

VEHICLE SYSTEMS LAB

Research & Systems Portfolio 2026

Building auditable
intelligence for complex
worlds.

Independent architectures · simulations · evidence · human
review

SEPTEMBER 2026

vehiclesystemslab.com



SCIENCE · RESPONSIBILITY · PASSION

One laboratory. One coherent research architecture.

VSL treats software, data, autonomy, physical systems and human interaction as parts of the same auditable systems problem.

The question behind the portfolio

Can a complex system remain observable, testable and reviewable while it grows across domains?



STRUCTURE

Finite layers, nodes, attractors and explicit interfaces keep complexity legible.



EVIDENCE

Claims are separated from inference, hypothesis and unknowns; experiments remain falsifiable.



CONTROL

Human review, authorization boundaries and recovery paths are designed into high-stakes actions.



TRANSFER

One architecture can produce specialized research lines without pretending every domain is the same.

PUBLIC RESPONSIBILITY COMMITMENT

25% of attributable positive net profit from large-enterprise clients · 7% from other clients · funded from VSL resources, not as a customer surcharge.

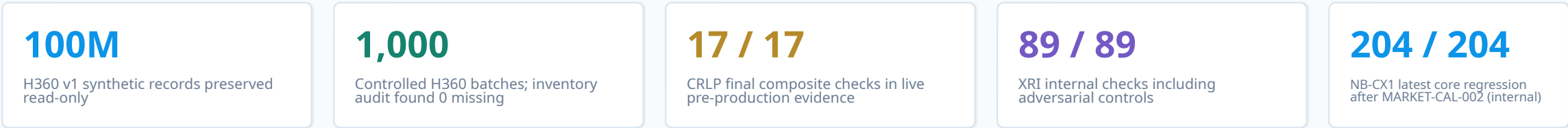
The VSL portfolio

Projects are grouped by function, not by marketing category. Status labels show what is public, internal, experimental or conceptual.

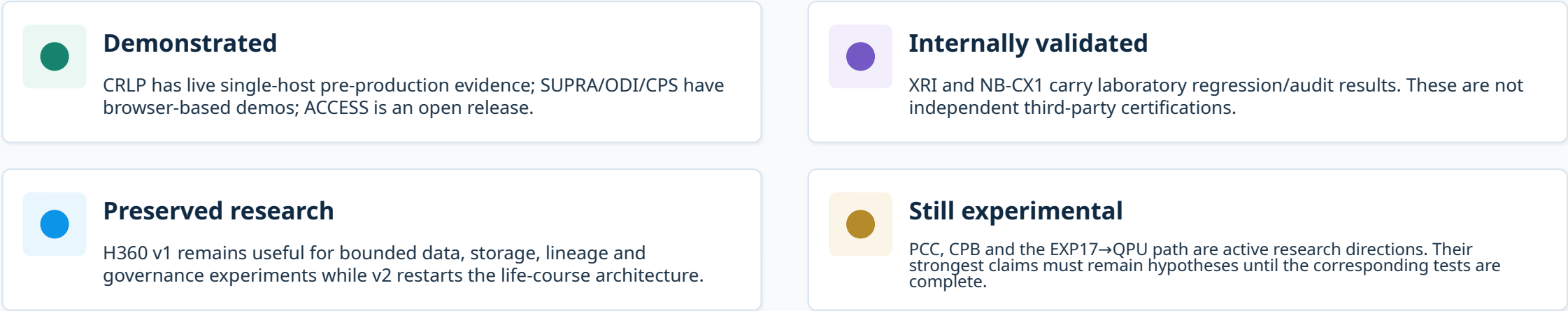


Evidence snapshot

A portfolio is credible only when scale, validation and limitations are visible at the same time.



What these numbers do - and do not - mean



Ambition without inflated claims

Every project is presented at its actual evidence level. This is part of the product, not a disclaimer added later.

WHAT WE CAN SAY



H360

Synthetic data architecture; not real persons, sentience or clinical validity.



CRLP

Pre-production single-host evidence; not production certification or enterprise-wide no-bypass proof.



XRI

Path-dependent acquired state; not a claim of consciousness.

WHAT WE WILL NOT SAY



EXP17 / QPU

Quantum execution is a research instrument; not proof of extra physical dimensions.



PCC / CPB

Architecture and research programs in development; not deployed infrastructure.



NVIDIA / cloud

Program membership and technology use do not imply provider endorsement or validation.

Truth before appearance. Evidence before narrative.

01 MADRE

ACTIVE RESEARCH

Core architecture for complex systems.

Not a chatbot. A living structural architecture from which specialized VSL systems inherit logic, coherence and purpose.

WHY IT MATTERS

Complex systems fragment when every project invents its own ontology, controls and evidence model. MADRE is the common structural spine.

EVIDENCE / STATE

Public architecture defines the Mother Cube, knowledge layers, nodes/attractors, contractors, E.I.A.R.(V) and informational mitosis. Demo remains intentionally behind research consolidation.

NEXT

Consolidate the training structure, formal diagrams and inheritance model; then demonstrate project separation and auditability.

vehiclesystemslab.com/vehicle-madre.html



02 H360 / Synthetic Humans

PUBLIC / ACTIVE

Governed synthetic populations for testing before real-world spend.

