

EON Universal

Facility-Agnostic Training & Field Intelligence

A composable equipment ontology for the industrial enterprise.

Genesis shows the steps. EON Universal understands the work.



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Executive summary

EON Universal is a facility-agnostic field-intelligence layer for the safety-critical industry. It understands industrial equipment at the level of process intelligence — not just the steps of a procedure — and uses that understanding to turn any worker into the equivalent of a multi-year expert, in the training center and in the field.

The industry has spent a decade building bespoke simulators one facility at a time. That model never closes economically, because it treats the work as an infinite list of places to memorise. EON Universal inverts the problem. It learns a bounded library of equipment components — roughly fifty classes in oil and gas — and composes any facility from them. Because the system understands the components, it can recognise them on sight, compose the correct procedure, branch a procedure on live conditions, inject faults, generate unlimited valid configurations, and certify a worker against a standard.

EON Universal is distinct from — and complementary to — **Genesis**, EON's engine for converting SOPs and photographs into simulations. The relationship is captured in a single line: **Genesis shows the steps; EON Universal understands the work.** Authored once, that understanding is delivered everywhere — on a phone or AR glasses, on a tablet on the real skid, and inside an immersive CAVE. It is built on ISO 14224, so its output speaks the customer's own reliability-data language, and it is a library the enterprise owns rather than a per-site cost that recurs forever.

The thesis in one paragraph. Don't model five thousand facilities; model the fifty component classes they are built from. Give each class a six-layer competence record so the machine truly knows it. Then let the system recognise, guide, and escalate — turning hard-won field expertise into an owned, compounding asset that no general-purpose AI can replicate, because that knowledge has never left your sites.

SECTION 1 · THE PROBLEM

The expertise cliff

In refineries, on platforms, and across processing trains, the people who hold thirty years of judgment are retiring. The people replacing them are green, frequently at remote sites where being wrong is a safety and escalation problem, not an inconvenience. The knowledge that matters — how this pump behaves when it trips, why this valve must reach a safe state before the next step, what 'normal' sounds and looks like — lives in a shrinking number of heads and almost nowhere in the company's systems.

The standard response has been content: thousands of hand-built simulators, each modelling one specific facility, each expensive to produce and obsolete the moment the plant changes. The unit economics never close, because every new site is a new modelling effort and the permutations are effectively infinite.

EON Universal begins from the worker's reality instead. A competent system should let someone walk up to equipment they have never seen and still do the job correctly. It should **recognise** the component on sight, **guide** the worker through the correct procedure step by step, and **escalate** — stop and hand off to a human — the instant it is unsure. The worker is green; the guidance is not.

SECTION 2 · THE CORE INSIGHT

Composition, not enumeration

A facility is not a monolith to be memorised. It is a graph assembled from a finite library of known components — the same pumps, compressors, valves, exchangers, and vessels, connected differently from one site to the next. The decisive move is to model the vocabulary, not the locations.

Think of learning a language. You could try to memorise every full sentence you will ever need - an endless, hopeless task. Or you can learn the words and the grammar, and then build any sentence on demand. Enumeration memorises sentences; composition learns words. EON Universal learns the components and composes any facility from them.

Two cost curves

Enumeration — model every facility. Effort scales with the number of facilities, so it is unbounded; every new site is a fresh modelling project, and the combinatorics are hopeless. It is a cost that recurs forever.

Composition — model the vocabulary. Effort scales with a bounded set of component classes — about fifty to start. The system recognises nodes, infers topology, and composes the rest. Every job performed makes the shared library smarter. It is an asset that compounds.

You don't program five thousand locations. You program the vocabulary they are built from.

SECTION 3 · THE BOUNDED LIBRARY

Fifty classes, not five thousand locations

In oil and gas, roughly **50 equipment classes** cover the overwhelming majority of frontline work. About **15 classes** carry most of the daily value, and together the core library accounts for **more than 80% of real field interactions**. This is what makes the problem tractable: a bounded, knowable set rather than an open-ended catalogue of sites.

The library is anchored to **ISO 14224** — the petroleum industry's own equipment taxonomy and the de-facto cross-industry reference for reliability and maintenance data. When EON Universal recognises a component, its output maps straight into the customer's reliability and

maintenance records and CMMS/EAM. The system speaks the operator’s data language on day one, rather than asking them to adopt a new one.

