**U.S. ARMY**

# PEO IEW&S
# Artificial Intelligence and Software
# At Pace (AIS@P) Industry Day

PEO
**IEW&S**

Program Executive Office
Intelligence, Electronic Warfare & Sensors

07 JANUARY 2025

PEO IEW&S

**AFTERNOON**

# RP2 – Software Development
## Mr. Mark Saxon & Panel
### PM EW&C

**PEO IEW&S** — U.S. ARMY

**EWC** — ELECTRONIC WARFARE & CYBER

*"The Army must generate EW capability in contact while integrating lessons learned from current conflicts to underpin soldier, platform, and formation protection while providing commanders the ability to generate effects in and through the EMS integrated with enduring and emerging army capabilities."*

**Acquisition and technology strategies that enable rapid delivery, quick adoption, agile adaptation, and inherent Joint/Coalition interoperability while reducing procurement and sustainment costs.**

- ☐ Limited prototyping and rapid fielding of mature COTS/GOTS products with shared ecosystems that can grow with technology.

- ☐ Common distributed hardware/software frameworks and open architectures across the EW, Army, and Joint/Coalition portfolio.

- ☐ Data-centric approaches that enable horizontal integration and interoperability under limited bandwidth conditions to support situational understanding, targeting, and non-lethal fires.

- ☐ Rapid development of new EW techniques and detectors delivered at the forward-edge to defeat a changing threat.

- ☐ Artificial Intelligence & Machine Learning for analytics, autonomous signal detection, identification and classification.

## Terrestrial Layer System (TLS) Manpack
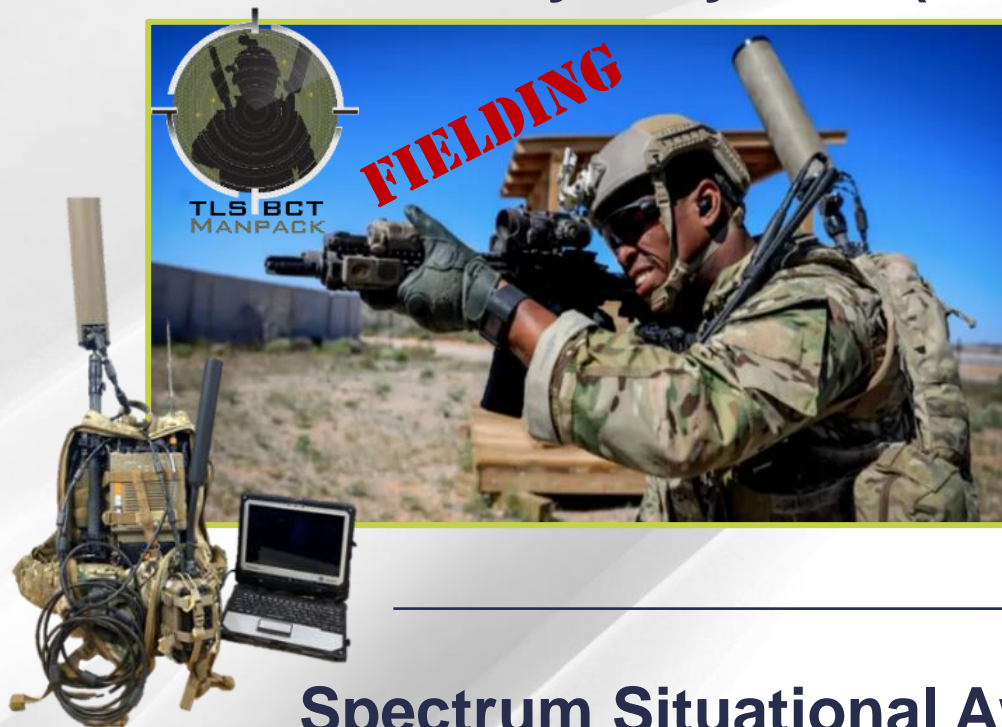


- 12-months from "good idea" to fielded product
- Limited prototyping of 4 different solutions tested in the hands of Soldiers and Unit Commanders
- Based on mature components currently employed by U.S. Army, U.S. Air Force, and SOCOM
- Working with FVEY partners to integrate architecture across battlespace
- Shared ecosystem rapidly matures/adapts by leveraging scale and rapid reprogramming