Structured synthetic humans are useful when they remain data - unique, governed, traceable and explicitly bounded.

WHY IT MATTERS

Organizations need safe pre-deployment experiments for products, campaigns, software and scenarios without exposing real-person data.

EVIDENCE / STATE

Public offering supports synthetic identities with lineage, controlled behavioral variation and market experiments. H360 v1 infrastructure scaled to 100M records; v2 rebuilds life-course coherence from Human 1.

NEXT

Turn synthetic lives into longitudinal, auditable systems whose biography, territory, work, memory and economy evolve coherently over time.

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SYNTHETIC POPULATION / GOVERNED IDENTITIES

**MARIA-001**trust
memory

synthetic-only

**DIEGO-014**avoidance
context

synthetic-only

**SOFIA-083**coping
history

synthetic-only

**NOAH-211**lineage
pressure

synthetic-only

**AISHA-404**identity
variation

synthetic-only

**LUCAS-877**governance
audit

synthetic-only

DATA → IDENTITY → HISTORY → DECISION TEST

03 MADRE-H360

SCIENTIFIC
TRANSITION

From population-scale engineering to life-course architecture.

H360 v1 proved the population engine. H360 v2 restarts the generative order so scale follows coherent lives - not the reverse.

WHY IT MATTERS

Scaling inconsistent layers can produce a larger system without producing a truer one. VSL preserved v1 instead of protecting sunk cost.

EVIDENCE / STATE

100M records preserved read-only · 1,000 controlled batches · 0 missing in inventory audit · lineage, manifests, hashes and cloud storage retained.

NEXT

Build Human 1 with coherent biography and causal order; validate; only then reconstruct population scale.

vehiclesystemslab.com/madre-h360-accelerated-computing.html



TRUTH BEFORE SUNK COST

The preserved v1 population remains useful for bounded infrastructure, lineage and governance research.

04 CRLP

DEMONSTRATED

Commitment, Containment and Recovery Layer.

No valid commit permit. No external effect.

WHY IT MATTERS

AI safety controls are incomplete if the final database change, payment, message, deployment or physical action can bypass authorization at commitment time.

EVIDENCE / STATE

Live pre-production AWS evidence: 17/17 final composite checks · 2 audited LOAD/UNLOAD runs · 9/9 host-network cases · 67/67 evidence artifacts.

NEXT

Move from single-host demonstration toward runtime-native enforcement, independent key custody, distributed federation and no-bypass coverage.

vehiclesystemslab.com/crlp/



05 NIRVANA-BORDA / NB-CX1

INTERNAL VALIDATION

Cognitive architecture, calibration and internal audit.

A cognitive core should be judged by what survives adversarial calibration and full regression - not by how intelligent a demo looks.

WHY IT MATTERS

Agentic systems can become persuasive before they become reliable. NB-CX1 focuses on calibration, failure detection, auditability and controlled state evolution.

EVIDENCE / STATE

Latest internal core regression after MARKET-CAL-002: 204/204 tests passing. XRI-006I durability work closed with integrated core regression pass.

NEXT

Continue the architecture from the last validated checkpoint; preserve rollback, ledgered changes and regression discipline before new capability.



06 VSL-XRI

Intrinsic Instantiation research.

FROZEN RESEARCH
LINE

**Experience becomes acquired state;
what comes next can change
because the system has lived
through a different trajectory.**

WHY IT MATTERS

Memory alone does not guarantee functional consequence. XRI investigates path dependence while keeping observed facts separate from future possibilities.

EVIDENCE / STATE

Seven staged experiments frozen after internal audit ·
80/80 main checks · 9/9 adversarial controls · 89/89
total internal checks.

NEXT

Integrate only the mechanisms that survived the frozen line into later VSL architectures without reopening or rewriting the evidence record.

vehiclesystemslab.com/xri/



07 EXP17 / ERC → QPU

ACTIVE RESEARCH

Geophysics, finite representation and quantum validation.

If a complex physical dynamic admits a stable finite representation, increasing representational capacity should eventually stop adding structural predictive information.

WHY IT MATTERS

EXP17 links a geophysical structure previously subjected to extensive classical falsification testing to a QPU question without using the quantum computer to manufacture the hypothesis.

EVIDENCE / STATE

RUN001 forensic audit retained 122,880 QPU shots with controlled identity, wrong-target, random-SO(5), leakage and global-operator checks. The research anchor remains EXP17.

NEXT

Test representational closure and persistence on QPU while preserving the distinction between mathematical structure, physical evidence and interpretation.



08 PCC

Physical Cognitive Computer.

CONCEPT
DEVELOPMENT

A standalone cognitive computer should be a physical system whose compute, memory, interconnect, power and cooling are designed as one replaceable organism.

WHY IT MATTERS

Current AI infrastructure is powerful but externally dependent, difficult to inspect as a whole and rarely designed around long-lived modular sovereignty.

EVIDENCE / STATE

Design target: ~20×20 cm, ≤5 kg, modular “organs,” wireless charging, manual shutdown, satellite-first connectivity and multi-cube lattice behavior. No physical prototype is claimed yet.

