

Faster, Safer Residential Damage Assessment

How DJI LiDAR accelerates early Red Cross disaster response



When the Sun Sets, the Mission Doesn't Stop

A New Capability to Accelerate Disaster
Assessment and Response, 24/7.

The Solution: High-Fidelity Aerial LiDAR with the Zenmuse L3

The Zenmuse L3 is a next-generation aerial LiDAR system that transforms our ability to see and understand a disaster zone. It combines three critical technologies into a single, powerful payload designed for rapid, high-accuracy data acquisition.

1535nm Long-Range LiDAR

Captures millions of precise 3D data points, creating a true-to-scale digital model of the environment. Its technology allows it to penetrate obscurants and operate in any lighting condition.



High-Precision Positioning System

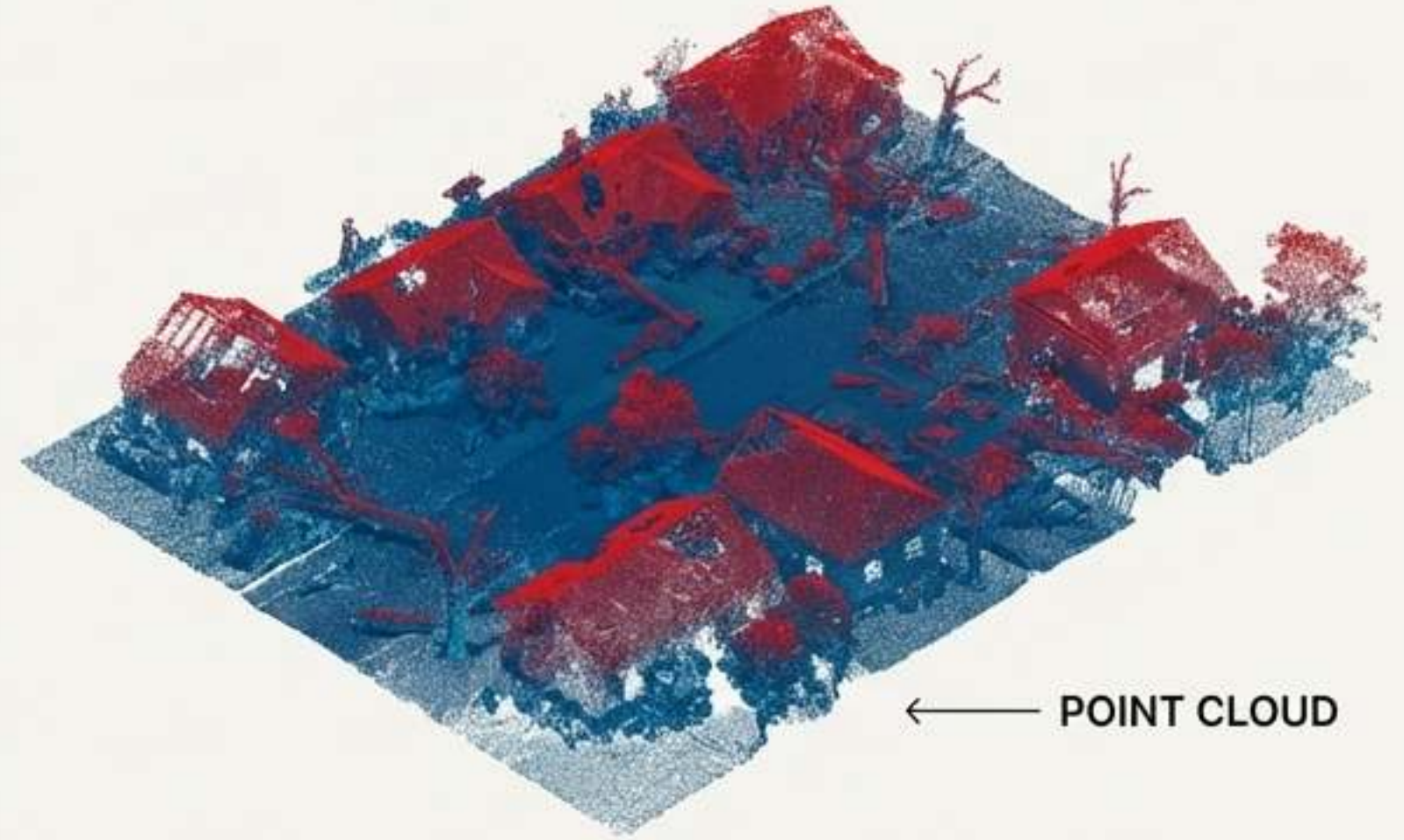
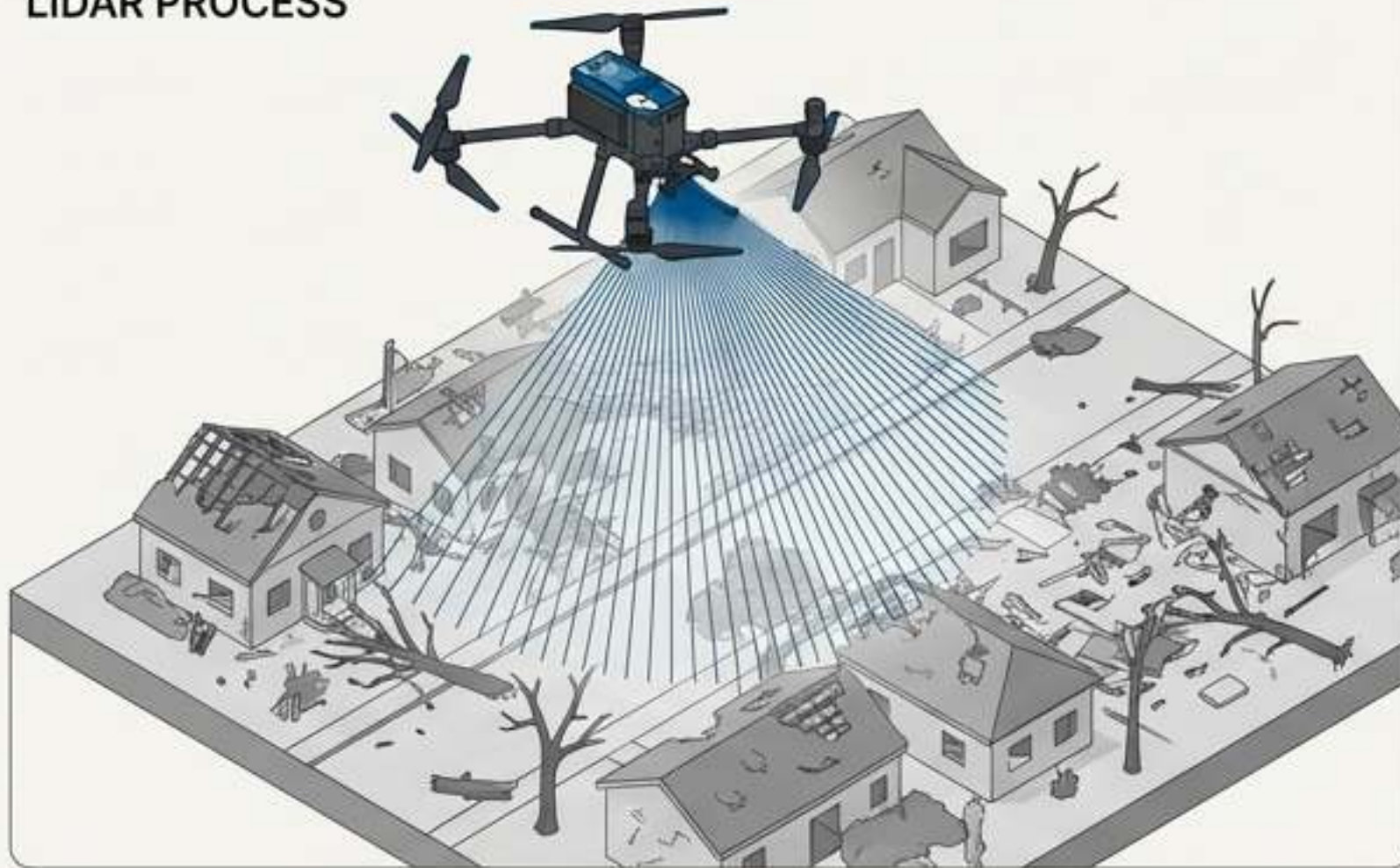
Ensures every data point is georeferenced with extreme accuracy, creating reliable maps for operational planning.