## Spectrum Situational Awareness System (S2AS)
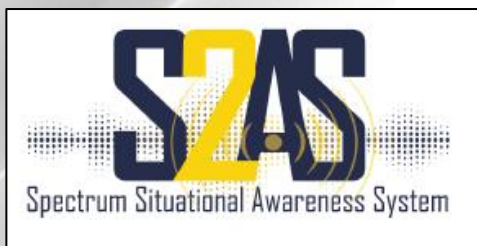


- Planned FY25 program -> procure & Field in < 1-year
- Limited prototyping of mature COTS/GOTS products
- Tested in the hands of Soldiers and Unit Commanders
- Wide adoption and rapid technology adaptation
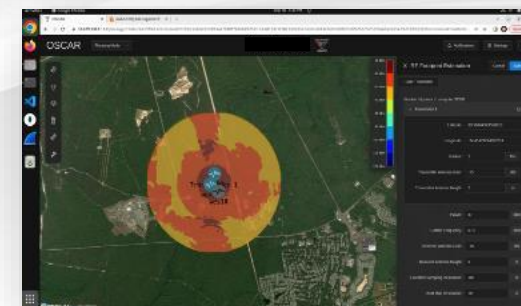


*A dedicated EMS situational awareness system provides the Commander with real time EMS Situational Awareness to support Emissions Control (EMCON) decisions, Electromagnetic Interference (EMI) Resolution, and detect/warn operations centers of unauthorized or intentional sources of interference.*

➤ **C5ISR/EW Modular Open Suite of Standards (CMOSS)**

❑ Suite of open standards to include Size, Weight, and Power

❑ Provides commonality and operational flexibility by sharing hardware and software components.

❑ Reduces risk and mitigates obsolescence

➤ **Graphical Processing Unity (GPU) Radio Frequency IQ Dataplane (GRID)**

❑ A GPU-accelerated computing digital signal processing (DSP) platform which provides wideband data ingest and zero-copy functions.

➤ **Common Framework Environment (CFE)**

❑ Adoption across the Joint services allowing for the collaborative development and sharing of ES/EA and SIGINT techniques

❑ A robust set of Software Defined Radio (SDR) interfaces facilitating the rapid portability

➤ **Advanced Automated Electromagnetic Warfare Suite (A2EWS)** *COMING SOON!*

❑ **Design Concept:** Integrate both current and future Army EW systems by employing mature COTS and GOTS spectrum analytics and machine learning software

❑ **Key Features:**
  ▪ Data aggregation and synthesis
  ▪ Advanced analytics
  ▪ Human-machine integration

❑ **Operational Payoff:** Speeds delivery of capability and portability
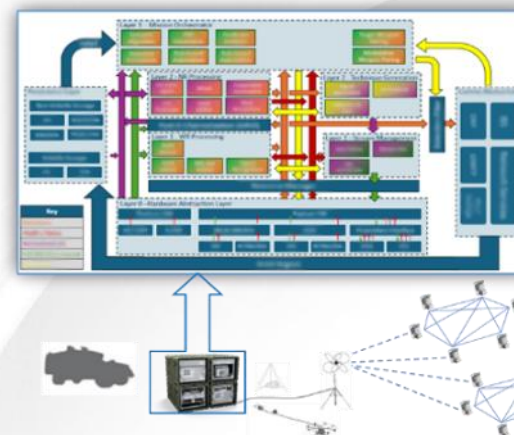
• **Planned 4QFY24 Combined Synopsis Solicitation (CSS) through SAM.GOV**

• **Potential for future limited procurement to support "Buy-Try-Decide" strategy for technical evaluation and operational utility assessment**

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## ➤ Tactical Assault Kit Framework

- ❑ Suite of geo-visualization tools for Windows, Android, web & server
- ❑ Mapping for precision targeting, navigation & situational awareness
- ❑ Open & government owned
- ❑ Plugin architecture