NEXT

Define EXP-PCC-000: thermal, power, mass, interconnect and serviceability constraints; then build the smallest physical demonstrator before scaling the concept.



09

CPB / Cryptographic Provenance Bureau

Proof without possession.

PHASE 0

Prove the history of digital content without forcing the bureau to possess the content itself.

WHY IT MATTERS

Centralized provenance systems create privacy, custody and concentration risks when proof requires uploading the underlying material.

EVIDENCE / STATE

Genesis principle frozen: content remains with the user; CPB receives cryptographic evidence. Architecture must preserve crypto-agility rather than depend rigidly on one signature scheme.

NEXT

Phase 0: threat model, prior art, competitive landscape and use-case selection; then define the smallest verifiable proof protocol.



10 SUPRA

PUBLIC DEMO

Structural autonomy for extreme multi-agent environments.

Autonomy is safer when every recovery decision can be explained as a relation between assets, terrain and mission pressure.

WHY IT MATTERS

A collection of individually healthy agents can still form a fragile mission system. SUPRA measures systemic tension, not just component status.

EVIDENCE / STATE

Public lunar demo models 4 rovers, T(X) relational tension, A0-A6 operational regimes and recovery sequencing with human-readable logic.

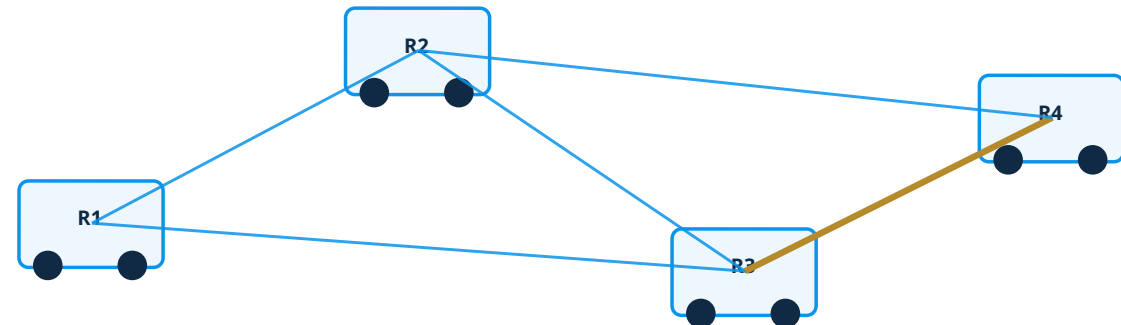
NEXT

Extend the same auditable resilience layer from lunar robotics into other high-stakes multi-asset environments.

vehiclesystemslab.com/vehicle-supra.html

T(X) = relational mission tension

A0 A1 A2 A3 A4 A5 A6



Readable regime assignment · crisis path · recovery priority

11 ODI

Orbital debris intelligence and responsibility.

PUBLIC DEMO + PAPER

Orbital safety needs both a removal priority and an auditable responsibility model.

WHY IT MATTERS

Tracking debris is not the same as deciding what to remove first, why, under whose responsibility and within what civil legal framework.

