

EON GENESIS 3.0

The AI-Powered XR Training Simulator

From slideshow training to physics-driven simulation.

Real objects. Real gravity. Real skills.

24

Pages

28

API Routes

636

3D Models

57

Interactions

17

Industry Segments

THE PROBLEM

Training today is a slideshow — not a simulator

Watch a video, click Next

Trainees passively consume content. No muscle memory is built.

Objects don't behave like reality

You can't pick up a valve, feel its weight, or screw it in.

No physics, no consequence

Drop a tool — nothing happens. Skip a safety step — no feedback.

One industry, one format

Same generic training across Energy, Healthcare, Manufacturing.

Genesis 3.0 changes this.

WHAT WE'VE BUILT

A complete platform — already working



24 Pages

Login, Dashboard, Scene Editor, Mission Trainer, Analytics, Leaderboard, and more



28 API Routes

Auth, projects, missions, training, scoring, gamification, certificates, AI vision



636 3D Models

14 high-fidelity local + 580 cloud models from Genesis Library across 17 segments



57 Interaction Primitives

Click, hold, grab, rotate, drag, slide, snap, place, toggle, and specialized types



AI-Powered Authoring

SOP import, auto-config, AI mission generator, conversational authoring



Gamification System

XP, levels, 10 badges, daily streaks, leaderboard with medals

All pages wired to real APIs. All endpoints tested. Dark theme throughout.

TRAINING ENGINE

The 4-Phase Training Loop

1

SHOW ME

AI guide demonstrates the full procedure step-by-step. Trainee watches and learns.

2

TRAIN

Guided practice with hints. Avatar points to the next step. Hints degrade with each attempt.

3

LET ME TRY

Trainee performs independently. Minimal guidance. Timer tracking. Building muscle memory.

4

EVALUATE ME

Formal assessment. Scored on accuracy, speed, safety, completeness. Certificate on pass.

Hint degradation: Full hints on first attempt, reduced on second, none on third — forcing real learning.

WHAT'S NEXT

From Training Platform to Real Simulator

Seven capabilities that transform Genesis 3 into the most advanced XR training simulator in the market.



Havok Physics Engine

Objects have mass, gravity, and collision



Procedural Sound

Collision, snap, motor, fire audio



Assembly/Disassembly

Constraint graphs with snap placement



Chopstick Controller

Phone gyroscope = laser pointer



Mixamo Avatar Guide

Walking, pointing human replaces drone



Visual Step Schema

Icon pipeline with color-coded progress



17-Segment Expansion

1,145 courses across every industry

Each feature has a detailed specification, implementation plan, and Claude Code prompt ready to execute.



Havok Physics Engine

Objects have mass, gravity, and collision — just like reality

What It Does

- Gravity at 9.81 m/s^2 — drop a wrench, it falls
- Dynamic mass: 0.5 kg (small tool) to 10 kg (heavy part)
- Grab = physics constraint, release = natural fall
- Collision sounds via Web Audio API
- Click = impulse (object bounces realistically)
- Hold = anti-gravity rise, drop on release

Why It Matters

Training without physics is like flight school without aerodynamics.

When a trainee drops a part and it falls — they learn consequence. When they grab a heavy valve and feel resistance — they build muscle memory.

No other web-based training platform has real-time physics.



Assembly / Disassembly System

The core training mechanic — take apart, put together, learn the sequence

Example: Lockout/Tagout (LOTO) Procedure

1. Unscrew cover panel
2. Pull disconnect hasp
3. Attach padlock
4. Remove fuse
5. Test for zero energy
6. Attach danger tag

Constraint Graph

- Each part has prerequisites
- Removal order is enforced
- Wrong sequence = red feedback
- Snap zones show ghost outline
- Progress bar tracks assembly

Visual Feedback

- Green glow = removable part
- Red glow = locked (prerequisite not met)
- Ghost mesh at snap target zone
- Physics removal with gravity
- Works in all training phases



AI Avatar Guide System

Mixamo Avatar

BUILDING NOW

Skeletal human with 20+ animations: walk, point, pick up, open door. Walks to equipment, demonstrates steps.

HeyGen Avatar

SDK INTEGRATED

Photorealistic AI-generated human. Lip-synced speech. Premium tier for enterprise customers.

Drone Guide

FULLY WORKING

Flying drone with laser pointer. Narrates via TTS. Currently the default. Always available as fallback.

20+ Mixamo animations already in repo: idle, walk, walk backward, point, pick up, lift, open door, turn 180°



17 Industry Segments — 1,145 Courses

Segment	Courses	Status
Energy	100	DONE
Smart Manufacturing	100	NEXT
EV Workforce	100	PLANNED
Aerospace & Defense	100	PLANNED
Healthcare	98	NEXT
Life Sciences	99	PLANNED
Construction	99	NEXT
Maritime	100	PLANNED
First Responders	100	NEXT
Mining	100	PLANNED
Data Center	99	PLANNED

+ 6 Soft Skills / Professional segments (45 courses) planned for Phase 3

Three features that double immersion



Procedural Sound

- Metal collision: 200-400Hz burst
- Valve turn: low frequency sweep
- Click/snap: sharp 800Hz pulse
- Motor hum: continuous 60Hz
- Fire crackle: random noise
- Success/fail chimes



Chopstick Controller

- Phone gyroscope = laser ray
- Touch screen = grab button
- Visual laser beam in 3D
- Mesh highlights on hit
- Physics grab + drop
- **Dan's original invention**



Visual Step Schema

- Horizontal icon pipeline
- Color-coded progress states
- Gray = upcoming steps
- **Blue = current step**
- **Green = completed**
- **Red = failed step**

CROSS-PLATFORM XR

One codebase — every device



Quest 3 / Pico 4

CODED

Full VR with hand tracking.
6DOF controllers.
Havok physics in VR space.
Avatar guide visible in 3D.