## ➤ EWPMT-X Pilot

- ❑ Rapid development on existing mature framework
- ❑ Army, Joint, Coalition interoperability is "built it"
- ❑ Large ecosystem of existing capabilities and developers
- ❑ Government owned

*A data-centric approach to enable horizontal integration and interoperability under limited bandwidth conditions to support situational understanding, targeting, and non-lethal fires.*
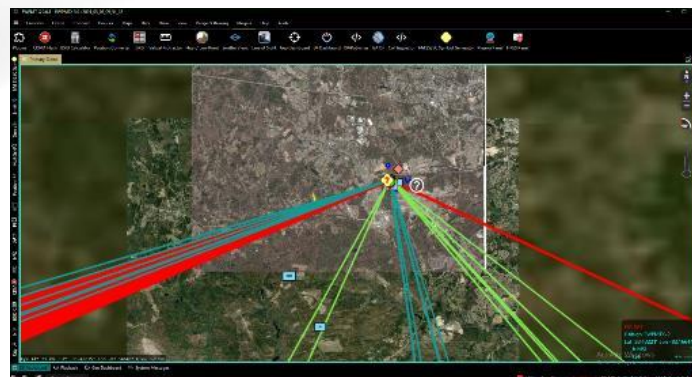
**SENSOR TO SHOOTER ECOSYSTEM**

### Next Generation Electronic Warfare Planning & Management Tool

- FY24: CQ24 sensor to shooter kill chain scenario
- FY25: PNTAX 24 JICD & App CEMA implementation
- FY25: PC25 MCS Interoperability
- FY25: MFIX 25 kinetic/non kinetic kill chain
- FY26: EWPMT-X replaces EWPMT Legacy

## ➤ Goals

- ❏ Enhanced signal detection, identification and classification
- ❏ Improved ability to target emitters in the electromagnetic spectrum

## ➤ Initial Focus Areas

- ❏ RF Data Management: acquisition, generation, storage, access and retrieval for model training
- ❏ Synthetic RF data generation and labeling approach
- ❏ Model training: approach, fine-tuning and leveraging open-source and non-open source pretrained models and datasets
- ❏ Test & Evaluation: approach, tools and metrics for evaluation and adversarial testing
- ❏ Intellectual Property

**LINCHPIN** — SENSOR AI SYSTEMS · PM IS&A

## ARSENAL

*AI/ML enables classification of unknown signals and rapid development of new techniques and detectors to defeat a changing threat.*