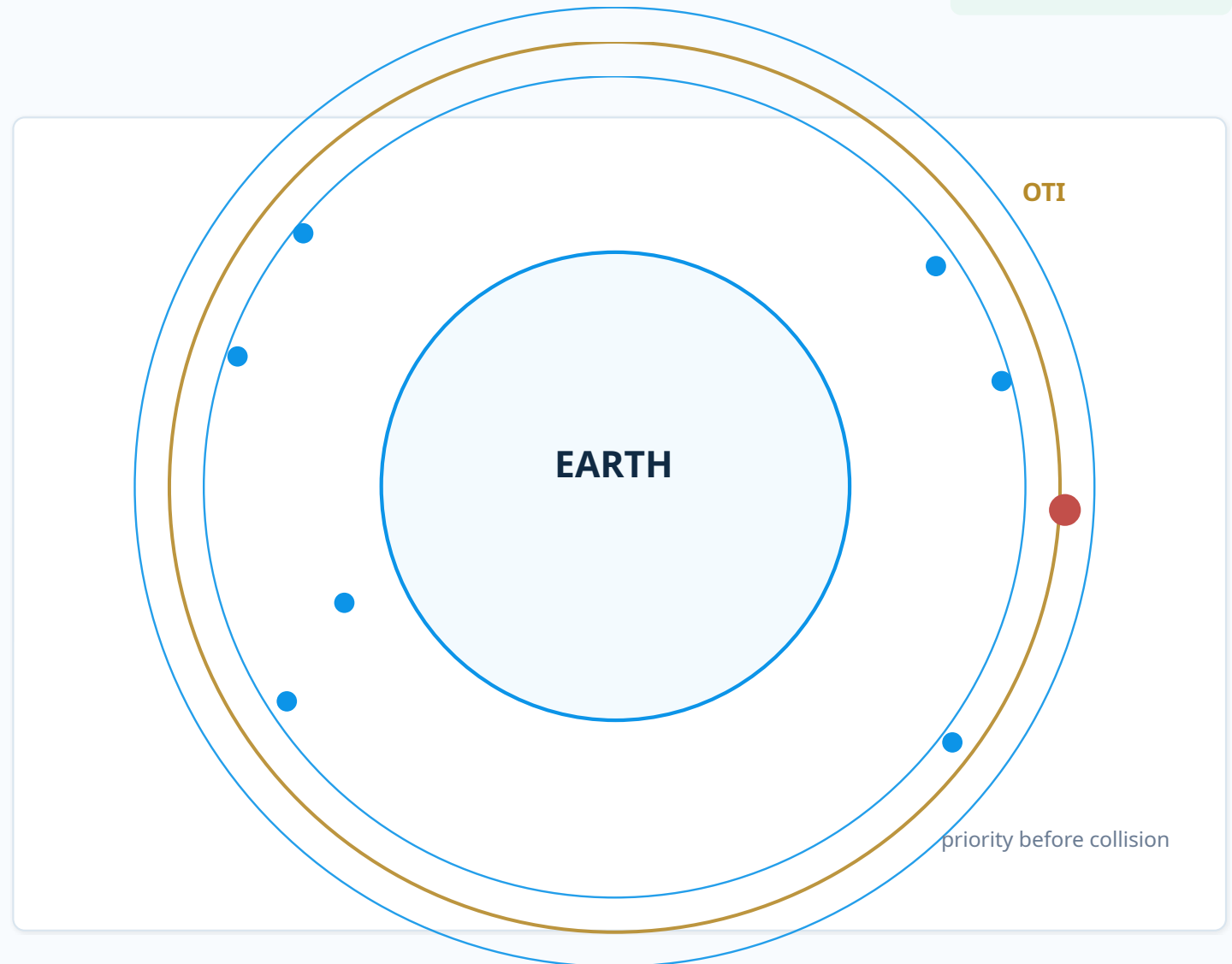
EVIDENCE / STATE

Public decision surface simulates 280+ orbital objects across six bands and computes an Orbital Tension Index. A responsibility paper proposes forensic attribution and a civil removal-fund framework.

NEXT

Strengthen orbital data ingestion, validation and policy review while preserving a non-offensive, traceable decision doctrine.

vehiclesystemslab.com/vehicle-odi.html



12 CPS

Cyber-physical protection systems.

PUBLIC SIMULATION

Measure systemic fragility before collapse; keep humans in the authorization loop.

WHY IT MATTERS

Physical risk emerges from relations among infrastructure, people, sensors and response capacity - not from a single alarm stream.

EVIDENCE / STATE

Public architecture defines P0-P6 protection regimes, T(X) systemic tension, a V_op priority operator and UWB/BLE sensing concepts with human supervision.

NEXT

Move from command simulation toward bounded physical pilots with explicit sensing accuracy, false-positive and intervention constraints.

vehiclesystemslab.com/vehicle-cps.html



13 ACCESS

[OPEN RELEASE v0.2](#)

Verification before AI output.

Fluent is not the same as accurate. ACCESS inserts a compact reasoning checkpoint before a system produces its final answer.

WHY IT MATTERS

AI systems can sound certain when evidence is incomplete. The risk is especially high in legal, medical, strategic and institutional contexts.

EVIDENCE / STATE

Free CC BY 4.0 package includes a response contract, ethics layer, llms.txt, integration example, validation tests and citation files. No live web dependency is required.

NEXT

Measure the effect of the checkpoint across real deployments; keep the free layer simple while offering documented institutional integration.

vehiclesystemslab.com/vehicle-access.html

- ✓ Evidence?
- ✓ Inference?
- ✓ Unknown?
- ✓ Invented certainty?
- ✓ Ethical risk?
- ✓ User pressure?
- ✓ **Revise?**

FINAL OUTPUT

**EVIDENCE
INFERENCE
UNKNOWN**

revise before responding if a gate fails

14 TensionCup Pro

CLOSED 2026 LAB

Structural operators in high-performance sport.

Do not predict goals. Measure where relational tension is most likely to break the game.

WHY IT MATTERS

Sports prediction is easy to overfit after the result. TensionCup forces pre-match sealing and post-match verification against an external record.