HoloLens 2

CODED

Mixed reality overlay.
Hand gesture interaction.
Spatial anchoring.
Enterprise AR training.



iPhone / iPad

CODED

ARKit + LiDAR placement.
USDZ Quick Look export.
Chopstick controller.
Step overlay in AR.



Android

CODED

WebXR AR mode.
ARCore surface detection.
Touch-based interaction.
Chrome browser support.

All XR code written. Needs device testing on physical hardware.

ENTERPRISE FEATURES

What supervisors and procurement need



Instructor Dashboard

PLANNED

Assign training to teams, track completion rates, flag low performers, export CSV/PDF reports. Supervisors see everything.



Certificate PDF + LinkedIn

PLANNED

Trainee completes training, downloads PDF certificate with QR code verification. One-click share to LinkedIn.



Scoring Calibration

PLANNED

Per-step complexity timing, difficulty multipliers (Beginner/Expert), partial credit for near-misses. Realistic grades.



No-Code Interaction Editor

PLANNED

Click a mesh in the 3D editor, radial menu appears with interaction icons. Non-programmers can build training scenarios.

TECHNOLOGY STACK

Production-grade architecture

Frontend

- React 18 + TypeScript
- Vite 5 (hot reload)
- Zustand state management
- Babylon.js 7 (3D engine)
- Havok Physics (WASM)
- WebXR API

Backend

- Express.js + Node.js
- Drizzle ORM
- PostgreSQL (Supabase)
- JWT authentication
- 13 database tables
- 28 API route files

AI & Avatar

- GPT-4o (mission generation)
- Claude AI (authoring)
- Google Gemini (vision)
- HeyGen (streaming avatar)
- Web Speech API
- TTS (50+ languages)

XR / AR

- WebXR (Quest 3, Pico 4)
- HoloLens 2 (MR)
- ARKit (iOS / LiDAR)
- ARCore (Android)
- USDZ Quick Look
- Electron (desktop)

WHY GENESIS 3 WINS

What no competitor has



Real Physics in Browser

Havok WASM running at 60fps. Objects have mass. Gravity works. No plugin, no download. Open a browser and train.



Assembly Mechanics

Constraint-based take-apart/put-together. No other web training platform has prerequisite-enforced assembly sequences.



AI Avatar That Walks

Not a floating head. A full-body avatar that walks to equipment, points at the part, demonstrates the step. Three avatar tiers.



17 Industries, One Platform

Energy, Healthcare, Manufacturing, Construction, First Responders, Aerospace, Mining — 1,145 courses on day one.



Phone = Training Tool

Chopstick controller turns any smartphone into a laser pointer with physics interaction. No headset required.



Zero Install

Web-based. Send a link. Works on desktop, tablet, phone, Quest 3, HoloLens. One URL, every device.

The combination of physics + assembly + avatar + multi-industry is unique in the market.

EXECUTION ROADMAP

What's building now vs. what's next

Priority 1 — Simulator Core

- Havok physics engine
- Assembly/disassembly system
- Mixamo avatar guide
- Multi-segment missions (5 industries)

Priority 2 — Polish

- Procedural sound design
- Visual interaction editor (no-code)
- Visual step schema
- Chopstick mobile controller

Priority 3 — Enterprise

- Instructor dashboard
- Certificate PDF + LinkedIn
- Scoring calibration

Priority 4 — Scale

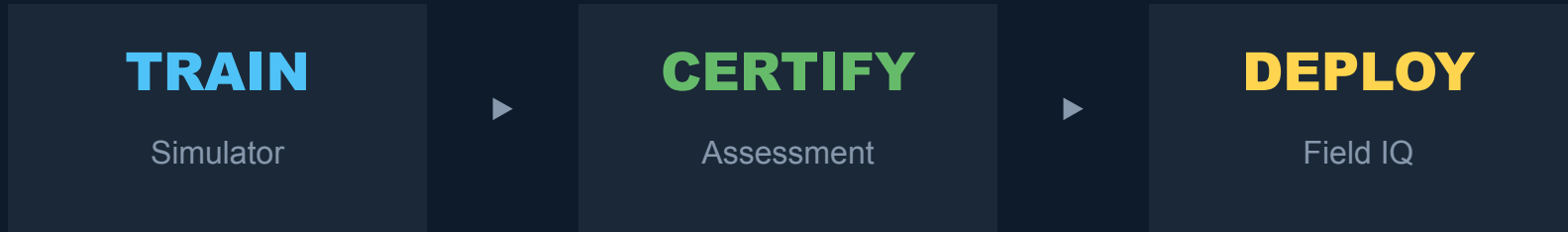
- Full 11-segment coverage
- XR device testing
- Offline mode
- LMS integration (SCORM/xAPI)

Each feature has a Claude Code prompt ready to execute. Specification lives in GENESIS3_SPEC.md.

FUTURE VISION

Field IQ — Training Meets Reality

The same data model that powers simulator training will power field guidance on AR glasses.



Steps, procedures, scoring — all reused. Build once in Genesis 3, deploy everywhere.

Architecture decisions today ensure Field IQ compatibility tomorrow. Not building now — but not blocking it either.

EON GENESIS 3.0

Not a training viewer. A training simulator.

Real physics. Real assembly. Real avatars.

17 industries. Every device. Zero install.

Built for the world's most demanding training environments.