

EON Universal

Facility-Agnostic Training & Field Intelligence for Aerospace

A composable equipment ontology for aircraft maintenance, repair & overhaul.
For line & base maintenance — airframe, powerplant and systems.

Genesis shows the steps. EON Universal understands the work.
Understand the Work. Compose Any Aircraft.



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Executive summary

EON Universal is a facility-agnostic field-intelligence layer for aviation maintenance, repair and overhaul. It understands aircraft components 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 line.

The industry has spent a decade building bespoke simulators one type at a time. That model never closes economically, because it treats the work as an infinite list of aircraft types to memorise. EON Universal inverts the problem. It learns a bounded library of aircraft components — about fifty classes in aviation maintenance — and composes any system on any tail 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 airframe, and inside an immersive CAVE. It is built on ATA iSpec 2200, so its output speaks the customer's own data language, and it is a library the enterprise owns rather than a per-type cost that recurs forever.

The thesis in one paragraph. Don't model every aircraft type; 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

On the line and in base maintenance, the licensed engineers who hold decades of judgment are retiring, and the B1/B2 and A&P technician shortage is widening. The knowledge that matters — how a system behaves when it is degraded, why a hydraulic line must be depressurised before removal, what 'normal' looks like on a serviceable unit — lives in a shrinking number of heads and almost nowhere in the operator's systems.

The standard response has been content: bespoke courseware, each modelling one aircraft type, expensive to produce and obsolete the moment the fleet or configuration changes. The unit economics never close, because every new type 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 an LRU 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

An aircraft is not a monolith to be memorised. Across every type, maintenance is performed on a finite library of known components — the same pumps, actuators, valves, generators and line-replaceable units, organised by ATA chapter. The decisive move is to model the vocabulary, not the airframes.

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 system on any tail from them.

Two cost curves

- **Enumeration — model every type.** Effort scales with the number of aircraft types, so it is unbounded; every new type 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 model every aircraft type. You model the components every type is built from.

SECTION 3 · THE BOUNDED LIBRARY

Fifty classes, not five hundred tail numbers

In aviation maintenance, roughly 50 component classes cover the overwhelming majority of line work. About 15 classes carry most of the daily value, and together the core library accounts for more than 80% of real maintenance interactions. This is what makes the problem tractable: a bounded, knowable set rather than an open-ended catalogue of tail numbers.

Built on ATA iSpec 2200 (ATA chapters) — aviation's own system-numbering standard and the de-facto taxonomy for every maintenance manual. When EON Universal recognises a component, its output maps straight into the AMM task, the part number, and the operator's MRO / M&E records. It speaks their data language on day one.

Tier	Scale	What it covers
Tier 1	~50 classes	Core LRUs a technician touches — 80%+ of line tasks
Tier 2	~300 types	Variants by type & effectivity — rarely surprised
Tier 3	1,000–2,000	Maintainable items: seals, bearings, bushings, fasteners

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 line.

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 ATA chapter, part number, and common aliases. 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 LRUs and types it has never seen

GENESIS — the core engine	EON UNIVERSAL — intelligence + library
Does not recognise equipment in real life	Recognises equipment on sight — feeds FieldIQ + 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 aircraft, and recognise the real thing in the line. 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 — depressurise the hydraulics before removal — 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, configuration-valid system layouts from one component library.
- **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 configurations** — unlimited valid layouts 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 removing a hydraulic component: isolate and tag the system, verify zero, then ask — is stored pressure still present? If yes, bleed the accumulators down and re-check, looping until safe; if no, proceed to remove. Anything abnormal stops the job and escalates to a human (Verdict).

Why this is the proof. The 'stored pressure still present?' branch only exists because EON Universal knows, from the component's behavior layer, that a hydraulic accumulator holds pressure after shutdown and a charged landing-gear strut stores energy. Genesis has no concept of stored pressure, so it cannot branch on it. A conditional, safe procedure is something only a system that understands the equipment can author.

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, off-base, with no aircraft on the dock.
- **In the hangar — tablet or AR glasses on the airframe.** LiDAR overlays the digital twin onto the real aircraft; every LRU is tappable.
- **Immersive — the CAVE (Holodeck).** LED walls and floor surround the trainee in a generated bay at full scale — a modern, reborn iCube, and the premium tier.

The progression is natural: practice on a phone off-base, validate on a tablet against the real airframe, 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 line: the eventual goal.

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

SECTION 10 · BEYOND AVIATION

The same engine, every heavy industry

Because EON Universal understands components rather than memorising aircraft, the method transfers to any industry built from a finite parts vocabulary. Aviation shares the same composition logic proven first in oil and gas. Mining and power and energy each present their own bounded vocabulary and follow the same approach. The investment in the method — recognition, the six-layer record, the configurator, conditional procedures — is reusable across verticals. Learn the parts once; help every asset 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. **FieldIQ 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 aircraft types it has never seen.** Recognise, infer topology, compose — no per-type rebuild required.
- **It is a library you own.** A bounded asset on your balance sheet, not a per-type modelling cost that recurs forever.

Own the work, not the weights. General-purpose AI models are a commodity that everyone rents. How your fleet 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 line through FieldIQ and the Holodeck.

SECTION 13 · ENGAGEMENT

Getting started

A typical engagement begins with a single high-value system — a hydraulic or landing-gear family, say — and a defined set of AMM tasks, proving the recognised–guide–escalate loop on the operator's own configuration and data. From there, the library extends class by class along the ATA-chapter vocabulary, and delivery expands across phone, tablet-on-the-airframe, and the CAVE. Because the records align with ATA iSpec 2200, outputs integrate with existing MRO and M&E systems from the start.

The composition method is proven first in oil and gas and maps directly onto aviation's ATA-chapter vocabulary. A companion presentation accompanies this paper, and the EON AI Ventures team is available to scope a first library against a target operation.