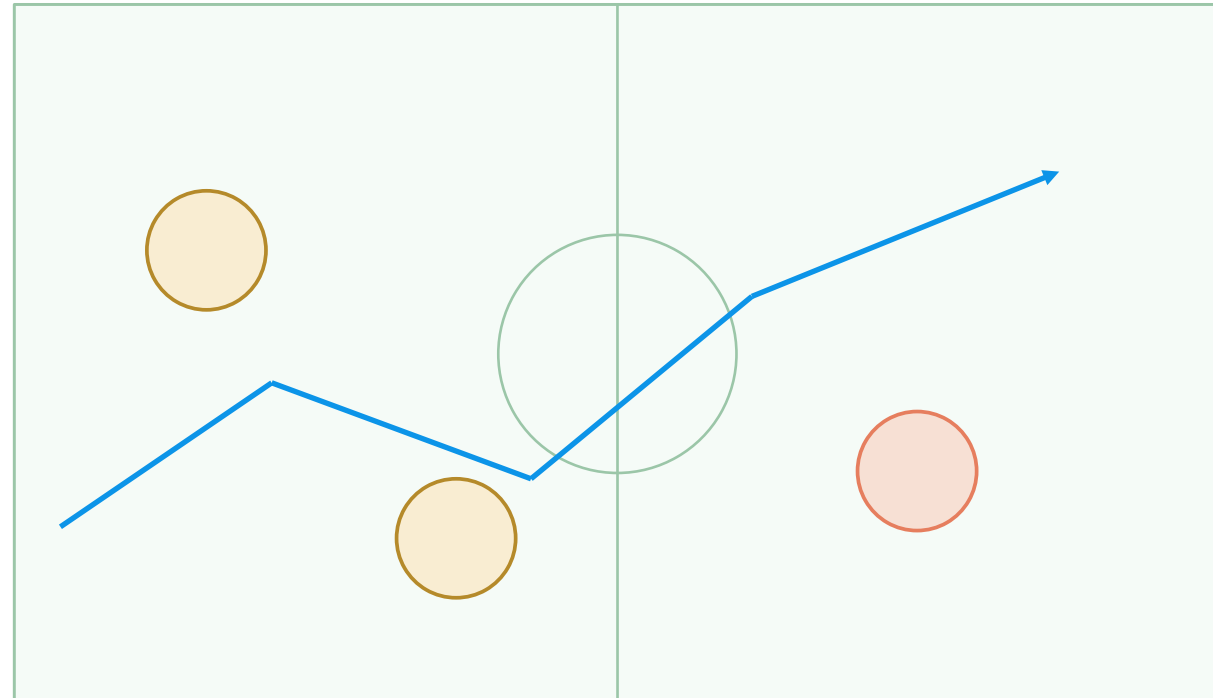
EVIDENCE / STATE

2026 lab archived with SHA-256-sealed certificates, FIFA post-match verification and a falsifiable Zenodo path. Public site reports 4/4 quarterfinal zone hits and 84% round-of-16 zone accuracy.

NEXT

Preserve the 2026 archive as a closed falsifiable experiment; redesign the next cycle before 2030 rather than retrofitting the old one.

vehiclesystemslab.com/tensioncup/



SEALED BEFORE KICKOFF → VERIFIED AFTER MATCH

15 AuraViva

ACTIVE PROTOTYPE

Emotional AI, avatar interaction and cognitive play.

A digital companion can be playful and emotionally expressive without pretending to be therapy or replacing human relationships.

WHY IT MATTERS

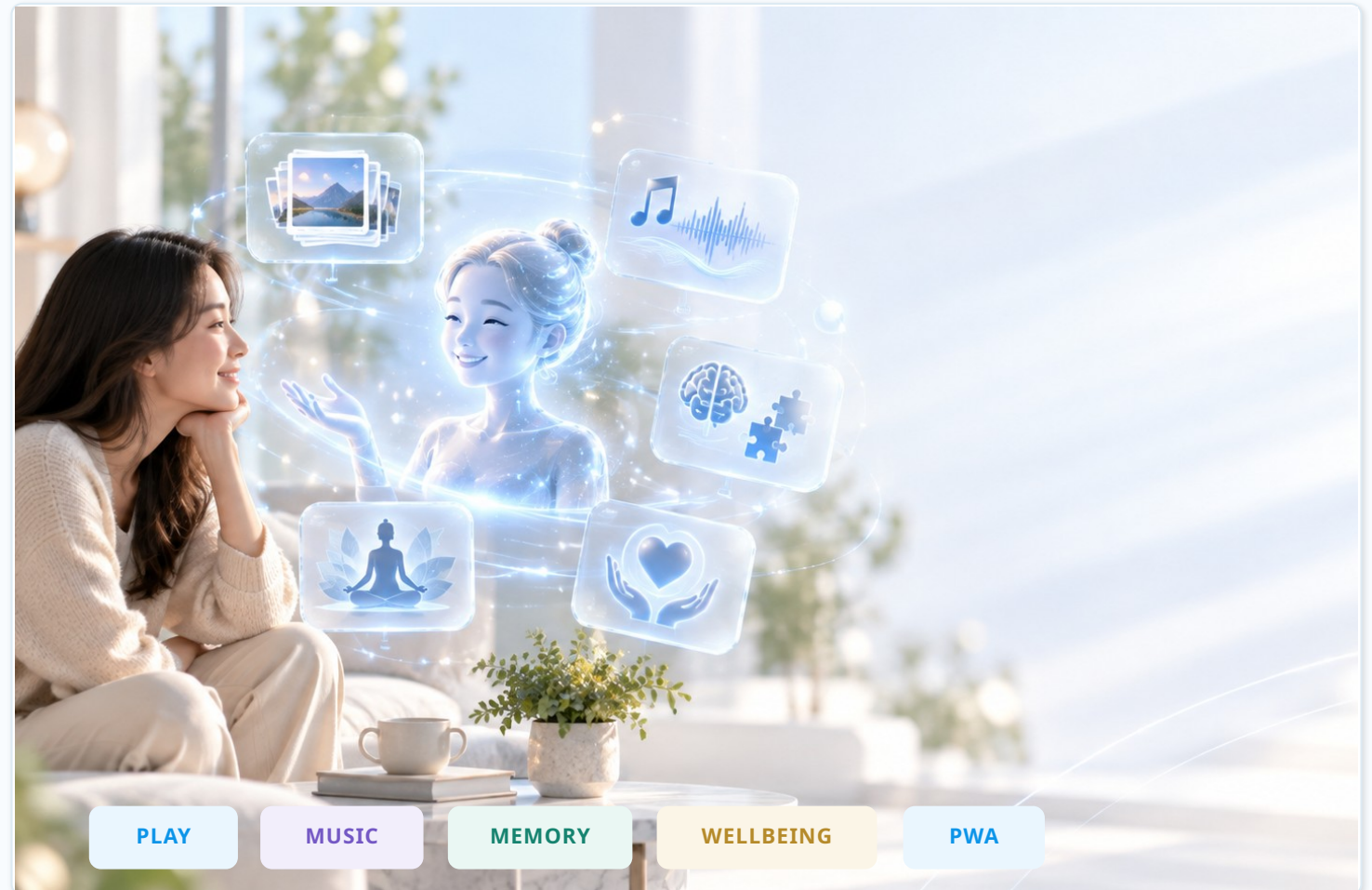
Most AI interfaces optimize conversation, not long-term engagement, embodied play, music, memory and safe emotional interaction.

