JOINT OPERATING SYSTEM (JOS)

Our nation's future warfighters will need to command and control collaborative human-machine networks to deliver information, decision, and effects advantage in systems conflicts.

As described by the Joint Warfighting Concept, systems conflict is characterized by distributed, heterogenous battle networks competing in a complex, dynamic, uncertain, and non-cooperative multi-domain operational environment.

The objective of systems conflict is to detect and deny adversarial system-of-systems before the adversary does the same. This may be achieved through the application of artificial intelligence, autonomy, and multi-agent theory from the enterprise level to the tactical edge.

To address this need, the Joint Operating System (JOS) provides battle management, command, and control (BMC2) of a collaborative human-machine battle network comprising processing nodes, sensors, effectors, manned and unmanned platforms, and other actors.

JOS focuses on what is required to integrate autonomous and intelligent entities (e.g., sensors, platforms, weapons) into the systems warfare framework envisioned in the Joint Warfighting Concept.

JOS approaches the challenge from a battle network's point-of-view whose members are replaceable agents and actors. To this end, JOS's key technological differentiator is its BMC2 language, an agent communication language for knowledge representation and reasoning, plan representation and planning, communication, and collaboration in multi-agent systems.

The JOS BMC2 language allows battle networks to represent situational understanding, orders, plans, and tasks with a common machine-understandable language. Additionally, JOS's communication and collaboration protocols provide the battle network the means to autonomously form ad hoc coalitions (as-a-service sub-networks of systems working toward a common goal) and share tasks and information at machine speeds. JOS's battle networks are dynamic and able to adapt in real-time to simultaneously execute multiple commands.
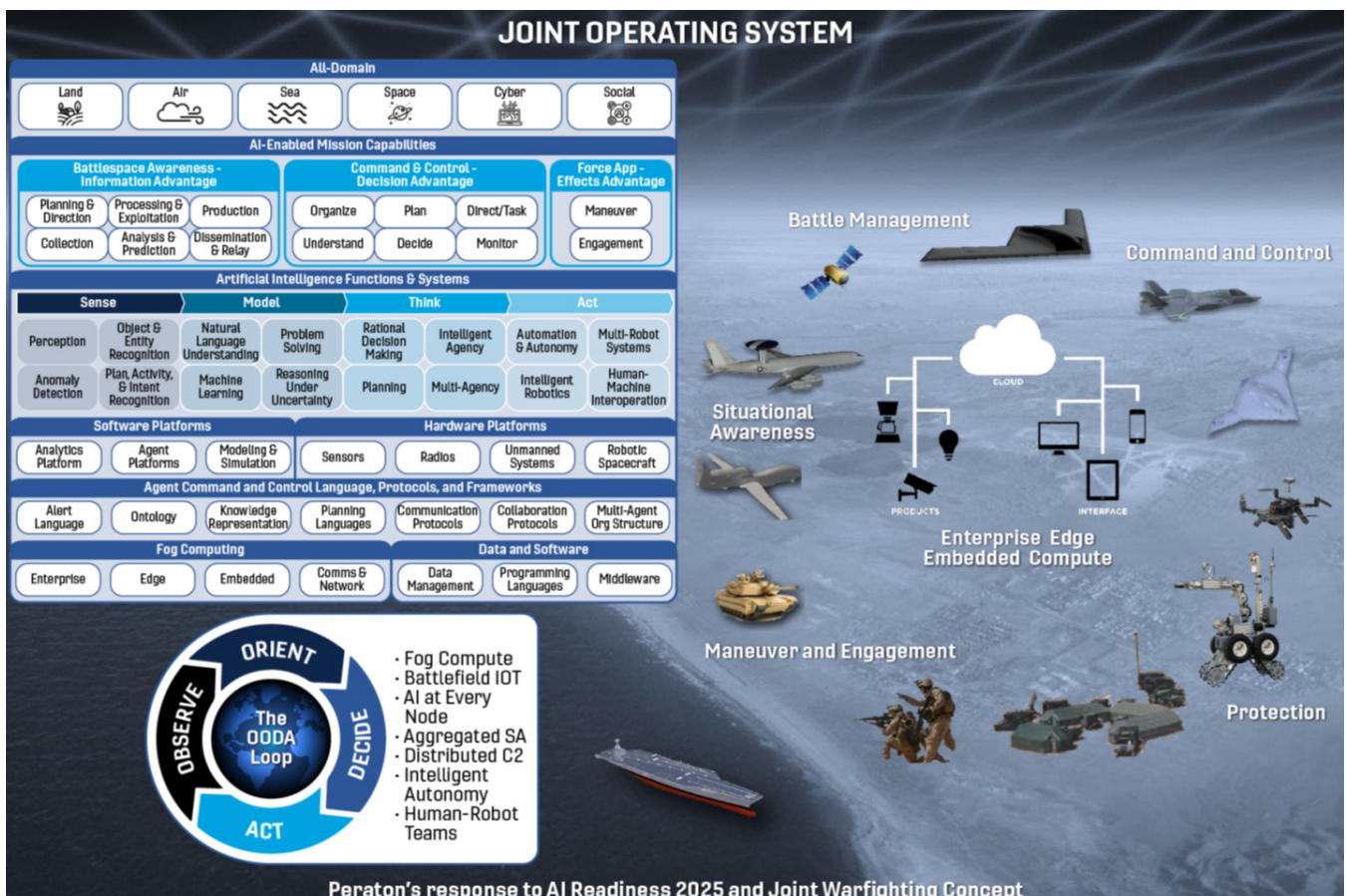
Peraton's response to AI Readiness 2025 and Joint Warfighting Concept

JOS provides:

- Real-time situational understanding of the operational picture from multi-domain information sources

- Automated and human-on-the-loop means to formulate orders, plans, and tasks given real-time situational understanding

- Ability to command the human-machine battle network with commander's intent

- Autonomous methods to control a battle network to collaborate toward achieving commander's intent

- Capability to demonstrate command, control, communication, computers, cyber, intelligence, surveillance, and reconnaissance (C5ISR) capabilities and gaps in a modeling and simulation environment.

Key Features

- Data management and analytics in a distributed enterprise, edge, and embedded compute environment.

- Information sharing over satellite communications, Wi-Fi and 5G.

- Automated detection, tracking, and characterization of high-value systems-of-systems from distributed multi-modal data sources.

- Human-on-the-loop and automated formulation of courses-of-action given the detection of a high-value system-of-systems.

- Automated collaborative execution of plans and tasks in distributed, heterogenous human-machine systems.

- Modeling and simulation of customer-driven mission threads.