

OAK UrbanSense

Ambient Urban Intelligence — every city a sensor grid, no new hardware

IDEaS CFP 006 · Challenge 15

Turning Urban Data into Real-Time Insight through AI

Component 1b · TRL 4 · W7714-248676/015

An AI middleware layer over a city's **existing** cameras, acoustic arrays, air-quality monitors, vibration sensors and passive-RF points: a machine-readable **privacy gate enforced at ingestion** feeds a pattern-of-life anomaly engine that fuses indications **across feed types** into explainable, conformally-calibrated alerts on a city COP — in real time, at a fraction of dedicated-sensor cost.

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threat events detected — all by ≥ 2 independent feed types

0.81 / 1.00

REAL-data AUC — drone-audio / air-quality validation

0.902

conformal coverage (target 0.90, guaranteed)

~16,000/s

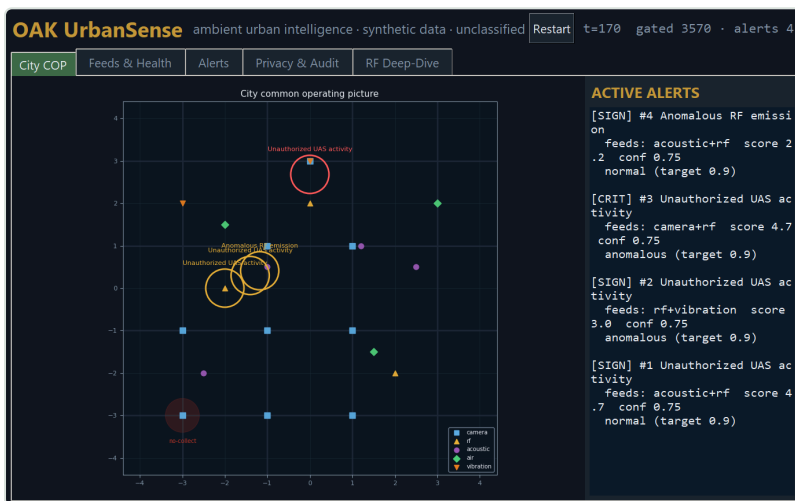
records/second per core · ~63 μ s/record

0

raw identifiers retained (8,610 records gated)

TRL 4 → 6

lab-validated → pilot-proven, privacy-assessed



Capability at a glance

- Five heterogeneous city feeds — cameras, passive RF, acoustic, air quality, vibration — through one source-agnostic HAL; feeds can degrade or drop and detection carries on (measured).
- Privacy compliance enforced AT INGESTION by machine-readable policy: aggregate features only, identifiers stripped by construction, no-collect geofences, retention limits, hash-chained tamper-evident audit.
- Per-sensor pattern-of-life baselines; anomalies fused across feed types by the same multi-INT correlation OAK fields in its EW SUITE.
- Explainable, machine-readable JSON alerts: contributing sensors, per-feature evidence, plain-language rationale, conformal (coverage-guaranteed) confidence.
- Urban counter-UAS demonstrated end-to-end: camera + 5.8 GHz downlink + rotor acoustics fuse to one alert; ELINT PDW deep-dive separates 3/3 urban emitters.
- Pure software, numpy-only, no GPU, no new hardware; ships its own synthetic-city generator — no government data required.
- **Validated on real public data:** acoustic drone detection on real UAS audio (ROC AUC 0.81, rotor-tonality cue) and environmental anomaly on real municipal air quality (AUC 1.00; flags a historic pollution crisis).