Forecast-Uncertainty-Driven Sensor Solicitation

by Nick Clark | Published April 25, 2026

What Uncertainty-Driven Solicitation Specifies

The forecasting engine continuously evaluates its own uncertainty about ongoing forecasts. When uncertainty exceeds a credentialed threshold for a specific spatial-temporal region, the engine produces a credentialed solicitation observation: a request that observation capacity be retasked toward the high-uncertainty region.

The solicitation propagates through the mesh. Mobile units (vehicles, drones, robots) within range may divert toward the region. Fixed sentinels in or near the region may increase their sensing rate. Directed sensors (steerable cameras, scannable radar, controllable acoustic arrays) may retask their attention. Each response is itself a credentialed action gated by the responding unit's admissibility evaluation.

Why Per-Robot Active Perception Doesn't Scale

Active perception (Bajcsy 1988, next-best-view planning, the broader robotics literature) typically operates within a single robot's sensor budget: the robot decides which of its own sensors to allocate where to reduce its own forecast uncertainty. The pattern works for individual robots; it doesn't compose to fleet scale.

Fleet-scale active perception requires cross-unit coordination. Multiple robots, vehicles, drones, and infrastructure agents operating in shared environments must

coordinate their observation strategies based on collective forecast uncertainty. Without architectural coordination, each unit optimizes its own perception independently, with the cumulative result that high-uncertainty regions receive uncoordinated overlapping coverage while low-uncertainty regions receive insufficient coverage.

How Cross-Unit Coordination Operates

The forecasting engine's solicitation propagates as a credentialed observation through the mesh. Receiving units evaluate the solicitation through their own admissibility framework: do mission priorities permit diverting toward the high-uncertainty region, do capability constraints permit the requested sensing, does the responding unit's authority admit the requesting authority's solicitation.

The composition is structural. Multiple units may respond to the same solicitation; their responses are themselves credentialed observations that the originating forecasting engine consumes; the resulting reduced uncertainty is observable to all participants. The pattern unifies what current systems handle through ad-hoc per-unit task management.

What This Enables for Cooperative Perception

Autonomy fleets (Waymo, Tesla, Mobileye REM) gain structural cooperative perception. Smart-grid forecasting gains cross-utility solicitation that the current per-utility forecasting cannot produce. Weather-services-as-coordination-hubs (Tomorrow.io, ClimaCell, emerging providers) gain credentialed integration with mobile-observation contributors.

Defense ISR gains the same architectural foundation. Multiple ISR platforms operating in shared airspace coordinate observation through forecast-uncertainty solicitation rather than through centralized tasking. The patent positions the

primitive at the layer where fleet-scale active perception has been operating without architectural support.