Tier	Scale	What it covers
Tier 1	~50 classes	Core gear a technician touches — 80%+ of all field interactions
Tier 2	~300 types	Variants and subtypes — the system is rarely surprised
Tier 3	1,000–2,000	Maintainable items: seals, bearings, actuators, instruments

The tiers describe depth, not breadth of effort. Tier 1 is where the value concentrates; Tiers 2 and 3 extend the same records into variants and maintainable items so the system is rarely surprised in the field.

SECTION 4 · WHAT “KNOWING A COMPONENT” MEANS

The six-layer competence record

A class name is a label. Understanding is a structure. EON Universal carries a six-layer competence record for every class, and each layer earns its place:

1. **Identity** — the ISO class, common aliases, and the tag pattern used in the field. This is how the system names what it sees.
2. **Geometry** — a 3D model and multi-angle imagery, so the component can be recognised and rendered from any viewpoint.
3. **Anatomy** — subcomponents and the boundary of the asset: what is part of it, and where it ends.
4. **Function** — what the component does and its operating envelope: the normal conditions under which it works.
5. **Behavior** — how it responds to upsets and abnormal conditions. This is the layer that makes guidance safe.
6. **Procedure** — how to operate, inspect, isolate, and fix it, expressed as composable steps rather than a single fixed script.

Recognition keys on layers 1–2. Guidance composes from layers 3–6. A simulator that only stores geometry can show a part; a system that also stores function and behavior can reason about it. That is the difference between a recording and an understanding.

SECTION 5 · THE DIFFERENCE

Genesis shows the steps. EON Universal understands the work.

EON Universal does not replace **Genesis**. Genesis is EON's production-ready core engine: it converts standard operating procedures and ordinary photographs into interactive, hands-on simulators, compressing what used to take hours of authoring into minutes. Genesis is the on-ramp — it captures how a task is done and renders it as a simulation a worker can practice today.

EON Universal is the **understanding layer** that sits on top. It brings the component library, the configurator, and live recognition, and it knows *why* each step exists. Because it understands the equipment, it can do things a scripted simulator structurally cannot. The boundary between the two products is exact:

GENESIS — the core engine	EON UNIVERSAL — intelligence + library
Needs 3D models supplied to it	Brings the component library and the configurator
Runs sequential SOPs only — not conditional	Authors conditional SOPs that branch on live conditions
Knows what to show, but not why	Explains why each step matters
Cannot configure different capabilities	Generalises to skids it has never seen
Does not recognise equipment in real life	Recognises equipment on sight — feeds Field IQ + Holodeck

This is the step nobody has taken — not even a simulator. Genesis gives you a faithful recording of a procedure; EON Universal gives you a system that understands the equipment well enough to adapt the procedure, generalise it to new skids, and recognise the real thing in the field. That understanding is the entire product.

SECTION 6 · IN THE TRAINING CENTER

What EON Universal makes possible

Understanding the equipment unlocks a class of capabilities that scripted content cannot reach:

- **Talking components.** Every part can explain what it is and how it works, and let the worker try it — turning a static model into an explorable teacher.
- **Conditional procedures.** Branching SOPs with safety gates — for example, release pressure before opening — rather than a single straight line of steps.
- **Fault diagnosis.** Inject a fault and require the trainee to recognise and respond, building judgment instead of rote sequence memory.

- **Generative configurations.** Produce unlimited, engineering-valid skids from one component library — endless practice variety with no new modelling.
- **Certification.** Generate defensible, scored evidence that a worker is ready, measured against the relevant standard.
- **Compounding.** Every session improves the shared library, so the next worker starts from a smarter system.

SECTION 7 · THE SEVEN TRAINING USE CASES

From exploration to certification

The first library ships with seven training use cases that move a worker from first contact to certified competence:

1. **Talking components** — free exploration: tap any part to learn it and try it.
2. **Guided & scored SOP** — step-by-step execution with live scoring and feedback.
3. **Conditional SOPs** — procedures that branch on live conditions, with safety gates.
4. **Fault injection** — recognise and respond to an introduced abnormality.
5. **Generative skids** — unlimited valid configurations for varied practice.
6. **AR-only practice** — 1:1 rehearsal with no physical hardware.
7. **Certification** — scored, defensible evidence of readiness against the standard.

The proof: a conditional SOP that branches

A fixed SOP is a straight line. A conditional SOP is a decision tree with safety gates, where the next action depends on a live condition. Take isolating a pump: de-energise, verify zero energy, then ask — is pressure still present? If yes, bleed down and re-check, looping until safe; if no, proceed to open. Anything abnormal stops the job and escalates to a human (Verdict).

