



## LiDAR vs. Photogrammetry: Key Differences & Use Cases

Both **LiDAR (Light Detection and Ranging)** and **photogrammetry** are widely used for creating 3D maps and models, but they have distinct methods, advantages, and applications.

### 1. Technology & Data Collection

| Feature                    | LiDAR  | Photogrammetry  |
|----------------------------|--|---|
| <b>How it Works</b>        | Uses laser pulses to measure distances and generate a point cloud. | Captures multiple overlapping images and reconstructs a 3D model using triangulation. |
| <b>Sensors Used</b>        | LiDAR sensor with laser, GPS, and IMU.                             | High-resolution cameras (drone, aerial, or ground-based).                             |
| <b>Works in Low Light?</b> | Yes, works in total darkness or low-light conditions.              | No, requires good lighting and clear visibility.                                      |



## 2. Accuracy & Detail

| Feature                | LiDAR  | Photogrammetry  |
|------------------------|--|---|
| Accuracy               | Very high (centimeter-level precision).                            | High, but depends on image resolution and processing. |
| Vegetation Penetration | Yes, penetrates through tree canopies to capture ground elevation. | No, only captures surface textures.                   |
| Texture & Color        | No, raw LiDAR data lacks color unless colorized with RGB sensors.  | Yes, provides realistic color and texture.            |

## 3. Cost & Efficiency

| Feature         | LiDAR   | Photogrammetry  |
|-----------------|---|---|
| Cost            | Expensive (LiDAR sensors and processing require specialized equipment). | More affordable (uses standard cameras and software).   |
| Processing Time | Fast – processes point clouds directly into 3D models.                  | Longer – requires stitching and 3D reconstruction.      |
| Data Density    | High-density point clouds, even in complex terrain.                     | Lower density compared to LiDAR, but visually detailed. |

## 4. Best Use Cases

| Application                        | Best Technology | Why?   |
|------------------------------------|-----------------|--|
| Forestry & Terrain Mapping         | LiDAR           | Can see through trees and provide bare-earth models. |
| Surveying & Engineering            | LiDAR           | High precision and works in various conditions.      |
| Architecture & Real Estate         | Photogrammetry  | Provides detailed, textured 3D models.               |
| Urban Planning & Mapping           | Photogrammetry  | More affordable for large-scale 3D city modeling.    |
| Mining & Infrastructure Inspection | LiDAR           | Captures precise elevations and structures.          |
| Historical Site Documentation      | Photogrammetry  | Creates realistic visual representations.            |



### **Final Verdict: Which One Should You Use?**

- ✓ **Use LiDAR** if you need precision, penetration through vegetation, or work in low-light conditions.
- ✓ **Use Photogrammetry** if you need cost-effective, high-resolution visuals for modeling and analysis.
- ✓ **Combine Both!** Many projects use LiDAR for accuracy and photogrammetry for realistic textures, creating a powerful hybrid model.