EVIDENCE / STATE

Web/PWA prototype with avatar states, Auren communication, cognitive games, music/wellbeing activities and a growing free avatar catalog. Current work focuses on interaction quality and visual fidelity.

NEXT

Integrate the 14-avatar free catalog progressively; improve motion, state transitions, market/game loops and age-appropriate safety before monetization.



16 H360 Mobile / Commerce

INTERNAL PROTOTYPE

Economic workflows tested against real operational constraints.

Synthetic-market intelligence becomes more valuable when it can connect to real catalog, authorization, payment and fulfillment workflows.

WHY IT MATTERS

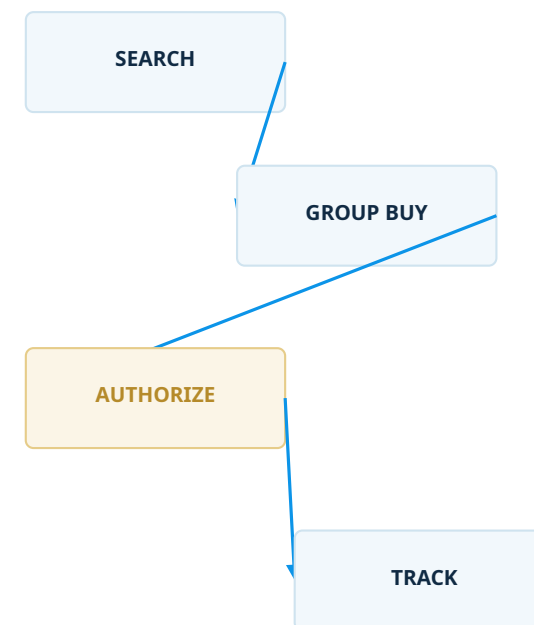
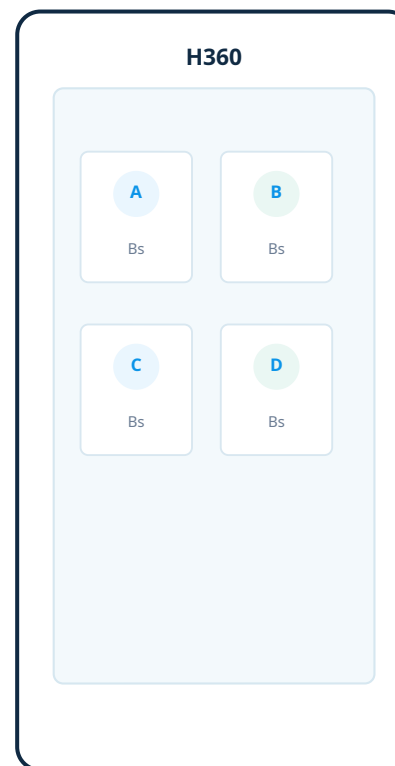
A recommendation engine is not a business system until its order states, concurrency, QR/payment path, group buying and operations surfaces survive real workflow tests.

EVIDENCE / STATE

Local mobile stack has buyer flow, checkout/authorization/tracking routes, Postgres concurrency tests and group-purchase logic. Current work is still prototype and integration focused.

NEXT

Complete reliable payment/QR integration, producer onboarding, product data governance and operational monitoring before public scale.



real catalog · authorization · payment · fulfillment

17 HÉROE FALLADO

IN DEVELOPMENT

AI-assisted feature film as a long-horizon human project.

Technology should also be capable of carrying memory, family, music, loss and second chances - not only infrastructure.