Why this is the proof. The ‘pressure still present?’ branch only exists because EON Universal knows, from the component’s behavior layer, that a pump stores pressure after power-off. Genesis has no concept of pressure, so it cannot branch on it. A conditional, safe procedure is something only a system that understands the equipment can author. The capability is not a feature bolted on; it falls out of the understanding.

SECTION 8 · ONE SYSTEM, THREE SURFACES

Author once — deliver everywhere

Because a single understanding drives delivery, content is authored once and meets the worker on whichever surface fits the moment:

- **Anywhere — phone or AR glasses.** AR-only practice at 1:1 scale, at home or in camp, with no physical hardware. Repetition becomes free.
- **On the rig — tablet or AR glasses on the skid.** LiDAR overlays the digital twin onto the real equipment; every part is tappable, and guidance is anchored to the asset in front of the worker.
- **Immersive — the CAVE (Holodeck).** LED walls and floor surround the trainee in a generated skid at full scale. A modern, reborn iCube, the CAVE is the premium delivery tier for high-stakes, team-based rehearsal.

The progression is natural: practice on a phone at home, validate on a tablet against the real skid, and rehearse the highest-consequence scenarios immersively in the CAVE — all from the same library, with the same understanding underneath.

SECTION 9 · HOW IT IS BUILT

The Pyramid — layer by layer

EON Universal is built from the bottom up, and you cannot skip a level. Each layer is a prerequisite for the one above it:

1. **3D model** — an accurate model is the base of everything.
2. **Label** — every component identified and tagged.
3. **Function** — what each labelled component does.
4. **Foundational skills** — the must-know basics, especially safety.
5. **SOPs** — standard procedures applied on that foundation.
6. **Field** — using everything in the real field: the eventual goal.

The lower layers are about understanding *components*, not facilities — which is precisely the bridge to a universal, facility-agnostic solution. Get the foundation right, and the field outcome follows.

SECTION 10 · BEYOND OIL & GAS

The same engine, every heavy industry

Because EON Universal understands components rather than memorising facilities, the method transfers to any industry built from a finite parts vocabulary. Petrochemical is the proven, built library today. Mining and heavy equipment, aerospace and MRO, and power and energy each present their own bounded vocabulary and follow the same composition logic. The investment in the method — recognition, the six-layer record, the configurator, conditional procedures — is reusable across verticals. Learn the parts once; help every site built from them.

SECTION 11 · THE ARCHITECTURE & THE VALUE

Own the work, not the weights

The architecture is intentionally legible. **Genesis** is the core engine — it models, labels, and runs step-by-step SOPs. **EON Universal** adds the intelligence: the library, the configurator, and recognition. **Field IQ and the Holodeck** deliver it — field recognition, on-the-spot guidance, and immersive scenarios. Capture flows up the stack; delivery flows back down to the worker.

Why it compounds

- **Every job makes the system smarter.** Usage feeds the shared library; the asset improves with operation rather than depreciating.
- **It works on facilities it has never seen.** Recognise, infer topology, compose — no per-site rebuild required.
- **It is a library you own.** A bounded asset on your balance sheet, not a per-site modelling cost that recurs forever.

Own the work, not the weights. General-purpose AI models are a commodity that everyone rents. How your plant actually runs is not on the public internet, so no foundation model can learn it. EON Universal turns that proprietary know-how into a structured, owned, compounding asset — the durable advantage as AI absorbs the commoditised work around it.

SECTION 12 · WHERE IT FITS

Work Intelligence and the Intelligence Flywheel

EON Universal is one engine inside a larger company architecture: **One System Human 2.0** is the vision, the **Intelligence Flywheel** is the engine, and **Work Intelligence** is the asset — the enterprise's missing system of record for how work is actually done. ERP holds your resources, CRM your customers, PLM your products; Work Intelligence holds your work. EON Universal is how that work becomes executable on the frontline: it converts the standard operating procedures captured by Genesis into living, adaptive guidance, and it carries that competence from the training center into the field through Field IQ and the Holodeck.

SECTION 13 · ENGAGEMENT

Getting started

A typical engagement begins with a single high-value equipment family and a defined set of procedures, proving the recognise–guide–escalate loop on the customer's own assets and data. From there, the library extends class by class along the bounded vocabulary, and delivery expands across phone, tablet-on-the-skid, and the CAVE. Because the records are built on ISO 14224, outputs integrate with existing reliability and maintenance systems from the start.

The oil and gas library is in active deployment in 2026. A companion presentation accompanies this paper, and the EON AI Ventures team is available to scope a first library against a target operation.