Dual 100MP RGB Mapping Cameras

Provides high-resolution color imagery that complements the 3D data, allowing for photorealistic analysis.

A Fundamental Shift: Seeing Through the Chaos with Aerial LiDAR

LIDAR PROCESS



LIDAR (Light Detection and Ranging):

Uses pulses of laser light to measure distances with millimeter precision, creating incredibly detailed 3D maps.



24/7 Operations:

It is not dependent on sunlight, allowing for high-fidelity data collection in complete darkness.



Penetration:

It penetrates through gaps in vegetation and smoke to map the true ground and structure beneath.

It provides a clear, comprehensive, and actionable view of the disaster zone, anytime.

The Mission Begins: Overcoming Initial Barriers

Traditional Approach



Initial Conditions

Ground teams are delayed by impassable roads from flooding, hurricane debris, or active fires. Operations stop at nightfall.

What Teams See

Fragmented, incomplete, and dangerous ground-level views. Situational awareness is built slowly, house by house.

With DJI L3 LiDAR



Initial Conditions

A drone with a Zenmuse L3 is launched from a safe staging area within hours, day or night. A single 30-40 minute flight can map up to 1 square mile.

What Teams See

A complete, precise 3D model of the entire neighborhood is generated, revealing the full scope of damage from a safe distance.

The New Reality: A Complete Operational Picture, in Minutes, at Night

Unprecedented Detail.

Capture precise 3D models of entire neighborhoods, revealing structural damage, debris fields, and access routes hidden by darkness.

From Days to Minutes.

What takes ground crews days to assess can now be mapped in a single 30-minute flight.



From Ambiguity to Certainty

The Human Eye at Night



The LiDAR View



Instantly assess structural integrity, identify specific entry points, and pinpoint hazards before ever putting a volunteer on site.

From 3D Models to Actionable Intelligence

The data from each flight is automatically processed to create a clear operational map, enabling commanders to make faster, smarter decisions.

KEY INSIGHTS



Automatic Damage Triage:

Rapidly classify homes as destroyed, major, or minor damage to prioritize response efforts.



Debris & Obstacle Mapping:

Automatically identify and quantify debris fields to plan clearance and safe access routes for Emergency Response Vehicles.



Safe Route Planning:

Instantly map passable vs. impassable roads for volunteer teams and aid distribution.



Decision Advantage: Faster, Safer, and Smarter Deployment



FASTER: Map Square Miles in a Single Flight.

A single 30-40 minute flight can map up to **1 square mile**, assessing **750 to 3,700 homes** at once.



SAFER: Assess from a Safe Distance.

Keep volunteers out of harm's way by remotely assessing unstable structures and hazardous zones cut off by flooding.



SMARTER: Turn Night into an Advantage.

The 'golden 48 hours' no longer stops at sundown. Continue critical assessment operations around the clock to accelerate the entire response cycle.

WHAT LIDAR DELIVERS: The High-Resolution Ground Truth

Precise building exteriors, footprints, and structural geometry.

Accurate ground surface, including yards, slopes, and curbs.



DJI LiDAR provides a sub-10 cm accurate 3D point cloud of everything *above the water line*:

- **Building Exteriors:** Precise footprints, heights, and structural geometry.
- **Ground Surface:** Accurate elevations of yards, slopes, and drainage paths.
- **Infrastructure:** Clear mapping of roads, curbs, debris fields, and access points.

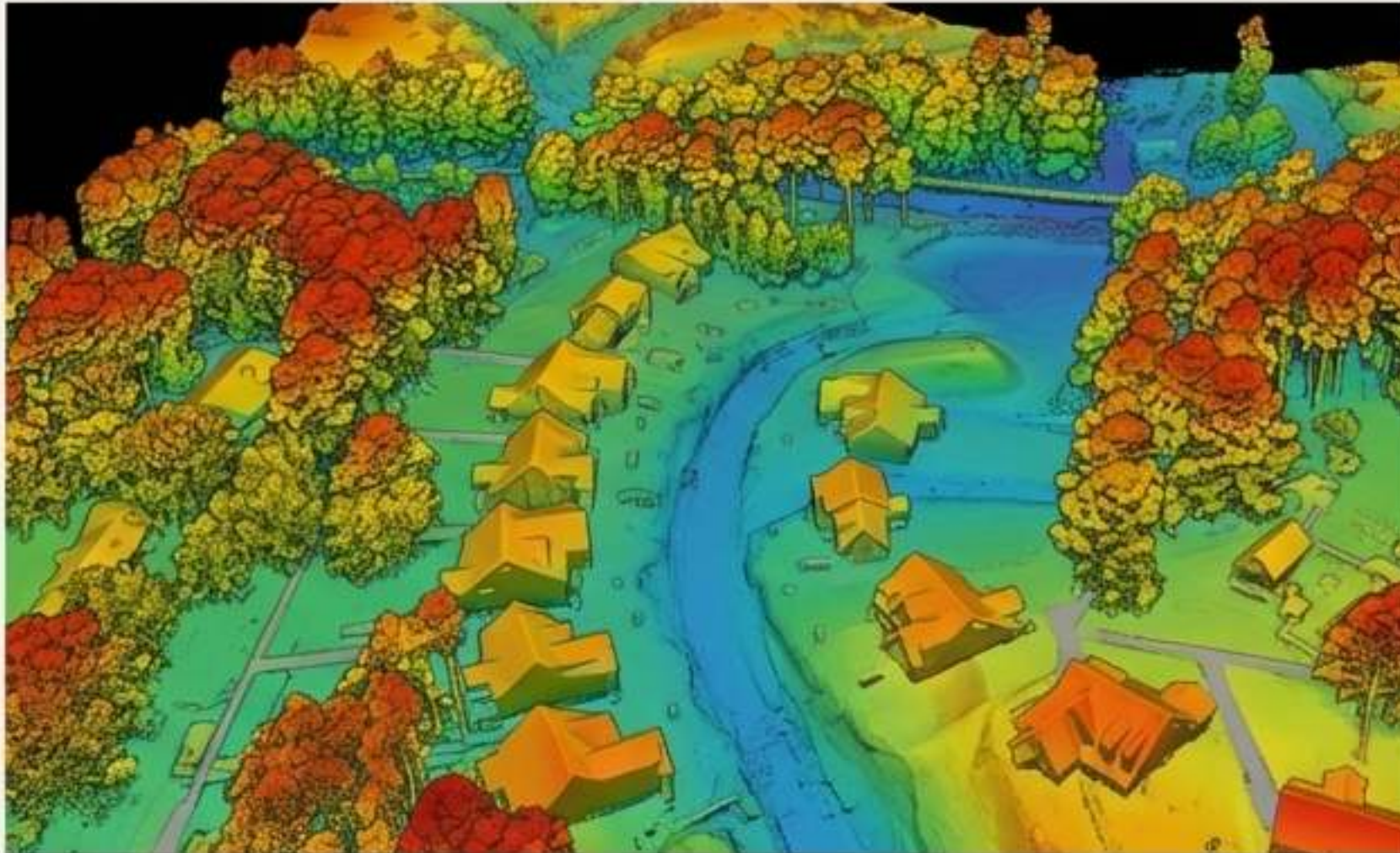
Clear mapping of infrastructure like roads, access points, and debris fields.