# PM EW&C Software Pools
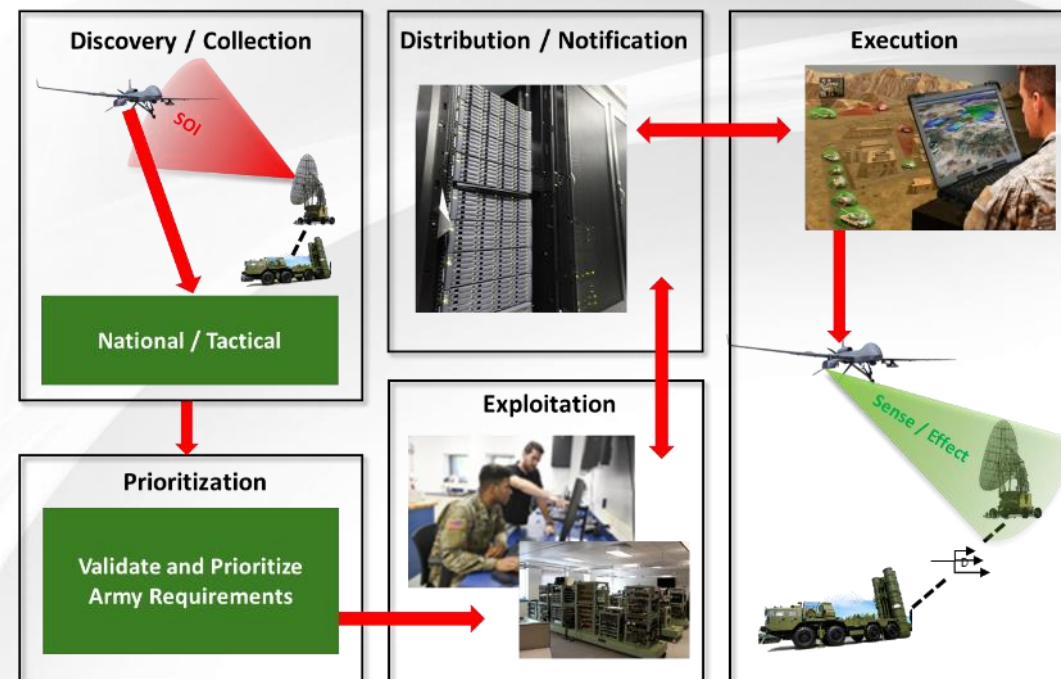
## Software and Systems Engineering Support

**2.1**

- Software Architecture and Design
- Situational Awareness and Data Processing
- Systems Integration and Configuration
- Resource Management
- Monitoring, Control, and Performance Optimization
- Software Maintenance and Upgrades
- Documentation and Requirements Management

## EMS Techniques Development

**2.2**

- Signal Detection and Analysis
- EMS Effects
- Signal(s) Exploitation
- Technique Implementation
- Advanced, Coordinated EMS Effects
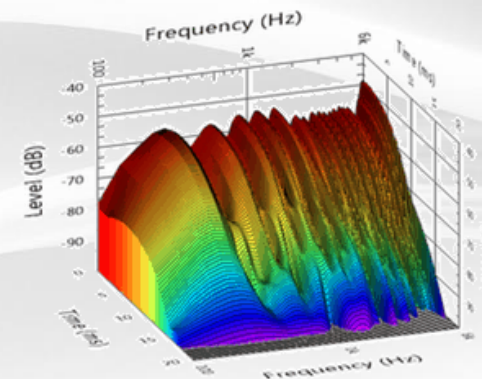
## Infrastructure as a Service (IaaS)

**2.3**

- Cloud Services
- Secure Hosting Compliance
- Software Licensing
- System Administration
- License Ownership and Delivery
- CM Library Administration
- Continuous Integration/Continuous Deployment (CI/CD)
- Security and Compliance
- User Support and Training
- Monitoring and Maintenance
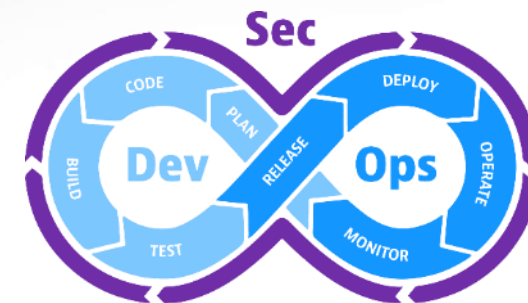
## SOFTWARE AND SYSTEMS ENGINEERING SUPPORT SUB-POOL EXAMPLE

## Task Description:

The contractor shall upgrade the EW&C POR system to support the Common Framework Environment (CFE) framework, enabling the system to leverage and execute community-proven EW detectors and effectors. The upgrade shall augment the current software and firmware of the EW system to integrate with the CFE framework.

## Key Requirements:

- **Capability Augmentation**
  - Augment the current software and firmware of the EW system to support the CFE framework, including modifications to existing code and development of new code as necessary
  - Integrate the CFE framework into the EW system, ensuring proper execution of CFE detectors and effectors

- **Required Expertise**
  - The contractor shall also possess systems knowledge to understand the overall system architecture, including hardware and software components, and their interactions
  - The contractor shall possess embedded programming knowledge to optimize the EW system's software and firmware components, ensuring efficient use of system resources

- **Compatibility and Interoperability**
  - Ensure that the upgraded EW system is compatible and interoperable with existing sub-systems and capabilities.

