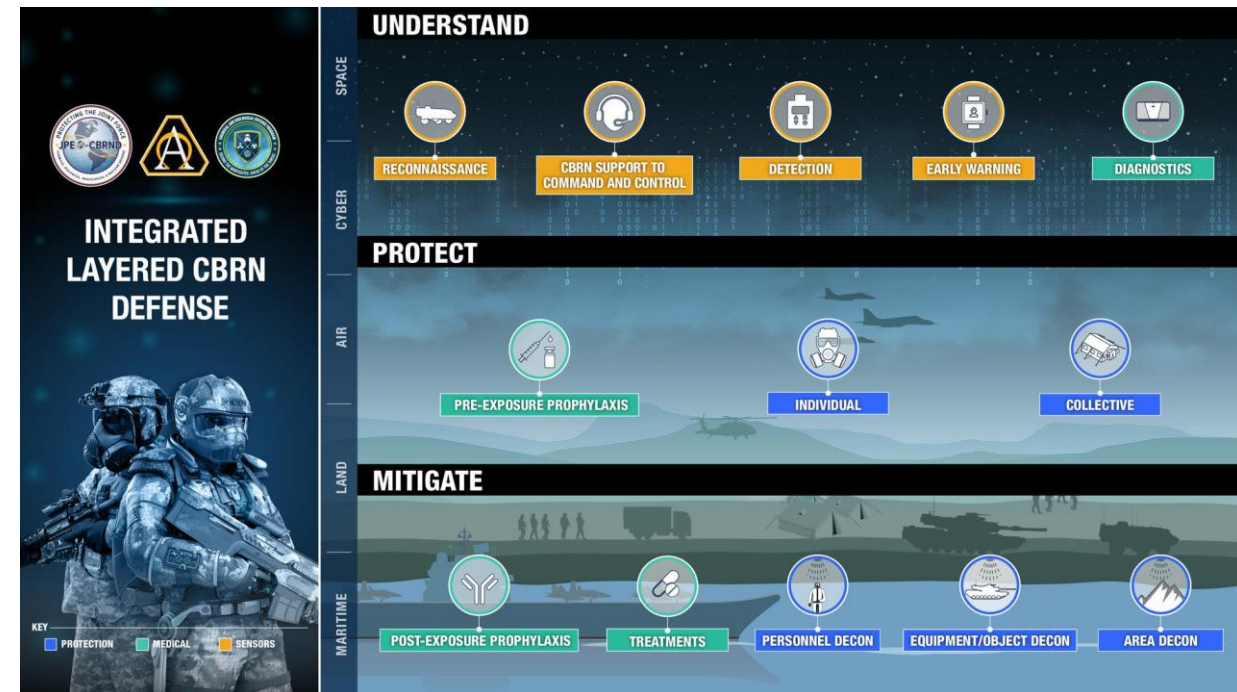
"**Integrate layered CBRN defense capabilities across all Domains and mission essential functions**"

- JPEO-CBRND Strategic Campaign Plan 2022
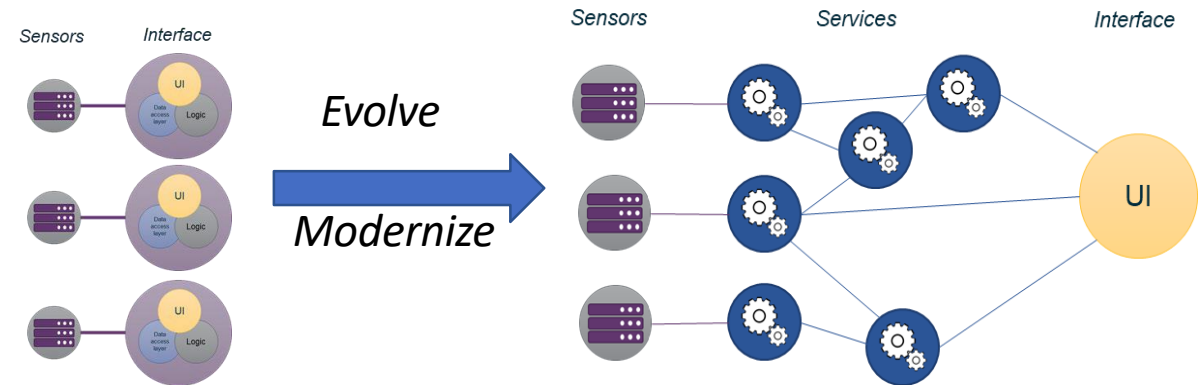
CBRN SUPPORT TO COMMAND AND CONTROL (CSC2)