This capability is excellent for understanding flood exposure and risk context around homes.

Visualizing the Reality: What LiDAR Measures vs. What We Infer

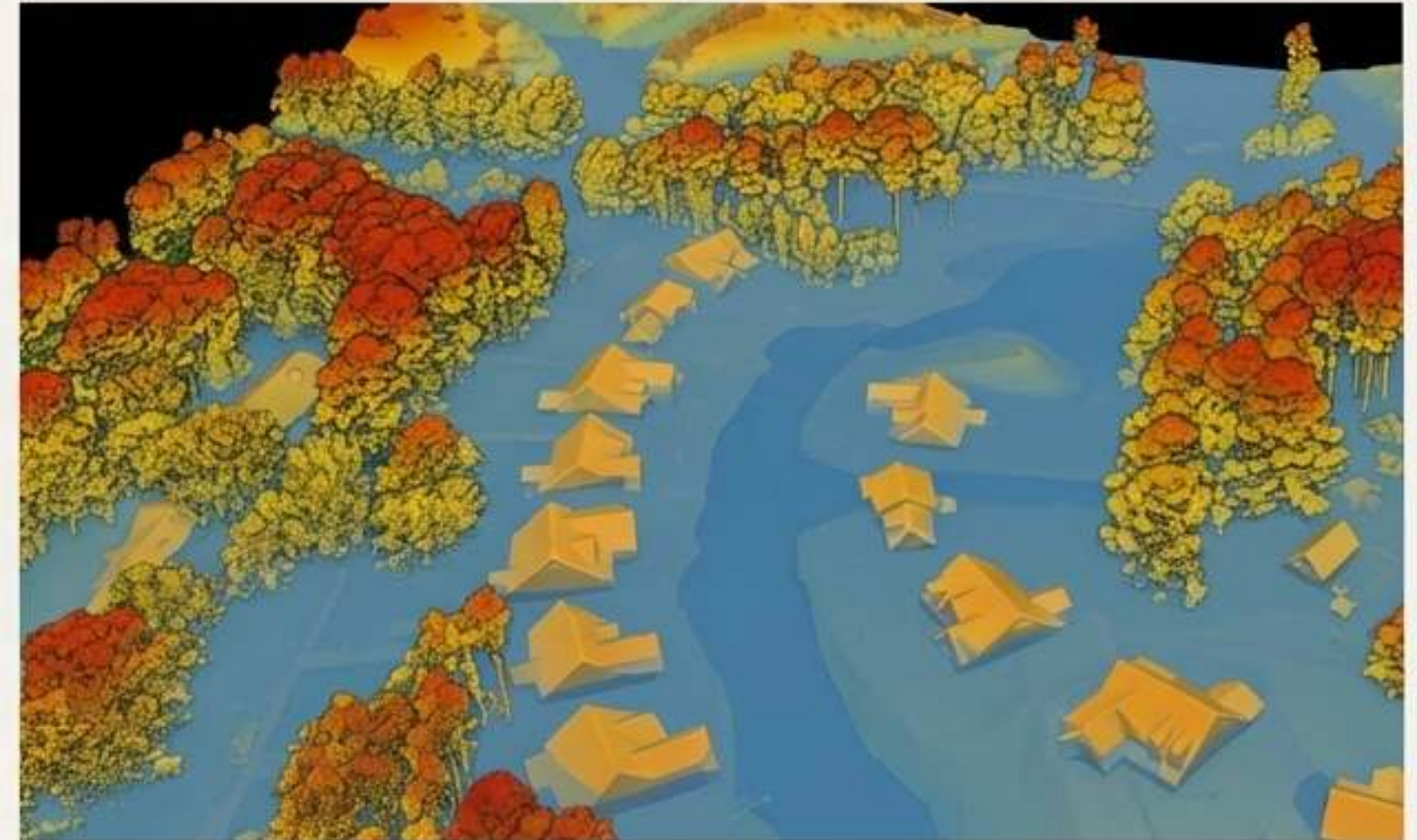
LiDAR Directly Measures:

