

The Living Library

**The first component library that understands the work — recognising equipment, guiding the procedure, and composing new facilities.
Petrochemical & oil & gas; the first of a family.**



Enterprises digitized their resources (ERP), customers (CRM), and products (CAD/PLM). One layer never was: how work is actually performed. This paper explains why that layer matters, how it differs from every existing library, what a library of self-describing industrial objects looks like, and how EON Universal builds and owns it — and extends it across heavy industry.

Table of Contents

- 1. Executive Summary..... 3**
- 2. The Why: The Last Undigitized Layer..... 3**
- 3. Where It Fits: Inside EON Universal..... 3**
- 4. What Exists Today — and Why It Falls Short..... 4**
 - 4.1 CAD and 3-D asset libraries — the shape..... 4
 - 4.2 LMS and courseware — generic theory..... 4
 - 4.3 Process and control simulators — the dynamics..... 4
 - 4.4 Large language models — the rented answer..... 4
- 5. Why This Is Different: The Comparison..... 4**
- 6. What the Library Is: Self-Describing Objects..... 5**
- 7. The Differentiator: It Understands the Relationships..... 5**
 - 7.1 Composition — what it is made of..... 5
 - 7.2 Causation — how it fails..... 5
 - 7.3 Procedure — how it relates to the work, especially isolation..... 5
- 8. A Living Library: Recognise, Guide, Build, Compound..... 6**
- 9. How It Is Built: Composition, Capture, Verification..... 6**
 - 9.1 Composition over enumeration..... 6
 - 9.2 The build pipeline..... 6
 - 9.3 Verification and the honest bar..... 6
- 10. First of a Family: Every Heavy Industry..... 6**
- 11. Ownership: Own the Work, Not the Weights..... 7**
- 12. Why No One Has Built This Before..... 7**
- 13. Roadmap and Availability..... 7**
- 14. Conclusion..... 7**

1. Executive Summary

The Work Intelligence Library is a collection of industrial equipment rendered as **self-describing objects**. Each object is a component — a pump, a valve, a vessel, a gauge — that carries six layers of authored knowledge bound to a 3-D twin. The first edition covers petrochemical and oil & gas: 50 equipment classes and 350 subcomponents, mapped to ISO 14224.

What makes it different is that it does not stop at geometry, courseware, or dynamic behavior. It is **alive**: it recognises real equipment on sight, guides the procedure step by step, builds new facilities from a vocabulary it understands, and compounds with every job. And it encodes the **relationships** between a component and the work — most critically, how each component is isolated relative to everything around it. This is knowledge that CAD, learning systems, and simulators were never designed to hold.

In one line: *Genesis shows the steps. EON Universal understands the work. The Work Intelligence Library is the first place that understanding is captured, recognised in the field, owned by the enterprise — and compounding.*

2. The Why: The Last Undigitized Layer

Nine-tenths of enterprise value is now intangible, and most of it sits in a system of record. Resources in ERP. Customers in CRM. Products in CAD and PLM. One slice was never captured: **how the work is actually performed** — which valve to close first, why a pump trips, what to verify before breaking a flange. That knowledge lives in people's hands, and in heavy industry those people are retiring faster than they can be replaced. When they leave, it leaves with them.

EON Universal calls this slice **Work Intelligence** and treats it as the fourth enterprise system of record, alongside ERP, CRM, and PLM. The Work Intelligence Library is its first tangible asset.

3. Where It Fits: Inside EON Universal

EON Universal is a three-part platform, and the library is its heart:

- **Genesis — the engine.** Models, labels, and runs step-by-step procedures. Powerful, but it needs the models supplied and only knows the steps.
- **EON Universal — intelligence + library.** The component library, the configurator, and recognition. It understands the work and generalises to equipment it has never seen.
- **Field IQ + Holodeck — delivery.** Field recognition, on-the-spot guidance, and immersive practice — delivered anywhere from a phone to a tablet on the rig to an immersive CAVE.

The library is the bounded vocabulary all three depend on: the finite set of understood components that Genesis runs, Universal composes, and FieldIQ delivers. **Genesis shows the steps; EON Universal understands the work.**

4. What Exists Today — and Why It Falls Short

Four mature categories each capture part of the picture and miss the rest.

