AUDEAMUS GROUP, LLC

Wi-Fi Sensing & Privacy Weekly Brief

October 9, 2026 | Historical public-summary edition

HISTORICAL PUBLIC SUMMARY

Wi-Fi sensing models start crossing hardware boundaries

October 2–9, 2026 · Four new papers or analyses met the relevance, date, and evidence checks. The archive also includes the IEEE P802.11bi status item. Correction (October 16): the Standards Association Standards Board had approved P802.11bi for publication on September 25; the earlier text incorrectly said that approval was pending.

01 / NEW · arXiv preprint · Eckhoff et al. / 2026-10-07

UniCSI: Towards a Universal Wi-Fi CSI Encoder for Ubiquitous Human Sensing

Key finding. The UniCSI paper introduces a single encoder that ingests CSI in its native shape across different subcarrier counts, bandwidths, carrier bands, and antenna arrangements. A physics-informed tokenizer locates each subcarrier within the observed spectrum, while a spectral aggregator converts variable-length channel sequences into a fixed-size representation. The corpus covers 25 public datasets and 530.2 hours of recordings. In joint supervised training, UniCSI reaches 71.6% average macro-F1 across eight tests versus 62.4% for the strongest fixed-grid baseline; with five labeled examples per class, pretraining raises average macro-F1 from 17.3% to 43.7%.

Why it matters for Audeamus. Hardware-specific CSI formats are a major barrier to deploying one sensing model across gateway generations and home configurations. Native heterogeneous ingestion could reduce per-device preprocessing, model retraining, and labeled-data requirements, making a common sensing platform commercially more plausible.

Evidence limits. This is an unreviewed preprint assembled from public datasets rather than a prospective deployment. Sampling rates are still normalized to 100 Hz, the model uses only 2.4- and 5-GHz data, training requires roughly 41 GiB of accelerator memory, and comparisons abstract prior ingestion strategies instead of evaluating their published checkpoints under native pipelines.

Read in full? Read in full. Its unusually broad corpus and explicit hardware-heterogeneity design make it the week's most consequential architecture, while the comparison protocol deserves careful scrutiny.

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02 / NEW · arXiv preprint · Wang et al. / 2026-10-05

Trajectory-Guided Tokenization of Complex CSI for Wi-Fi Sensing

Key finding. The paper proposes TGT, a compact CSI representation that separates each subcarrier's local complex center from its short-term trajectory. Motion trajectories guide attention weights, while both center and trajectory information remain available to the classifier. TGT reports 92.83% mean accuracy on a room-disjoint industrial presence dataset, 90.44% on EHUNAM presence detection, and 72.14% on cross-room Widar gesture recognition. With the same lightweight backend, the corresponding strongest baselines reach 86.65%, 74.23%, and 62.20%.

Why it matters for Audeamus. The presence study includes small seated movements plus moving curtains and fans, and separates test rooms from training rooms. That is closer to the nuisance conditions a consumer service must handle than the common same-room random split, while the tokenizer remains small enough to be interesting for edge deployment.

Evidence limits. The 157-GB industrial dataset is self-collected and not released with enough demographic, duration, or home-level detail to assess representativeness. It uses a monostatic three-link, 1,024-subcarrier, 80-MHz setup at 200 Hz; the paper reports window-level accuracy rather than week-long false-alarm rates, quiet-sleeper sensitivity, or performance with pets and multiple occupants.

Read in full? Read in full. It combines a clear representation idea with room-disjoint presence tests and realistic interferers, but its unpublished field dataset limits independent validation.

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03 / NEW · arXiv preprint · Rong et al. / 2026-10-04

WiSPER: Pose-Supervised Predictive and Residual Flow Refinement for Multi-Person 3D Pose Estimation with WiFi CSI

Key finding. WiSPER combines pose-supervised masked pretraining with a conditional residual-flow refiner. The first stage pushes the CSI encoder toward joint localization; the second generates and corrects pose candidates for a variable number of people. On PiW3D, WiSPER reports 63.72-mm overall mean per-joint position error, 40.0% below WiFi-JEPA. Reported error reductions are 42.1% for two people and 38.1% for three people; single-person PCK@0.2 rises from 74.26% to 89.07%.

Why it matters for Audeamus. Multi-person pose is materially more useful—and more privacy-sensitive—than binary motion detection. Better separation of overlapping reflections could support fall monitoring and household interaction services without cameras, while also increasing the fidelity of unauthorized observation.

Evidence limits. All evidence comes from one PiW3D split with seven volunteers and three environments. Training and test frames are different temporal portions of shared recordings, so the study does not establish generalization to new people or homes; results come from individual training runs, person-count accuracy is not measured, and inference latency is unreported.

Read in full? Read in full. The multi-person gain is large and well ablated, but the shared-recording split prevents the headline millimeter errors from being treated as deployment evidence.

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04 / CORRECTION · IEEE 802.11 standards work · TGbi / 2026-09-25

IEEE P802.11bi Enhanced Privacy Protection: Draft 6.0 approved for publication

Key finding. An IEEE 802.11 Working Group reflector message dated September 25 confirms that the Standards Association Standards Board approved P802.11bi for publication. The TGbi page agrees; the working-group homepage still showed stale text saying approval was pending. Approval for publication does not mean the amendment was already published.

Why it matters for Audeamus. P802.11bi is intended to add MAC-layer mechanisms addressing location, movement, contact, activity, tracking, and profiling risks that ordinary 802.11 compliance does not sufficiently prevent. Reaching the publication stage turns several years of privacy work into a near-term implementation and certification question for chipset and device vendors.

Evidence limits. The amendment had been approved for publication but was not yet published in the sources checked for this correction. The normative text was therefore unavailable for assessing defaults, interoperability, certification, or consumer-facing controls. Its MAC-layer privacy scope does not itself establish consent rules for device-free sensing or derived presence and pose data.

Read in full? Track only. The milestone is commercially important, but implementation analysis should wait for the final amendment and vendor adoption details.

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05 / NEW · Technical tutorial and standards analysis · Wilhelmi et al. / 2026-10-06

IEEE 802.11bx – WLAN Intelligent Networking: Toward an AI-Ready Wi-Fi 9

Key finding. The tutorial synthesizes early IEEE work around Wi-Fi 9 into three roles for AI: improving PHY/MAC operation, turning access points into compute platforms, and handling AI-specific traffic. It treats sensing inference as a candidate workload for access-point offload and maps the idea to current study-group activity and emerging AI-capable gateway silicon.

Why it matters for Audeamus. If access points advertise and execute sensing models, commercialization can shift from dedicated sensing appliances toward gateway-hosted services. Standardized service discovery, compute negotiation, mutual trust, and resource allocation could become as important as the sensing algorithm itself.

Evidence limits. This is an author tutorial, not adopted 802.11bx text; the project authorization request is still expected in 2027. The sensing discussion is illustrative, the quantitative case study concerns simulated AI traffic prioritization rather than sensing accuracy, and privacy is not developed into a consumer-control architecture.

Read in full? Skim. Read the sensing and AI-offload sections for the commercial roadmap, but treat every Wi-Fi 9 feature as a candidate rather than a commitment.

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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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