The precise elevation of all dry ground and structures. This is our known "ground truth."



We Indirectly Infer:

The extent of the flood and its potential impact on structures. We do this by comparing the known terrain elevation from the LiDAR data to the flat "plane" created by the visible water's edge.



Case Study: From a 30-Minute Flight to Actionable Triage

A single 30-40 minute flight with a Zenmuse L3 can map up to **1 square mile***, assessing between **750 and 3,700 homes** at once.

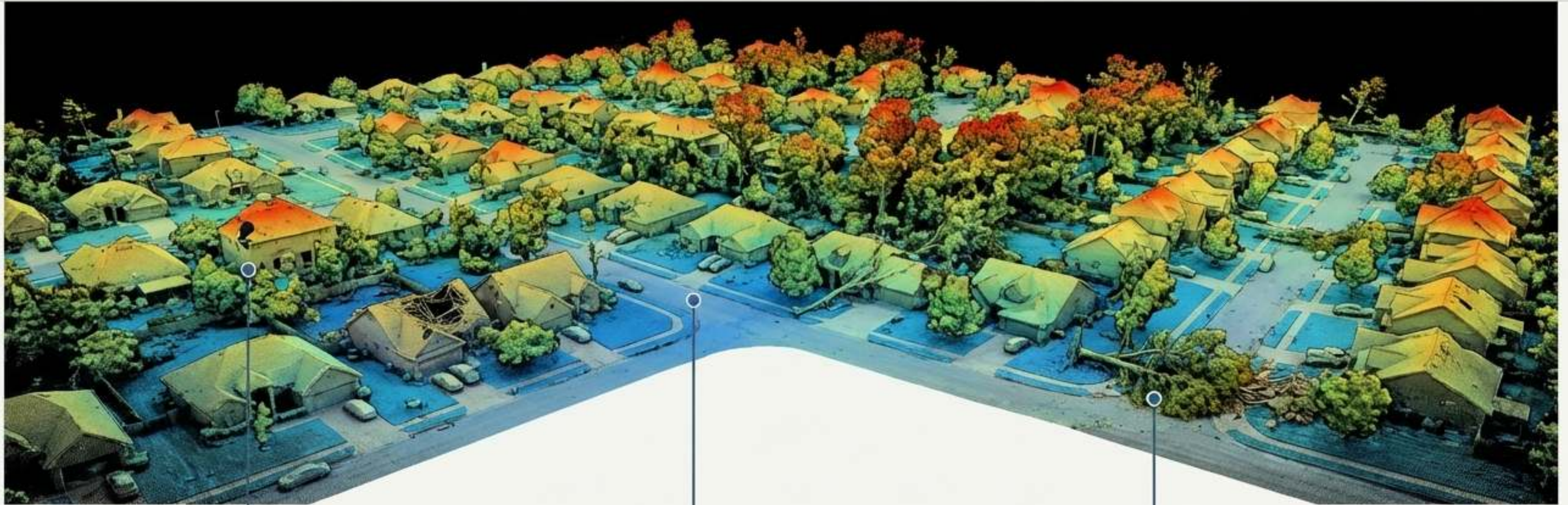
DELIVERABLE:

Within hours, teams receive a prioritized list identifying:

- Low-lying structures with the highest inundation risk.
- Potentially viable and blocked access routes.
- Safe, elevated areas suitable for staging grounds or command posts.