4.1 CAD and 3-D asset libraries — the shape

They hold geometry: what a component looks like. They answer “what does it look like,” not how it works, how it fails, or how to act on it. A beautiful model is still mute.

4.2 LMS and courseware — generic theory

Learning systems hold passive content: slides, videos, SCORM modules about a class of equipment in general. They do not know the specific component in front of the worker, do not branch on live conditions, and cannot recognise or build anything.

4.3 Process and control simulators — the dynamics

Simulators model how a process behaves over time. They are powerful, bespoke, expensive, and tied to one modeled plant. The knowledge is locked in a simulation, carried by no component, and not portable to the next facility.

4.4 Large language models — the rented answer

A modern AI talks fluently about a pump, but it **rents** that knowledge, cannot be trusted to be exact about a life-safety procedure, drifts as the model changes, and binds to nothing verifiable. It is a conversation, not an asset.

5. Why This Is Different: The Comparison

Set side by side, the gap is obvious. Every existing library stops short of the work; only one binds understood work to the component, recognises it in the field, and lets the enterprise own it.

	3-D / CAD library	LMS courseware	Process simulator	EON Work Intelligence Library
What it stores	A 3-D mesh or file	A course / SCORM module	A tuned plant model	A self-describing object: knowledge + 3-D twin
Knows how it works & fails	X	≈ generic theory	≈ dynamics only	✓ six authored layers
Understands isolation & relationships	X	X	≈ implicit	✓ explicit, per component
Tells you what to do — live	X	≈ passive content	X	✓ branching SOPs
Recognises real equipment on sight	X	X	X	✓ feeds FieldIQ + AR
Builds new facilities from it	X	X	X	✓ generative, valid
You own it — and it compounds	X vendor file	X vendor content	X one plant	✓ yours; better every job

Only the Work Intelligence Library is alive across all of these dimensions — the step nobody else has taken, not even a simulator.

6. What the Library Is: Self-Describing Objects

The unit of the library is not a shape and not a document. It is an **object that explains itself** — six authored knowledge layers bound to a 3-D twin, so explanation and geometry are one thing:

- **Identity** — ISO class, aliases, tag pattern.
- **Geometry** — the 3-D model and multi-angle imagery.
- **Anatomy** — subcomponents and the component boundary.
- **Function** — what it does and its operating envelope.
- **Behavior** — how it responds to upsets and how it fails.
- **Procedure** — operate, inspect, isolate, and fix — the relational, safety-critical layer.

Recognition keys on layers 1–2; guidance composes from layers 3–6. The first edition spans **50 classes across nine families** with **350 subcomponents**, mapped to **ISO 14224** — the petroleum industry's own equipment taxonomy — so its output speaks the customer's reliability-data language on day one.

7. The Differentiator: It Understands the Relationships

Other libraries treat a component as a **thing**. This one treats it as a **participant in work**, capturing three relationships a catalog cannot.

7.1 Composition — what it is made of

Each class decomposes into understood subcomponents, and those subcomponents recur — a casing, a nozzle, a shaft, a seal, a stem, a seat, a flange appear again and again. Understanding composes rather than being re-authored each time.

7.2 Causation — how it fails

Failure modes are bound to the component and the parts responsible for them, turning a model into a diagnostic aid that can explain not just that it fails, but where and why.

7.3 Procedure — how it relates to the work, especially isolation

Safe isolation is not a property of one component; it is a property of how components **relate** in a procedure. The library captures that relational truth directly:

- **A check valve** allows flow one way only — and is therefore never a valid isolation point.
- **An electrical disconnect** is the primary, lockable isolation point — the thing a lock actually hangs on.
- **A motor starter** starts and protects a motor but is a control device, not isolation — a distinction that, gotten wrong, gets people hurt.
- **A pressure gauge** is the stored-energy verification step — the check that proves a line is safe before it is opened.

These are statements about a component's role relative to the work and to everything around it. Encoding them is what makes this a **knowledge** library rather than a parts library — the first real one.