Description

- CSC2 is the capability to rapidly realize agile and resilient command and control (C2) across all domains within the full spectrum of Joint, Service, and Mission Partner environments.
- CSC2 is the enablement of situational awareness (SA) and C2 to continue military operations in an actual or threatened CBRN environment. These abilities include shaping and prevention, CBRN hazard and attack analysis, network integration, and decision support. This capability will be delivered through four increments of capability or capability description packages (CDP).
- The CSC2 Program is being uniquely structured to deliver this capability by developing an overarching system of systems (SoS) of interoperable and integrated CBRN defense capabilities to achieve needed situational awareness and understanding to accomplish CBRN integrated layered defense, interdependent with Service and Mission Partner Common Operating Environments and Computing Environments (CoE/CE). CSC2 addresses this objective by establishing a Service and JADC2 compatible CBRN CoE architecture, and initial deployment environment.

"The Single Pane of Glass for CBRN SA/SU"

Investment Delivers

- Establishes CBRN common operating environment (CoE) for CBRN sensors and Service CE and CoE to interface to achieve CBRN information transport to Service common operating pictures (COPs) and points of need.

- Unit Level Concept Controller: Control, distribution, visualization, and automated reporting of CB sensor data within tactical units.

- Expeditionary/Unit Sensor Analytics: A validated analytics package for CB that enables sensors to warn earlier and at greater confidence for decision support in a CBRN contested environment.

- Sensor Interface/Communication Kit: An application that enables data to move from the sensor to the sensor controller/manager across Service communication networks.

Benefits to Warfighter

- Integrates CBRN Sensor data and information into a common architecture
- Allows for a near plug and play capability for CBRN sensor to integrate in Services' CoE and COPs
- Provides initial suite of decision support applications to:
  - Accelerate the propagation of CBRN information resulting in accelerated decision making
  - Automate CBRN Hazard warning and reporting
  - Fusion of CBRN and Non-CBRN information (FP, Radar, Intel… etc)
- AI/ML analytics applications reduce sensor false alarm rates and increase confidence on CBRN alarms
- Common CBRN UI that reduces training and logistics burden

CSC2 CAPABILITY DEVELOPMENT PACKAGES
SNAPSHOT

FY22-23: Capability Development Package 1: (signed)
Sensors to Networks

- Provides for transfer, control, management and display of data from CBRN sensors to networks
- Ready and compatible for follow-on processing and analysis.
- Establish baseline CBRN CoE
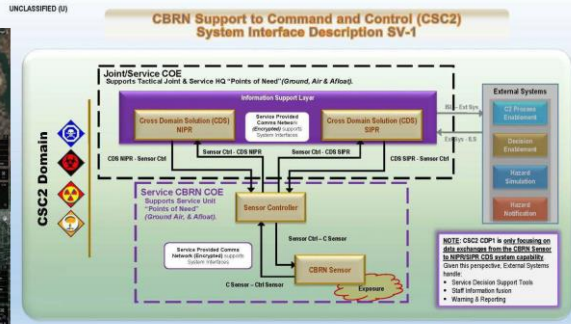
FY23-25: Capability Development Package 2: (Draft)
CBRN Network Convergence & Applications

- Integration, visualization, and analysis of data accrued
- Initial integration of operational, open source, and environmental health information to enable IEW decision support tools
- Development of decision support tools to support operational planning in a CBRN environment
- Initial integration of capabilities into Service COEs/COPs and JADC2
- Enable information sharing with domestic partners

FY24-26: Capability Development Package 3: (planning)
Service Network Convergence & Applications

- Expanded development of decision support tools to enable Joint operational execution in a CBRN environment
- Expanded integration of RN sensing, analysis and operational planning and execution into the CSC2 framework
- Continued integration into Service and Joint COEs/COPs.
- Expand capabilities delivered in CDP 1 and CDP 2

convergence

FY25-27: Capability Development Package 4:
High Network Convergence & AI Applications

- Will fully integrate CSC2 capabilities into Joint/Service COEs/COPs
- Continue integration of environmental/health monitoring information to enable IEW decision support tools using Artificial Intelligence (AI) and Machine Learning (ML)

CBRN Battlespace Awareness Capabilities and Mission Configurations to Support the Warfighter Joint Operations in & across Integrated Environments

JOINT EFFECTS MODEL (JEM)

Description: Joint Effects Model (JEM) is a software application that provides the Department of Defense (DoD) with the only operationally tested and accredited tool to model and simulate the effects of CBRN weapon strikes and incidents that is approved for use by operational warfighters. JEM applies advanced physics using weather, terrain, and agent characteristics to predict the time-phased impact of CBRN and Toxic Industrial Chemical/Material (TIC/TIM). JEM displays hazard information on the Common Operational Picture (COP) and allows commanders to assess risk and take steps to mitigate the effects of Weapons of Mass Destruction (WMD) on operational forces.