## NOT INTENDED AS PART OF THE RFP, EXAMPLE ONLY

## SOFTWARE AND SYSTEMS ENGINEERING SUPPORT SUB-POOL EXAMPLE

### Task Description:

The contractor shall develop a new plug-in for the Electronic Warfare Planning and Management Tool (EWPMT-X) software to enable integration with an RF Modeling and Simulation (M&S) tool. The plug-in shall leverage and support existing TAKX architecture tools and APIs to allow EWPMT-X to pass EW scenario data to the M&S tool for processing and receive processed data back from the M&S tool for visualization and further analysis by other processors.

### Key Requirements:

- **Plug-in Development**
  - Develop a new plug-in for EWPMT-X to interface with the M&S tool, leveraging existing APIs, standard software development methodologies and programming languages
  - Utilize a government provided CI/CD pipeline for collaboration with other development and test processes

- **M&S Tool Interface**
  - The plug-in shall enable the exchange of data between EWPMT-X and the M&S tool, not limited to: EW system location, capabilities and performance, and available resources; Threat or target locations, capabilities and ranges

- **Data Visualization and Exchange**
  - The plug-in shall enable EWPMT-X to visualize the processed data received from the M&S tool: Predictive RF heat maps, J/S heat maps, recommendations for relocating EW systems and technique employment for improved effectiveness
  - Data generated shall be shareable with external systems for further technical computation or operational analysis

- **Compatibility and Interoperability**
  - The plug-in shall be designed to be compatible and interoperable with existing EWPMT-X software
  - The new plug-in shall be TAK-X framework compliant, ensuring compatibility with current and future TAK-X based software

**NOT INTENDED AS PART OF THE RFP, EXAMPLE ONLY**

## EMS TECHNIQUES DEVELOPMENT SUB-POOL EXAMPLE

### Task Description:

The contractor shall design, develop, test, and deliver a new capability to detect and analyze a particular classified Signal of Interest (SOI). The detector capability shall be engineered to operate within a common Electromagnetic Spectrum (EMS) framework, such as the Common Framework Environment (CFE), to ensure seamless integration and interoperability with existing systems.

### Key Requirements:

- **Signal Detection and Analysis**
  - The detector capability shall be optimized to detect and analyze the specific SOI, with the goal of achieving high probability of detection and low false alarm rates.
  - While the primary focus is on the specific SOI, the contractor shall also investigate and design the capability to detect and analyze similar signals, enhancing the overall versatility and effectiveness of the system

- **Reprogrammability**
  - The detector capability shall be fully compliant with a common EMS framework, ensuring compatibility and interoperability across Army EW&C POR systems.

- **Efficiency**
  - The solution shall optimize the use of hardware and software resources, reducing system SWAP requirements.

- **Classification**
  - The SOI and resulting detector capability shall be classified at the SECRET level. All work products, documentation, and deliveries shall be marked and handled accordingly.

**NOT INTENDED AS PART OF THE RFP, EXAMPLE ONLY**

## EMS TECHNIQUES DEVELOPMENT SUB-POOL EXAMPLE

## Task Description:

The contractor shall develop an RF effect capability that can deny, degrade, and disrupt adversary communications while ensuring spectral efficiency and not impeding successful friendly communications. The contractor shall leverage AI/ML tools as part of the capability development process. The capability shall be designed to operate in a way that minimizes interference with friendly communications systems, ensuring that the Army's own communications capabilities are not compromised.

## Key Requirements:

- **RF Effect Development**
  - RF effect capability that can deny, degrade, and disrupt adversary communications, using techniques such as jamming, spoofing, or other forms of RF manipulation.

- **Minimize Impact to Friendlies**
  - The capability shall be spectrally efficient, minimizing the amount of RF energy required to achieve the desired effect while avoiding interference with friendly communications systems

- **Supporting Frameworks**
  - The resulting capability shall be executable within the Common Framework Environment (CFE) framework, allowing for seamless integration with other CFE-compatible capabilities
  - The resulting capability shall be accessible and fully characterized in the Electromagnetic Spectrum (EMS) Arsenal, enabling users to easily discover, access, and employ the capability in support of their missions

- **Classification**
  - Development and testing of the capability will be classified at the SECRET level. The resulting capability shall be classified as Sensitive but Unclassified (SBU) at the IL5 level, allowing for wider dissemination and use within the Army.

