

EON Worlds:

Spatial serious games with guided practice and human review



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Executive summary

EON Worlds aims to turn a navigable place into an intelligent practice space. A learner first watches a brief mission, then finds evidence with help, and finally makes the decision alone. The current public preview demonstrates this pattern in a refinery scene and offers a six-question creator planner. The complete authoring, review, and publishing pipeline remains a roadmap.

The problem

Safety work depends on noticing small, context-dependent signs. Flat documents often separate a rule from the place where it matters. The International Labour Organization (ILO) estimated about 330,000 occupational accident deaths annually in 2023, approximately 900 a day, and 2.6 million deaths from work-related disease. Its US\$2.99 trillion economic cost estimate is from 2017. These figures are broad motivation, not a claim of product impact.

The product idea

A serious game should teach the correct observation and decision in a believable environment. EON Worlds combines a 3D world, visible annotations, a guided narrative, assisted search, independent challenge, feedback, and reviewed teaching content. The environment must remain central; newly staged objects should support a lesson without turning the world into a backdrop.

Learner mode	Purpose	What to measure
Show me	See the place, clue, explanation, and safe response	Comprehension and completion
Find me	Search with optional help	Recognition, hints used, wrong choices
Challenge me	Decide independently	Correctness, time, confidence, missed clues

How a world is created

1. A person enters a simple idea and chooses the learning goal.
2. The author checks a visual brief and chooses a rights-cleared existing or newly generated world.

3. The system drafts possible situations; a person discards anything that cannot be seen or safely taught.
4. The author places evidence in the 3D environment and composes a scenic route at a comfortable distance.
5. The lesson is rehearsed in all three modes, tested for performance and accessibility, then approved by an expert.
6. An approved version is published; learning results and field feedback guide the next revision.

Today, the public creator implements the draft-planning portion, local saving, JSON export/import, and a limited handoff into existing sample worlds. A local owner-only generation gateway has been exercised against a fake provider, but real generation was blocked by zero credits at the last audit. Arbitrary Marble imports, production storage, versioned approval, and one-click publishing are not complete.

Design rules

- Use original world features as the first teaching surface. Stage precise 3D objects only where the captured world lacks necessary detail.
- Choose central viewpoints and plausible scale; avoid forcing close views of fuzzy Gaussian splat edges.
- Keep hazard cues subtle but discoverable. Compare normal and abnormal evidence rather than decorating every defect with a large marker.
- Separate generated draft text from approved safety instruction and label fictional scenes as exercises.
- Make answers accessible through captions, clear color and sound feedback, keyboard focus, and usable mobile layouts.

Evidence and evaluation

A randomized construction safety VR study with 119 workers reported improvements in safety motivation and self-efficacy and later self-reported safety performance. It did not establish fewer injuries or deaths. A NIOSH-hosted study of panorama-based hazard training suggests that greater visual realism can make hazard identification harder than in simplified VR. For EON Worlds, the product hypothesis should be tested, not assumed.

Pilot measure	Method
Learning gain	Same target decisions in a pretest and delayed posttest

Search behavior	Missed clues, false positives, hint use, and time to a correct answer
Transfer	Supervisor-approved field observation, with consent and site safeguards
Experience	Motion comfort, frames per second, captions, and completion on target devices

Connection to EON One Platform

The attached EON One Platform slide frames a digital twin side and a work loop. EON Worlds is best positioned as the experiential learning layer of the digital twin. EON Universal can be a source of captured places; Genesis and XR Infinite can support scored simulation; EON Live and Situation Room suggest richer physical or incident scenarios; EON Tacit can preserve expert explanations. Proposed future connections with Permit IQ, Field IQ, Assess IQ, Compound IQ, and the Distillery could return approved work controls and field observations to a revised lesson. These links are an architecture direction, not verified integrations in the public preview.

Ten candidate worlds for the first library

These are proposed training settings. Each needs rights-cleared source material, site-specific rules, and expert approval. The linked official guidance is a research starting point, not a complete procedure.

1 LNG cargo deck

A pre transfer observation round across manifold, walkway, and temporary power areas. Example cues: Wet trace, obstructed route, damaged lead.

Starting reference: <https://www.imo.org/en/ourwork/safety/pages/igc-code.aspx>

2 Refinery pump alley

A maintenance handback walk through where the learner compares normal and abnormal evidence. Example cues: Flange seep, loose guard, disconnected lead.

