

BRENDEN TENNANT

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PRINCIPAL ENGINEER: R&D, REAL-TIME SYSTEMS, AR AND SENSOR FUSION

Architect of the systems layers other engineers build on: game engines, kernels, cross-platform audio stacks, memory and threading systems, and real-time AR tracking. Founded the R&D function at Overmatch and owned the physical object tracking behind FATS AR, the augmented-reality training product now sold through Inveris Training Solutions. That tracking is the capability the product depends on.

TECHNICAL LEADERSHIP

- Technical gatekeeper for engine systems at two studios. Set the coding standards for memory, threading, file I/O, audio, and asset conditioning, then personally reviewed the work written against them.
- Owned the platform layer at Gearbox and at Paradigm. Every other engineer in those studios built on top of it.
- Ran a company's entire R&D function single-handed, carrying open questions through to working systems and deciding on evidence what earned development resources. Mentored engineers across three shipped projects at Terminal Reality.

TECHNICAL FOCUS

Sensor Fusion & Tracking: OptiTrack optical motion capture, rigid-body tracking, extrinsic calibration, coordinate-frame transformation, motion compensation and prediction, thermal imaging, stereo cameras, real-time instrumentation

AR / XR: Magic Leap 2 and Magic Leap 1, head-mounted sensor arrays, AR object registration, dynamic occlusion, shared co-located AR sessions

Systems & Performance: Engine and runtime architecture from scratch, custom allocators and fragmentation control, threading primitives, background streaming, real-time codecs, cross-platform abstraction, SIMD via SSE/AVX/VMX

Hardware & Embedded: Microcontroller firmware, sensor instrumentation, custom peripherals, breadboard-to-PCB prototyping, mechanical design in Autodesk Fusion, CNC and additive fabrication, full-stack hardware-to-software platforms

Languages & Tooling: C, C++, managed C++, C#, x86 and MIPS assembly; Unreal Engine 4, Unity, WPF and Windows Forms tool frameworks, Visual Studio build and platform integration

AI-Assisted Development: Agentic coding tools adopted as a working method rather than an experiment, integrated into daily engineering practice

EXPERIENCE

Principal Software Engineer (R&D and Prototyping) — Overmatch

2021 – 2026

- Owned physical object tracking for FATS AR. Designed successive OptiTrack head-mounted camera rigs, then wrote the micro-PC software that consumed OptiTrack rigid-body output, applied the camera-rig extrinsics, and transformed it into headset space for motion compensation and prediction on-headset. It is the system that makes tracking a physically held object inside an AR scenario possible.
- Because that transform stage ran off-headset rather than on the device, the later Magic Leap 1 to Magic Leap 2 platform transition was largely transparent.
- Architected and built OM Gadgets, a full-stack platform for instrumenting and tracking physical objects in real time, covering hardware, firmware, and software end to end.
- Designed prototype sensing devices and their firmware, including a door-angle sensor that let virtual entities be occluded correctly behind a real door as it swung. That is dynamic occlusion against a moving physical object, which static spatial mapping does not solve.
- Ran a build-at-home, iterate-in-office hardware cycle that kept fabrication and rework off the team's critical path.

Lead Software Engineer — Magic Leap Horizons

2018 – 2021

Magic Leap's defense-focused arm, formed to pursue U.S. military AR programs.

- Led prototype development on the team bidding the U.S. Army IVAS program, building headset augmentations on the Magic Leap 1 platform.
- Delivered high-precision object tracking, custom peripheral input devices, and AR scenario systems for military training.
- Integrated thermal imaging into Magic Leap's AR stack and authored a physical object tracking library for registering real-world objects into AR.
- Solved shared co-located AR, a single session across multiple headsets in one physical space, which is a distributed state and spatial-alignment problem.

Programmer — Robot Entertainment

2016 – 2018

- Owned UI and level management on an unreleased Unity project, including an MVVM UI framework layered over Unity's own UI system.
- Designed a first-person procedural level generation system in Unreal Engine 4; supported tools and production on Orcs Must Die: Unchained.