WHY IT MATTERS

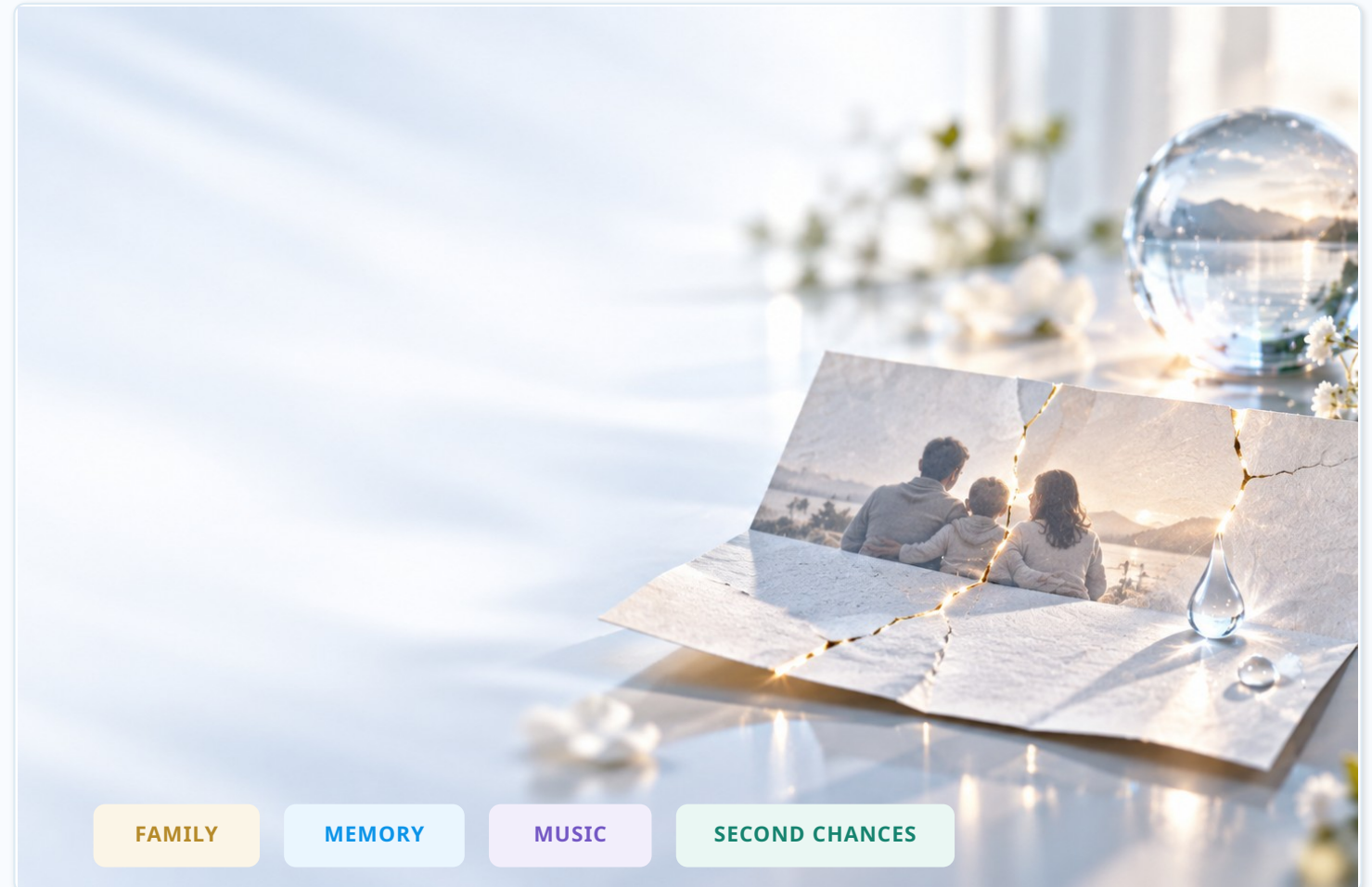
VSL is testing whether disciplined AI-assisted production can sustain emotional continuity across a feature-length work without flattening human authorship.

EVIDENCE / STATE

~90-minute, 1080p feature in development · 54-scene structural skeleton · reversible narrative constraints · scene-by-scene production planned over ~1 year.

NEXT

Finish screenplay refinement, continuity bible and scene pairing; then produce and audit the film progressively rather than generating the feature in one pass.



Research pipeline

Some lines are public, some remain non-public, and some exist only as future experimental directions.



DENGUE

Public-health relations among climate, territory, mobility and institutional response.



HUNGER

Humanitarian resource allocation across food, logistics, vulnerability and crisis.



WATER

Transboundary water governance across territory, agriculture, industry and climate.



TIPPING

Planetary tipping-point analysis across environmental and geophysical tensions.



Teddy

Child-safe, privacy-conscious educational companion direction.



PROTECTED RESEARCH

Non-public institutional research remains under confidentiality, access control and ethical review.

Research pipeline rule

Create independently → test → falsify → compare with prior art → integrate only what survives.

Protected work remains non-public: the deck names the research direction without disclosing protected mechanisms or sensitive operational detail.

Technology ecosystems in current VSL work

Use does not equal endorsement. Membership does not equal certification. Every relationship is described at its actual level.



NVIDIA

Inception program member
Company membership; developer resources and startup ecosystem access.



GOOGLE CLOUD

Cloud workloads & startup credits
Used for H360 / cloud prototypes and current infrastructure exploration.



