

# Discovery-Coordinated Multi-Sensor Perception

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## What Coordinated Multi-Sensor Perception Requires

Defense ISR (intelligence, surveillance, reconnaissance) operations coordinate sensors across platforms — fixed-wing reconnaissance aircraft, drones, satellite assets, ground-based sensors, intelligence-grade signal collection. Industrial inspection coordinates sensors across robots, fixed cameras, hand-held testing equipment, and emerging autonomous-inspection drones.

Each domain requires the same architectural primitive: coordinate sensor capability across the population of available sensors based on what the operation needs to perceive. The primitive is currently reconstructed per-domain through bespoke integration; the architectural alternative provides what each domain has been building incrementally.

## Why Per-Mission Integration Doesn't Scale

Each ISR mission, each inspection campaign, each emergency response reconstructs sensor coordination through mission-specific integration. The cumulative integration effort across operations is substantial; the structural information loss when sensors don't operate within shared coordination frameworks limits operational outcomes.

Discovery-coordinated multi-sensor perception extends beyond per-mission integration to architectural-primitive consumption. The mission's sensor coordination becomes a configuration of the primitive rather than a custom build. Cross-mission learning (operations that benefited from specific coordination patterns inform subsequent operations) becomes structurally tractable.

## **How Discovery Drives Sensor Coordination**

The mission's discovery queries (find specific evidence within specific spatial-temporal windows) drive sensor invocation through the architectural primitive. Sensors with relevant capability respond through credentialed observations; the responses augment the discovery's evidence base; the mission's operational decisions consume the augmented evidence.

The primitive composes naturally with existing mission-management tooling. ISR mission planning, inspection scheduling, emergency-response coordination all continue to operate; the architectural primitive provides the underlying sensor-invocation layer that current per-mission integration handles ad-hoc.

## **What This Enables for Multi-Sensor Operations**

Defense ISR gains structural cross-platform sensor coordination. Industrial inspection gains structural multi-sensor coordination across inspection campaigns. Emergency response gains coordinated multi-sensor observation across the response area.

The patent positions the primitive at the layer where multi-sensor coordination has been operating without architectural support.