Programmer (Platform Specialist) — Gearbox Software

2013 – 2016

- Owned the studio-wide low-level library suite: platform abstraction, memory management, threading primitives, debug networking, containers, concurrent processing, and unit testing.
- Replaced memory management on Battleborn with a custom allocator that cut fragmentation and improved processing performance, and delivered a tool suite for inspecting high-volume gameplay event streams.

Principal Programmer — Terminal Reality

2009 – 2012

- Designed and implemented a real-time video codec from scratch that compressed camera-peripheral video live during gameplay, plus the complete audio processing pipeline for Def Jam Rapstar, covering effects, signal analysis, and microphone analysis for scoring.
- Owned the Rancor Rampage mode of Kinect: Star Wars. Fully destructible levels driven by a cause-and-effect event-chain scoring system, under hard memory and performance budgets.
- Delivered a full PlayStation 3 platform implementation, integrated tools and build processes into Visual Studio, and owned the Wii U port and performance optimization of The Walking Dead: Survival Instinct.

Senior Software Engineer III — Paradigm Entertainment (THQ)

1998 – 2009

- Architected the technology engine's systems layers from scratch (memory, threading, file I/O, background streaming, audio, hardware-accelerated math, asset conditioning, and the profiling and debugging toolchain), along with the pluggable DCC conversion pipeline, asset database, and level editor implemented in .NET. Contributed to the graphics layer in an optimization capacity.
- Designed the memory allocator at the base of it, with pointer-sized overhead, O(1) behavior on most operations, and fragmentation held down across a decade of shipping titles.
- Replaced the SGI/Nintendo N64 audio stack with a custom implementation that cut the audio memory footprint from roughly 400 KB to 28 KB, and designed a PlayStation 2 audio compression format achieving 5:1 compression at 7 clock cycles per sample to decompress on the IOP.
- Drove memory, shader, and CPU optimization across Stuntman: Ignition, BattleZone, Terminator 3, and Mission: Impossible — Operation Surma, including collision routines rewritten in Xbox assembly for a 100x speedup and VU microcode optimization on PS2.

Software Engineer — Paradigm Simulation

1997 – 1998

- Maintained AudioWorks2, a real-time audio simulation product, and completed a tank simulator built for Krauss-Maffei, the German defense manufacturer.

INDEPENDENT ENGINEERING

Surreal is a personal C#/.NET framework in continuous development since 2021, spanning audio, graphics, concurrency, networking, and tooling.

- Plugin runtime with hot reload on collectible assembly load contexts: assemblies byte-loaded so files never lock, generation-based compile-before-swap so a failed build cannot dislodge the running generation, and a teardown ledger that traces a context refusing to unload back to the binding pinning it.
- DAW-class audio stack: ASIO, VST3 and CLAP plugin hosting, HRTF and spatial rendering, MIDI 2.0, OSC control surfaces, synthesis and voicing. The largest subsystem in the framework, at 36 of its 200-odd projects.
- Home lab: mechanical design in Autodesk Fusion, 3D printing, a self-built CNC machine, an electronics bench, and microcontroller development boards. Used in production at Overmatch, where hardware was built and validated here before office iteration. Current build: a pinball machine from scratch.

SELECTED WORK

Programs & Titles: FATS AR object tracking (Inveris Training Solutions, Magic Leap 1 and 2) · OM Gadgets real-time instrumentation platform · U.S. Army IVAS program bid prototype · Krauss-Maffei tank simulator · AudioWorks2 audio simulation · Battleborn · Borderlands: The Handsome Collection and Pre-Sequel · The Walking Dead: Survival Instinct · Kinect: Star Wars · Def Jam Rapstar · Stuntman: Ignition

Platforms: Magic Leap 2 and Magic Leap 1 · embedded micro-PC and microcontroller · Windows · PlayStation 4, 3, and 2 · Xbox One, Xbox 360, and Xbox · Wii U, GameCube, and Nintendo 64