

# NEMESIS: Networked Edge-based Multi-INT Exploitation for Situational Intelligence and Security

**Table 1: Project Details**

|                             |                   |                         |                            |
|-----------------------------|-------------------|-------------------------|----------------------------|
| <b>Sponsor</b>              | US Army PEO IEW&S | <b>Status</b>           | Direct to Phase II Award   |
| <b>TRL</b>                  | 3                 | <b>Demo Dates</b>       | Q1/2026, Q1/2027           |
| <b>Classification Level</b> | Unclassified      | <b>Point of Contact</b> | Dominick.Perini@OzniAI.com |



(a) NEMESIS pushes the horizon of deep sensing, providing a multi-INT reasoning layer for tactical users.



(b) NEMESIS envisioned as gateway to intelligence about the local environment.

**Figure 1: NEMESIS redefines intelligence collection and distribution in contested environments.**

**Abstract:** Networked Edge-based Multi-INT Exploitation for Situational Intelligence and Security (NEMESIS) is an advanced, AI-driven cognitive sensor system designed to transform military intelligence by decentralizing processing capabilities and performing sense-making at the tactical edge. The system is **engineered to operate in contested and austere environments** where reliable communications are limited or denied, enabling autonomous, attritable sensor platforms to locally process multi-modal data and deliver actionable intelligence in real time and at the right time. By embedding artificial intelligence directly onto sensor hardware, NEMESIS reduces dependence on high-bandwidth links and minimizes its radio frequency signature, thereby enhancing covert operations and overall battlefield resilience.

At its core, **NEMESIS integrates diverse sensor modalities—such as electro-optical/infrared (EO/IR) imagery, audio signals, and radio frequency (RF) data—through specialized sensory embedding modules.** Each data stream is processed using state-of-the-art algorithms: advanced computer vision techniques extract detailed information from EO/IR data, while sophisticated audio and RF processing methods capture and characterize environmental signals. NEMESIS then combines and processes data in a joint-semantic representation that allows for explainable, multi-modal pattern of life analysis and anomaly detection. This fusion of sensor data enables the development of an evolving context, which dynamically integrates current observations with historical data and external intelligence sources to map the pattern of life of the area of regard. As a result, NEMESIS is capable of accurately distinguishing between normal environmental variations and true anomalies, thus ensuring that the intelligence it generates remains both current and contextually relevant.

Development of NEMESIS is structured around a comprehensive development plan that includes **synthetic multi-modal data generation**, rigorous risk mitigation strategies, and the iterative integration of both hardware and software components. Furthermore, NEMESIS is designed with scalability in mind, offering potential dual-use applications in non-military domains such as interplanetary scientific exploration and industrial process monitoring.