AWS

Prototype deployment & evidence
Used for public demos, pre-production evidence and web releases.



IBM QUANTUM

QPU research execution
Used as a research instrument in the EXP17 / ERC validation line.



GITHUB

Code & public technical assets
Repository and public release surface for selected projects.



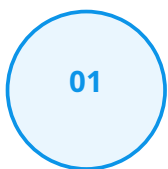
ZENODO

Time-stamped research releases
Archival publication and falsifiable research record for selected outputs.

Claim boundary: provider names describe membership, usage or publication surfaces only. They do not imply endorsement, funding, certification, adoption or technical validation unless explicitly documented.

One source story. Four delivery formats.

The master narrative is designed once, then expressed as an editable deck, a fixed PDF, a project-by-project web experience and a short film.



POWERPOINT

Editable master

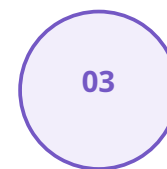
16:9 · project modules · speaker notes · reusable for partners



PDF

Portable evidence deck

Same claims and status boundaries
· easy to send and archive



WEB /deck/

Living project atlas

One project at a time · responsive · links to evidence and demos



VIDEO

3-5 minute portfolio film

Cinematic motion from the same visual system · no “recorded slideshow” feel

Design rule: one project · one identity · one major claim · one evidence boundary · one next leap.

VEHICLE SYSTEMS LAB

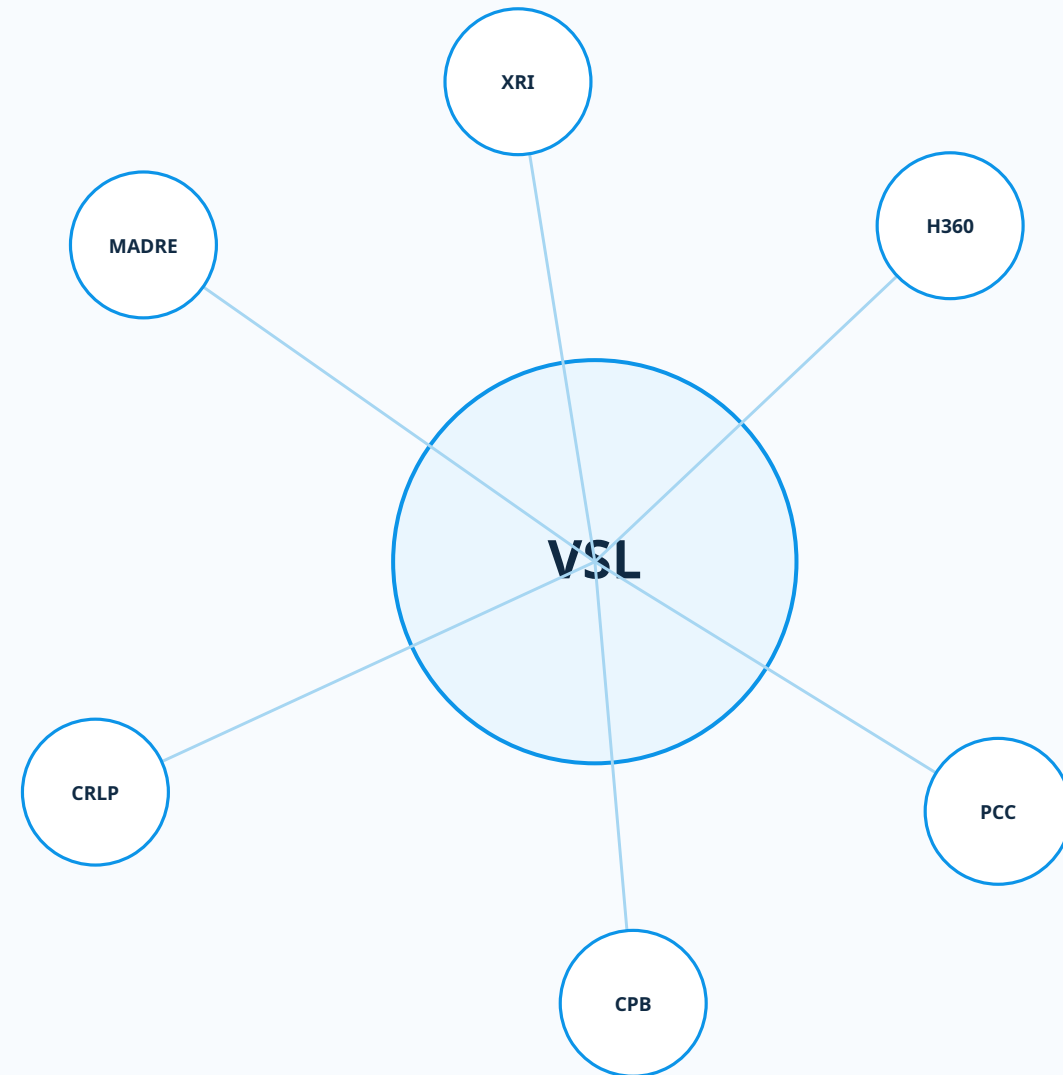
Explore. Validate. Co-develop.

Independent research and systems architecture from Bolivia for complex worlds.

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