**NOT INTENDED AS PART OF THE RFP, EXAMPLE ONLY**

## INFRASTRUCTURE AS A SERVICE SUB-POOL EXAMPLE

### Task Description:

The contractor shall establish, maintain, and administer three (U-IL5, S, TS) cloud-based EMS Arsenal environments, each with its own set of tools and software to support EW capability development and Continuous Integration/Continuous Deployment (CI/CD) and DevSecOps practices. The contractor shall procure and install the required development software and licensing for each environment and ensure that the software and tools meet the necessary security compliance requirements per associated classification.

### Key Requirements:

- **Establish Development Environment**
  - Each cloud-based environment shall be maintained at a different classification level: Unclassified (IL5), Secret, and Top Secret
  - Deliver three fully functional EMS Arsenal development environments, each with its own set of tools and software to support CI/CD and DevSecOps practices

- **Software Procurement**
  - The contractor shall procure and install the necessary software and tools for each environment, accounting for the specific needs and requirements of each environment.

- **Security compliance**
  - Each environment shall meet the security compliance requirements for its associated classification level, including implementation and maintenance of access controls, firewalls, and other network security measures
  - Deliver a security compliance plan for each EMS Arsenal environment, outlining the measures taken to ensure security compliance with the associated classification level

**NOT INTENDED AS PART OF THE RFP, EXAMPLE ONLY**

# RP1 – AI / ML
## COL Christopher Anderson & Panel
### PM IS&A

- Project Linchpin was designated as the Army's AI Ecosystem across the ASA(ALT) area of responsibility: Implementation of the Army Artificial Intelligence Ecosystem through Project Linchpin (DEC 2024)

- Project Linchpin will establish and manage AI infrastructure and services to support materiel development within the AI space

- PEOs are directed to use Project Linchpin as their starting point for any AI related activities

Project Linchpin operates as a hybrid business model, comprising of core services and customer sponsored capabilities.

## What PL Funds

A set core capabilities funded by Department of the Army G8 Force Development- Human Machine Integration (FD-H), established the foundations for AI development

## What Our Customers fund

Resource the AI needs though flexible options offered by PL:

1. Leverage tools provided by Cloud Service Providers or Tools inherited through partnerships and investments, resource your own services, contract management, and technical oversight. Pending the tool desired, there might be a cost.

2. Resource your own tools and services, contract management, and technical oversight.

3. Resource Project Linchpin to provide any tailored services needed to meet your mission requirements.

## AI Ecosystem Onboarding

Align AI capabilities with your business objectives

## Secure Trusted Environments

Access to Secure Hybrid environments with advanced computing for AI

## Data Management

Scalable and secure data management for AI development

## AI Standards Management

Standardized frameworks for AI development to ensure interoperability and security

## Model Marketplace

Centralized repository for AI models, enabling you to find and implement models quickly

## Core Enabling Capabilities

Capabilities that enable you to enhance your experience and use cases

**Project Linchpin has stood up an AI intake website for users across the Army and collected / categorized ~80 Use Cases (and counting):**

- **Automated Target Recognition**
- **Text/Language Summarization**
- **Imagery Analysis**
- **Document Generation**
- **more every day!**

**As the Army's use cases begin to scale, so will the need to leverage contract vehicles, such as AIS@P, to rapidly deliver trusted AI into Army programs!**

Welcome to the Army Data Catalog

The First Stop on Any Data Journey

Data Governance Roster | Coming Soon: Data Products | ADM Lexicon | ADM Policies | Army Data Board

Having trouble finding the data you need? Ask ADC
List of buttons to start workflows.

Ask ADC

Chart categories: Automated Target Recognition, Imagery Analysis, Text/Language Summarization, Document Generation, Predictive Maintenance/Lifecycle

Legend: FORSCOM, INSCOM, PEO IEWS, PEO GCS, JPEO CBRND