AUDEAMUS GROUP, LLC

Wi-Fi Sensing & Privacy Weekly Brief

October 16, 2026 | Historical public-summary edition

HISTORICAL PUBLIC SUMMARY

CSI calibration, sensing spillovers, and RF scene reconstruction

October 9–16, 2026 · Three new items met the relevance and evidence checks: a peer-reviewed cross-hardware calibration method, an early Wi-Fi object-detection study, and a large but simulation-only wireless scene-reconstruction paper. No material standards or regulatory change in this window met the inclusion threshold. Archive correction: the previous edition incorrectly said IEEE 802.11bi publication approval was pending; the IEEE Standards Association Standards Board approved it on September 25.

01 / NEW · IEEE LCN 2026 proceedings paper · Khamaisi et al. (preprint July 2026) / 2026-10-08

OpenCSI: Self-Calibration Layer for Heterogeneous Mesh Wireless Sensor Networks

Key finding. The OpenCSI paper introduces per-link normalization against each link's own quiet-period variation, with a maturity tag to indicate whether calibration is ready. The IEEE LCN 2026 paper appeared in the proceedings this week; its arXiv preprint predates this edition. Across three rooms and three ESP32 generations, a classifier trained on one setup transferred without retraining in 7 of 8 tested hardware/room cells, with F1 scores of 0.896–0.993. The remaining ESP32-C3 cell failed under compressed signal variation.

Why it matters for Audeamus. Hardware swaps and room changes commonly break CSI models. A self-calibrating feature layer could lower installation and retraining costs for mesh-based occupancy products, with an explicit "not ready" state that can support safer abstention.

Evidence limits. The study covers three rooms and three ESP32 generations, requires a 120-second empty-room bootstrap, and detects binary occupancy only; normalization also removes magnitude information needed to separate still presence from motion. The weakest C3 transfer cell fails, and field validation remains small.

Read in full? Read in full. The cross-hardware transfer addresses a core deployment barrier and the paper makes its calibration failure mode explicit.

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02 / NEW · arXiv preprint · Persson et al. · Swedish Defence Research Agency / 2026-10-13

Concealed Handgun Detection using WiFi Signals

Key finding. The authors introduce WiFireNet, which learns to localize concealed handguns from Wi-Fi CSI using synchronized RGB images as training supervision; deployment inference uses CSI alone. The new WiFire dataset and code are also released. In a controlled two-room study, WiFi-regular CSI reached 47.1% mAP at 50% box overlap and 89.5% recall. Handgun-only AP was 53.8% at the 50% threshold; WiFi-plus results were lower.

Why it matters for Audeamus. The work extends RF inference beyond occupancy and activity to object-level claims, raising both security-screening possibilities and privacy concerns. It also shows that camera-supervised training can produce a camera-free inference system.

Evidence limits. The preprint uses two rooms and a random per-CSI-sample train/test split, which can place near-adjacent samples in both sets and overstate generalization. Object localization remains modest, and there is no validation across unseen people, homes, radio placements, or realistic security settings.

Read in full? Skim. The concept is consequential, but the sample-level split and controlled setup make the headline feasibility result preliminary.

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03 / NEW · arXiv preprint · Yazdnian and Ghasempour / 2026-10-15

Scene Reconstruction Using Ubiquitous Wireless Signals via Diffusion Posterior Inference Over Physics-Grounded Representations

Key finding. The authors combine a physics-grounded wireless foundation model with diffusion-based posterior inference to reconstruct outdoor building footprints from channel measurements and user locations. This is environmental mapping, not human-presence detection. On roughly 700 simulated held-out scenes, the method reports median F1 of 0.655 and median IoU of 0.487. Its training corpus contains over 30 million ray-traced channels across more than 11,000 outdoor environments.

Why it matters for Audeamus. It shows how communication links may reveal physical layout without a dedicated camera or LiDAR sensor, broadening the privacy threat model from tracking people to inferring structures around radio users.

Evidence limits. The evidence is entirely based on Sionna ray-tracing simulations over mapped outdoor buildings; no real-radio field test is reported. The output is a coarse 2D footprint grid at 10-meter resolution, not indoor household layout or occupant presence.

Read in full? Track only. The scene-reconstruction result is technically ambitious, but it is simulated, outdoor, and only indirectly relevant to in-home presence sensing.

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ARCHIVE NOTE

This edition preserves the dated public summary and original citations from Wi-Fi Sensing Review. It has been repackaged for the Audeamus Group archive; the historical claims have not been independently reverified during this formatting pass. No private desk analysis is included.

Original public Wi-Fi Sensing Review

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