Starting reference: <https://www.osha.gov/process-safety-management>

3 Offshore well pad

A route through pumps and high pressure lines before work starts. Example cues: Line exclusion zone, ignition source, falling object.

Starting reference: <https://www.osha.gov/oil-and-gas-extraction/hazards>

4 Electrical substation

A visual pre job check without simulated energized work. Example cues: Boundary, damaged enclosure, unclear isolation status.

Starting reference: <https://www.osha.gov/electrical/flash-hazards>

5 Chemical blending skid

A batch preparation decision with a label and valve line up check. Example cues: Label mismatch, blocked relief path, spill trace.

Starting reference: <https://www.osha.gov/process-safety-management/hazards>

6 Crane lift area

A walk around the lift perimeter before the load moves. Example cues: Person in load path, missing barrier, rigging issue.

Starting reference: <https://www.osha.gov/hazfinder/text-version/construction>

7 Confined vessel entry

A stop at the entry point focused on authorization and visible safeguards. Example cues: Permit status, attendant position, entry marking.

Starting reference:

https://www.osha.gov/sites/default/files/publications/CONFINED_SPACE_PERMIT.pdf

8 Warehouse loading dock

A forklift and pedestrian route decision beside an open dock. Example cues: Trailer restraint, blind corner, rack damage.

Starting reference: <https://www.osha.gov/powerful-industrial-trucks/>

9 Healthcare isolation room

A short preparation and exit practice for a fictional patient room. Example cues: Hand hygiene, PPE selection, disposal point.

Starting reference: <https://www.cdc.gov/infection-control/hcp/basics/standard-precautions.html>

10 Wind turbine access

A climb preparation and route inspection at a fictional turbine. Example cues: Fall protection, weather cue, rescue equipment.

Starting reference: <https://www.osha.gov/green-jobs/wind-energy/falls>

Delivery sequence

1 Complete one world

Resolve credits and rights. Import a generated or existing world; verify scale, camera comfort, and full/light variants.

2 Finish authoring

Place visible clues and route controls. Bind feedback, narration, captions, and scoring to reviewed cards.

3 Prove learning

Run user and expert tests. Record before/after decision accuracy and accessibility or performance failures.

4 Make it repeatable

Add identity, storage, revision approval, publishing, audit trail, and cost limits. Then expand the library.

Future features

- **AI scene scout:** Suggests visible learning points from an imported world; never auto approves them.
- **Before and after:** Compare the same place before and after a corrected condition.
- **Practice a repair:** Attach a precise interactive 3D object when physical steps matter.
- **Team missions:** Let teams coordinate observations and compare decisions.
- **Expert voice:** A named reviewer explains why an answer is right.
- **Adaptive difficulty:** Change hints and distractors based on mistakes.
- **Replay my route:** Show where a learner looked, paused, and missed a clue.
- **Multi language narration:** Localize reviewed content and captions.
- **Mobile and headset handoff:** Resume one approved mission across browser, phone, and XR.
- **Measured transfer:** Compare pretest, posttest, and later real-world observation.

Limitations and claims

The preview is an illustrative serious game. Scores are not certifications. Generated worlds and drafted hazards can be wrong. No evidence currently supports a claim that this product reduces accidents, deaths, or the global cost estimated by ILO. Those outcomes require appropriately designed independent evaluation.

Sources and evidence

ILO 2023 occupational mortality:

<https://www.ilo.org/resource/news/nearly-3-million-people-die-work-related-accidents-and-diseases>

ILO 2017 economic estimate:

<https://www.ilo.org/resource/news/ilo-head-calls-global-coalition-safety-and-health-work>

ILO safety and health portal: <https://www.ilo.org/safework>

Construction VR randomized trial: <https://pubmed.ncbi.nlm.nih.gov/33334479/>

NIOSH hosted panorama safety study: <https://stacks.cdc.gov/view/cdc/213257>

World Labs API: <https://docs.worldlabs.ai/api/reference/worlds/generate>

LNG cargo deck: <https://www.imo.org/en/ourwork/safety/pages/igc-code.aspx>

Refinery pump alley: <https://www.osha.gov/process-safety-management>

Offshore well pad: <https://www.osha.gov/oil-and-gas-extraction/hazards>

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