

**Problem Statement**

Time-sensitive operations (e.g., hostage rescue, extraction, raid, disaster response) often require teams to understand and rehearse a target building/compound before execution. Today, that rehearsal capability is constrained by the time and labor required to build accurate training environments.

- State of the art: When time allows, units may create physical replicas or manual 3D models for walkthroughs and mission rehearsal. These approaches can produce high fidelity, but typically require weeks to months, specialized labor, and significant cost.

**Proposed Solution**

Limit Labs provides an AI-driven pipeline to generate mission-relevant 3D digital twins of buildings and compounds from sparse or mixed intelligence sources. This enables rapid rehearsal, walkthrough, and contingency planning when timelines are compressed.

Metric	Limit Labs Rapid Digital Twin	Physical Replica / Manual 3D Build
Time to first walkthrough	<b>1 Hour</b>	<b>2+ Weeks</b>
Update speed (new intel)	<b>30 Minutes</b>	<b>2+ Days</b>
Cost to generate	<b>\$30</b>	<b>\$150k-\$1M</b>
Usability	<b>Walk Through, Rehearsal, Planning</b>	<b>Walk Through, Rehearsal, Planning, Live Fire</b>
Scalability across targets	<b>High</b>	<b>Low</b>



- Multi-input ingestion: floorplans, sketches, partial interior photos, UAV imagery, satellite/GIS context, witness descriptions (as available).
- Rapid 3D synthesis: automated reconstruction of fully furnished interiors/exterior into a coherent 3D scene (rooms, doors, windows, stairwells, key objects).
- Training-ready export: outputs to Unreal and lightweight web/XR viewers for distributed planning and rehearsal.
- Uncertainty-aware variants: generate multiple plausible layout hypotheses when intel is incomplete, with confidence/assumption annotations to support decision-making.

**Advantage**

**Table 1. Features and Benefits of Technical Approach**

FEATURE	BENEFIT
Multi-source inputs (floorplans, sketches, imagery, GIS)	Works with incomplete intel; reduces dependency on perfect plans
Automated 3D reconstruction (interior + exterior)	Walkthrough-ready environments fast; less manual modeling
Variant layouts + assumption tagging	Enables contingency planning under uncertainty
Rapid “intel refresh” updates	Incorporate new info quickly; keep plans aligned with reality