What the DJI Zenmuse L3 Captures in a Single Flight



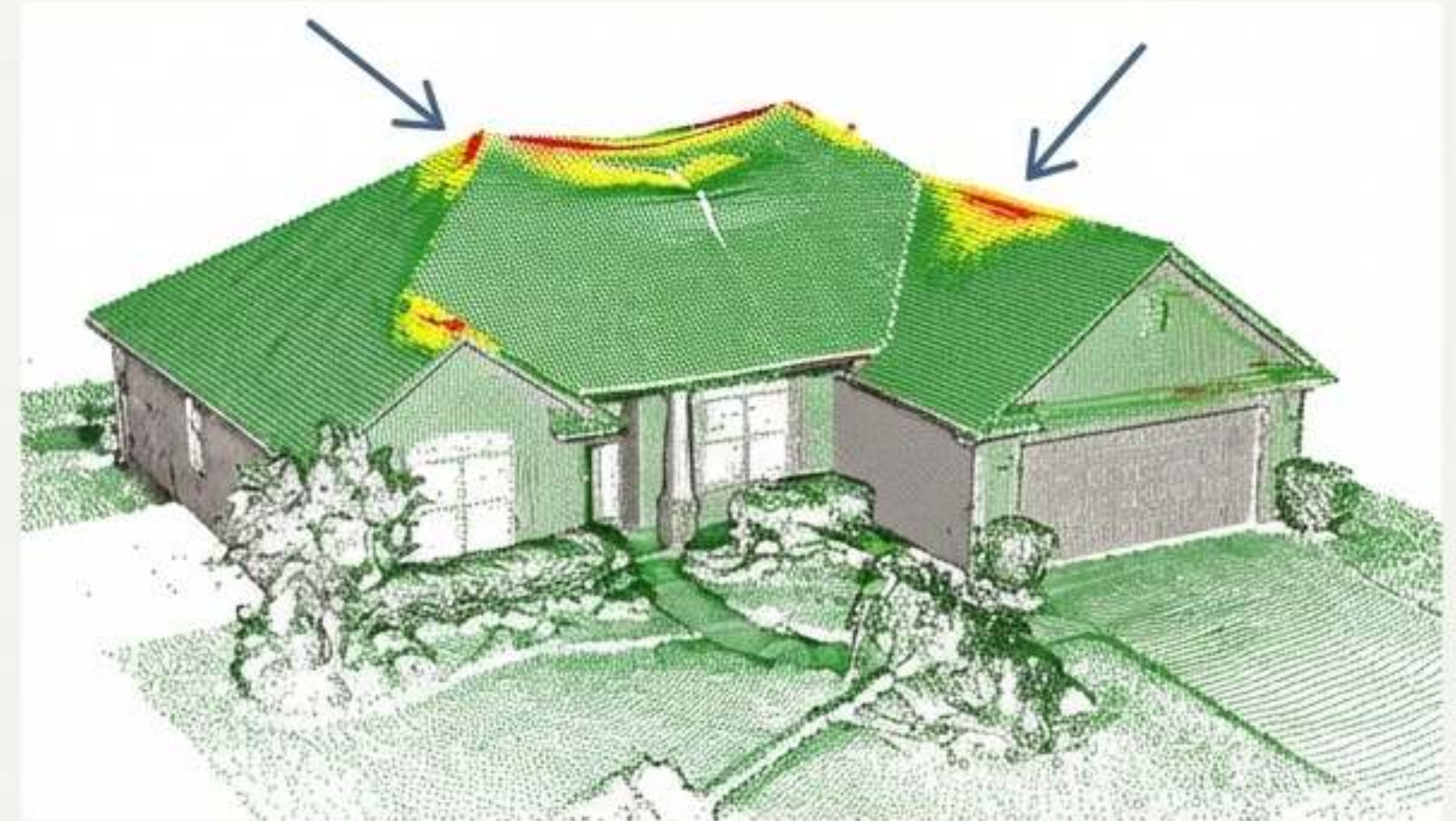
Precise structural damage—
roof loss, wall collapse.

True ground elevation and
clear access routes.

Debris fields and impassable
areas mapped instantly.

From Hours to Minutes, From One House to a Whole Neighborhood

Assessing Wind Damage with Surgical Precision



LiDAR reveals what a simple photo can't.

- **Structural Deformation:** Detects subtle sagging or warping of the roofline.
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- **Debris Field Analysis:** Quantifies the volume and spread of debris, informing cleanup and access strategy.
- **Faster Categorization:** Provides the objective data needed for rapid, FEMA-aligned damage assessments (Minor, Major, Destroyed).

Seeing Through Smoke, Mapping the Burn Scar

WITH SMOKE



WITH LIDAR



LiDAR penetrates smoke and maps the true extent of fire's impact on a neighborhood.



Identify At-Risk Homes: Map vegetation loss and proximity to structures.

