

— SYSTEM ARCHITECTURE

The Vehicle Lab Suite

An integrated, local-first engineering ecosystem uniting seven specialized instruments for ECU calibration, measurement, and diagnostics.

7 Integrated Instruments

MDF4 · A2L · UDS · MCP

Zero Cloud Dependency

Local-First & Air-Gapped

Automotive toolchains are fragmented and license-locked.

ECU software, calibration, and test teams routinely operate isolated desktop applications that complicate multi-team collaboration.

DATA FRAGMENTATION

Incompatible Formats

Measurement traces, calibration datasets, and diagnostic fault memory live in incompatible proprietary silos, requiring manual export and conversion steps.

INFRASTRUCTURE OVERHEAD

Node-Locked Dongles

Legacy tools bind engineering seats to expensive USB hardware dongles and centralized corporate floating license daemons that fail in remote test environments.

AUTOMATION BARRIERS

Closed Scripting Walls

Proprietary automation interfaces prevent calibration pipelines from directly collaborating with modern AI agent runtimes and continuous test suites.

An on-premise ecosystem from measurement to release.

The Vehicle Lab suite replaces disparate desktop tools with seven focused instruments designed around open automotive standards.

MEASUREMENT & CALIBRATION

Telemetry, DoE & Lifecycle Management

MDX indexes multi-gigabyte MDF4/BLF traces with oscilloscope precision. CIE Pro optimizes dyno test plans with physics-informed surrogate models. HELIX coordinates calibration datasets and semantic 3-way merges.

DIAGNOSTICS & AGENT WORKSPACE

Hex Editing, AI Reasoning & Execution

Hexx decodes flash memory into physical 3D maps. DiagAI isolates vehicle faults via 8 specialist protocol agents. XHandbook navigates ECU function containers. Orbis provides an agentic workspace with human approval gates.

Modular Adoption: Every instrument functions independently as a standalone tool or interoperates across local APIs and the Model Context Protocol.

— SEVEN SPECIALIZED TOOLS

The seven instruments of the Vehicle Lab suite.

INSTRUMENT	PRIMARY ENGINEERING DOMAIN	SUPPORTED FILE STANDARDS	DEPLOYMENT MODEL
MDX	MDF4 telemetry, bus logging, oscilloscope inspection & MCP	MDF3/4, BLF, ASC, CSV, DBC, ARXML	Local desktop (Tauri)
CIE Pro	Model-based calibration, space-filling DoE & Bayesian optimization	A2L, CDF, HEX, CSV	Desktop / On-premise
HELIX	Calibration dataset governance, 3-way merge & release control	A2L, HEX, S19, DCM, CDFX, PAC0	On-premise server / Desktop
Hexx	A2L-aware binary editor, 3D map editing & checksum calculation	Intel HEX, S19/S37, BIN, A2L	Local desktop (Tauri)
DiagAI	Multi-agent diagnostic reasoning & fault code isolation	ISO 14229 UDS, OBD-II, J1939, MDF4	On-premise / Local LLM
XHandbook	Interactive ECU function documentation & KAOM model navigation	.ehb, .ehbencrypt, .ehbp, A2L	Local desktop (Tauri)
Orbis	Agentic engineering workspace with human diff approval gates	A2L, MDF4, scripts, MCP	Local desktop (PTY)

Built directly on open automotive standards.

The suite communicates using open industry formats without requiring proprietary database conversions.

MEASUREMENT & BUS

ASAM MDF4 & Vector Logs

Direct parsing of MDF v3/v4 binaries, Vector BLF, and ASCII traces with CAN DBC and AUTOSAR ARXML network descriptions.

CALIBRATION & FLASH

ASAP2 (A2L) & Intel HEX

Full support for ASAM MCD-2 MC descriptions, Intel HEX, Motorola S19, and DCM/CDFX/PACO calibration patch exchange packages.

DIAGNOSTICS & AGENTS

ISO 14229 UDS & MCP

Standardized diagnostic service structures paired with the Model Context Protocol for deterministic AI assistant integration.

Local-first architecture and air-gapped security.

Every byte of proprietary measurement and calibration telemetry stays inside your facility.

DESKTOP ISOLATION

Zero Cloud Telemetry

Desktop applications run as native binaries compiled with Tauri. They contain no telemetry trackers, no phone-home mechanisms, and require no license servers to run in air-gapped test cells.

ON-PREMISE AI

Local LLM Routing & RAG

DiagAI and Orbis interface with local inference runtimes (Ollama, LM Studio) running models such as DeepSeek. Each organization's knowledge index is strictly segregated on private infrastructure.

Data Residency Guarantee: All processing occurs on local loopback (127.0.0.1) or internal networks. Zero telemetry is sent outside your organizational firewall.

What we do not claim.

Accurate technical evaluation requires clear operational boundaries.

NOT A HARDWARE OEM

No Proprietary Hardware Lock

Vehicle Lab builds software. We do not manufacture physical bus interface boxes, dyno load banks, or proprietary CAN transceivers.

NO AUTONOMOUS SIGN-OFF

Human Review Required

While our tools accelerate analysis and generate DoE models, we do not certify regulatory type approval or functional safety compliance without human engineering sign-off.

NO LIVE ECU FLASHING

Separation of Tool Roles

Our tools produce verified datasets, hex patches, and calibration releases; physical in-vehicle bootloader flashing is handled by your approved hardware flash drivers.

COMMERCIAL MATURITY

Pre-Revenue & In Pilot

We are a focused engineering team in pilot with selected OEM and Tier-1 teams. We do not claim universal industry dominance or thousands of legacy seats.

How to evaluate the Vehicle Lab suite.

We invite engineering teams to test standalone instruments against representative internal datasets.

STEP 1

Standalone Tool Trial

Evaluate MDX, Hexx, or XHandbook on your local workstations. Verify offline performance and format parsing against real logs.

STEP 2

Test Cell Integration

Pilot CIE Pro or DiagAI in your dynamometer or diagnostic test environments with local model routing and DoE workflows.

STEP 3

Release Governance

Test HELIX calibration dataset merges and validation gates against historical multi-variant calibration packages.

TECHNICAL ACCESS & DEMOS

Contact Vehicle Lab Engineering Team

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