Mission: Provide enhanced situational awareness of the battle space through near real-time hazard prediction information to minimize the effects of release of CBRN and Toxic Industrial Materials on current operations. Protect the force!

Acquisition Phase: Operations & Sustainment

JOINT WARNING AND REPORTING NETWORK (JWARN)

Description: Joint Warning and Reporting Network (JWARN) is a software application that provides the DoD with a warning and reporting system that enables an immediate and integrated response to threats of contamination by WMD, CBRN, and TIM incidents. JWARN provides a digital display of CBRN reports on the COP, presented through Service-provided Command and Control systems resident at all echelons of command. Enhanced situational battlespace awareness provides Commanders the ability to support warfighter battle management and continuity of operations in a contaminated environment.

Mission: The JWARN mission is to enable an immediate and integrated response to threats of contamination by weapons of mass destruction or CBRN incidents through rapid warning and dissemination of CBRN information, enhance situational awareness throughout the area of operation, and support Warfighter battle management.

Acquisition Phase: Operations & Sustainment

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR DEFENSE INFORMATION SYSTEM (CBRN IS)
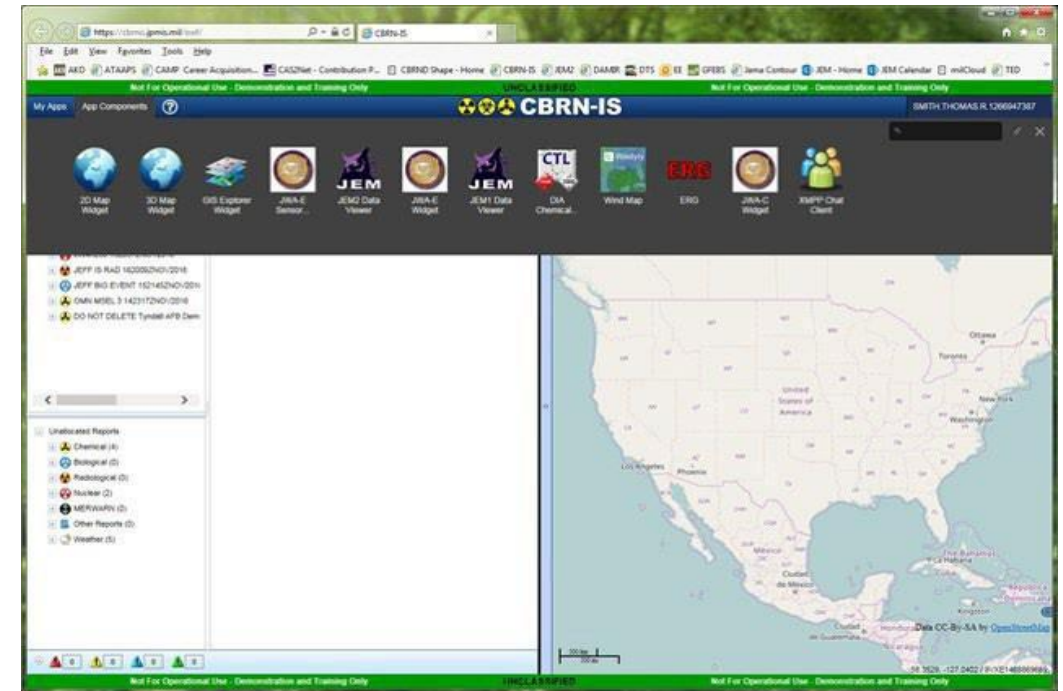
Description: Chemical, Biological, Radiological, and Nuclear Defense Information System (CBRN IS) provides a collaborative Cloud-hosted environment that allows users to collect and disseminate CBRN warning and reporting data, provide detailed CBRN hazard predictions, aid in decision support, and make relevant CBRN defense information available in near-real time. CBRN IS provides an environment that supports the implementation of Integrated Early Warning (IEW) capabilities that allow users to access netted sensor information, data fusion, disease modeling, biosurveillance data, source term estimation data, incident management tools, and planning and analysis capabilities. The CBRN IS enterprise makes CBRN decision aids readily accessible from any desktop through a web browser simplifying interoperability, reducing integration and deployment costs and increases cybersecurity protection.

Mission: CBRN-IS is an enterprise environment providing timely, fused, and easily accessible information to the Joint Warfighter, CBDP Community of Interest, civil and international partners.

Benefits to Warfighter
CBRN IS provides a collaborative cloud-hosted environment that allows users to collect and disseminate CBRN warning and reporting data, provide detailed CBRN hazard predictions, aid in decision support, and make relevant CBRN defense information available in near-real-time. CBRN IS makes decision aids accessible through a web browser, simplifying interoperability, reducing integration and deployment costs, and increasing cybersecurity protection.

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