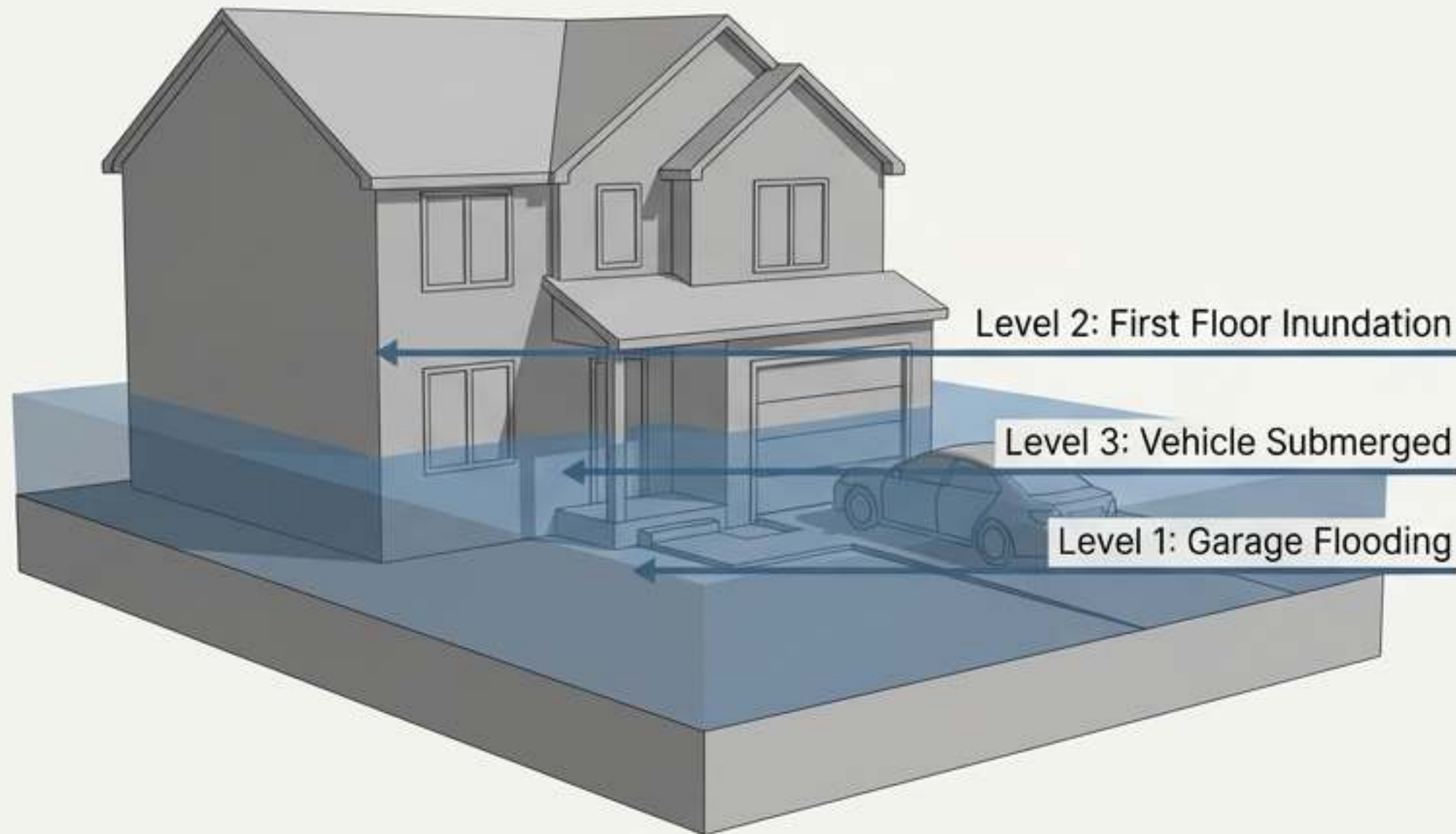


Safe Assessment: Survey dangerous, smoldering areas without deploying teams.



Infrastructure Check: Instantly locate downed power lines or other hazards hidden by smoke or darkness.

Inferring Flood Impact for Faster Triage



We can infer operationally critical flood depth without being there.

- **Practical Inference:** Relate waterlines to known heights of doors, windows, and vehicles.
- **Prioritize Neighborhoods:** Quickly identify the hardest-hit areas based on inferred inundation levels.
- **Actionable Insight, Not Perfect Measurement:** This provides enough information to direct resources where they're needed most, *now*.