8. A Living Library: Recognise, Guide, Build, Compound

Because the objects understand the work, the library does the work — it is not browsed so much as used:

- **Recognise** — names every component on sight and links the real skid to its digital twin. The green worker points; the library identifies.
- **Guide** — composes the correct procedure step by step — conditional SOPs that branch on live conditions, with safety gates that stop the line. (A pressure-check branch only exists because the library knows a pump stores pressure after power-off.)
- **Build** — drags understood parts onto a canvas to compose any facility — unlimited, engineering-valid skids from one bounded library.
- **Compound** — every session improves the shared library for the next worker. And when it is unsure, it escalates: it stops and hands off to a human. The worker is green; the guidance is not.

9. How It Is Built: Composition, Capture, Verification

9.1 Composition over enumeration

You do not program five thousand facilities; you program the vocabulary they are built from. The 350 subcomponents collapse into roughly **two dozen recurring primitives**. Understand each once, and every assembly that uses it inherits the knowledge — the decision that makes the library tractable to build and cheap to extend.

9.2 The build pipeline

Each object is produced in a repeatable sequence: author the six knowledge layers; generate a consistent set of photoreal images (four orthographic views plus a teaching cutaway); reconstruct a 3-D mesh through a multiview-to-3-D step; and bind the model into the object's empty geometry slot. Knowledge is authored first and is independent of the geometry, so filling the 3-D slot is the last, cheapest step. Image generation and reconstruction are batched through the automated EON Ready pipeline.

9.3 Verification and the honest bar

The library is held to an explicit standard: make a reliable, competent day-one technician — not impersonate a thirty-year veteran. Generic class knowledge is authored for the library; site-specific tags, materials, and set-points are confirmed per instance. Understanding is verified before it is trusted.

10. First of a Family: Every Heavy Industry

Because the system understands components rather than memorising facilities, the method transfers to any industry built from a finite parts vocabulary. Petrochemical and oil & gas is the proven, built edition (ISO 14224, 50 classes). **Mining and heavy equipment** is the next adjacent

vertical; **aerospace and MRO** and **healthcare** follow the same bounded-vocabulary logic. Learn the parts once; help every site built from them — and every new industry compounds on the last.

11. Ownership: Own the Work, Not the Weights

The library's knowledge is authored and owned by the enterprise, independent of any single AI model. The model is a swappable engine behind the asset — useful, replaceable, rented. The asset is the library, and unlike a rented model it **compounds**: every component captured, every site confirmed, every field correction makes it more valuable, and that value stays with the owner. A bounded library you own — not a per-site modelling cost forever.

12. Why No One Has Built This Before

The library sits at the intersection of four capabilities that rarely live in one place: deep 3-D and immersive heritage; modern AI for authoring and interaction; genuine domain modeling of industrial process and safety; and a capture loop that lets field reality flow back into the asset. CAD and asset vendors went deep on geometry, LMS vendors on courseware, simulator vendors on dynamics, model vendors on language. Binding understood work to the component, recognising it in the field, verifying it to a safety standard, and making it an owned, compounding asset required all four at once — which is what EON Universal was built to do.

13. Roadmap and Availability

- **Petrochemical & oil & gas (built now)**: 50 classes, 350 subcomponents, ISO 14224, browsable and bindable.
- **The primitive kit**: generate the recurring primitives as reusable 3-D building blocks every assembly inherits.
- **Guide and Build, then Recognise in the field**: conditional procedures, generative skids, and AR recognition on the rig.
- **Adjacent industries**: mining, aerospace MRO, and healthcare on the same method.

The first edition is being deployed with tier-one energy and process operators as part of EON Universal engagements.

14. Conclusion

For thirty years the industry digitized everything about its equipment except the one thing that mattered most: the understanding of how to work on it safely. The Work Intelligence Library captures that understanding as a self-describing, owned, compounding asset — one that recognises equipment, guides the work, and builds new facilities. It is the first component library that is alive, the

first that understands the work rather than merely holding the parts, and the first of a family that will carry the same method across heavy industry. **Genesis shows the steps; EON Universal understands the work.**

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