More Than a Picture: Why LiDAR Data is a Game Changer

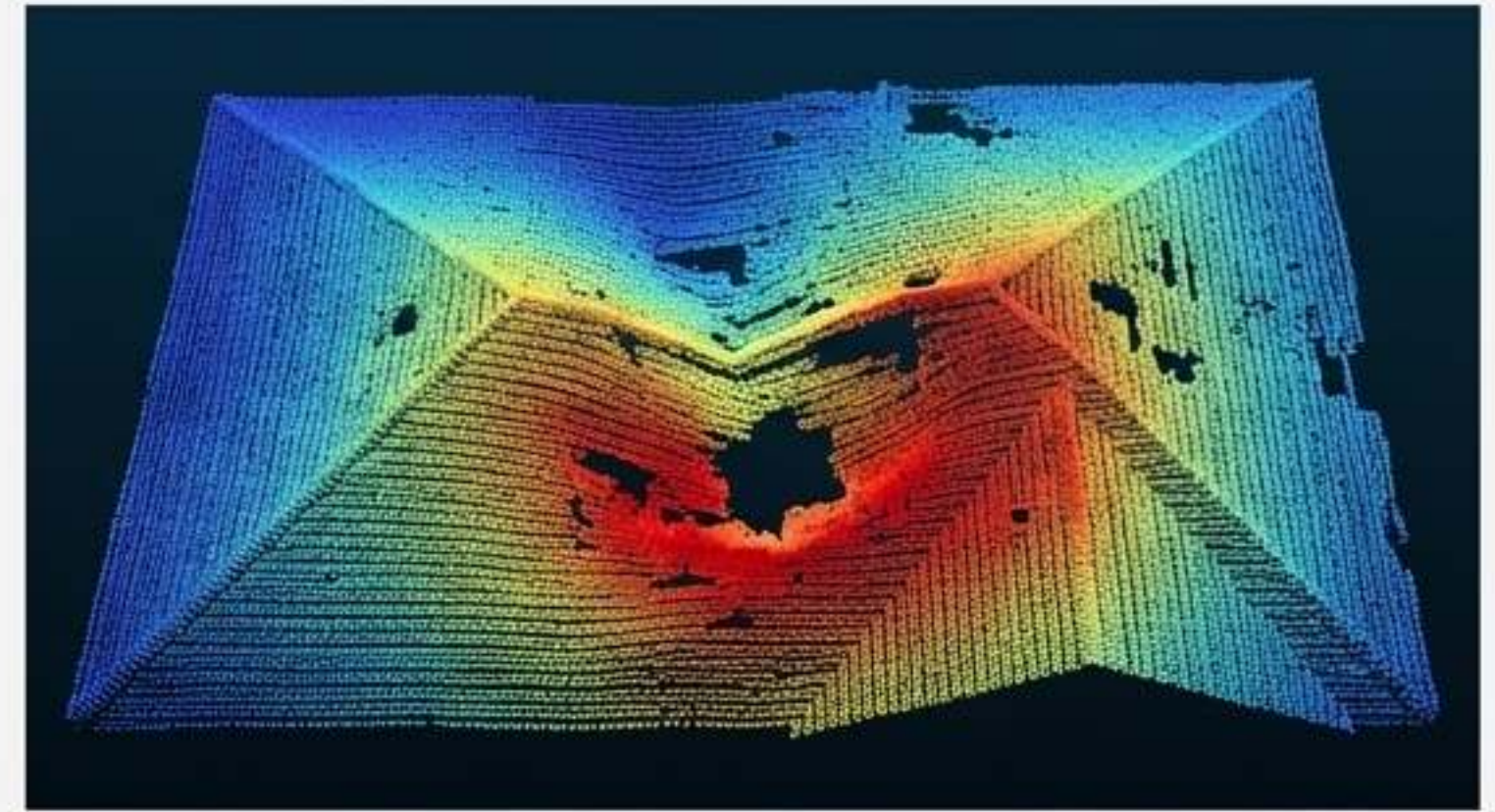
Unlike standard photography which captures a flat, 2D image, LiDAR builds a mathematically precise 3D model of the environment. This provides objective, measurable data on structural integrity.

Standard Photogrammetry



- Can identify visible surface-level damage.
- Relies on interpretation of light and shadow.
- Cannot measure underlying structural deformation.

LiDAR Point Cloud



- Creates a 1:1 scale digital model.
- Precisely measures sag, warping, and changes to the building's geometry.
- Allows for cross-sections and volumetric calculations.

Closing the 48–72 Hour Assessment Gap

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**American
Red Cross**



A wide-angle photograph of an American Red Cross disaster response site. In the foreground, several volunteers wearing red vests with the Red Cross logo are working at tables, organizing supplies like bottled water. In the background, there are several white Red Cross trucks, a large white tent, and a line of smaller white tents. People are seen walking around the site. The scene is set outdoors in a parking lot or open area with some trees and buildings in the distance.

**Let's build a faster, safer
future for disaster response.**

For more discussion:
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