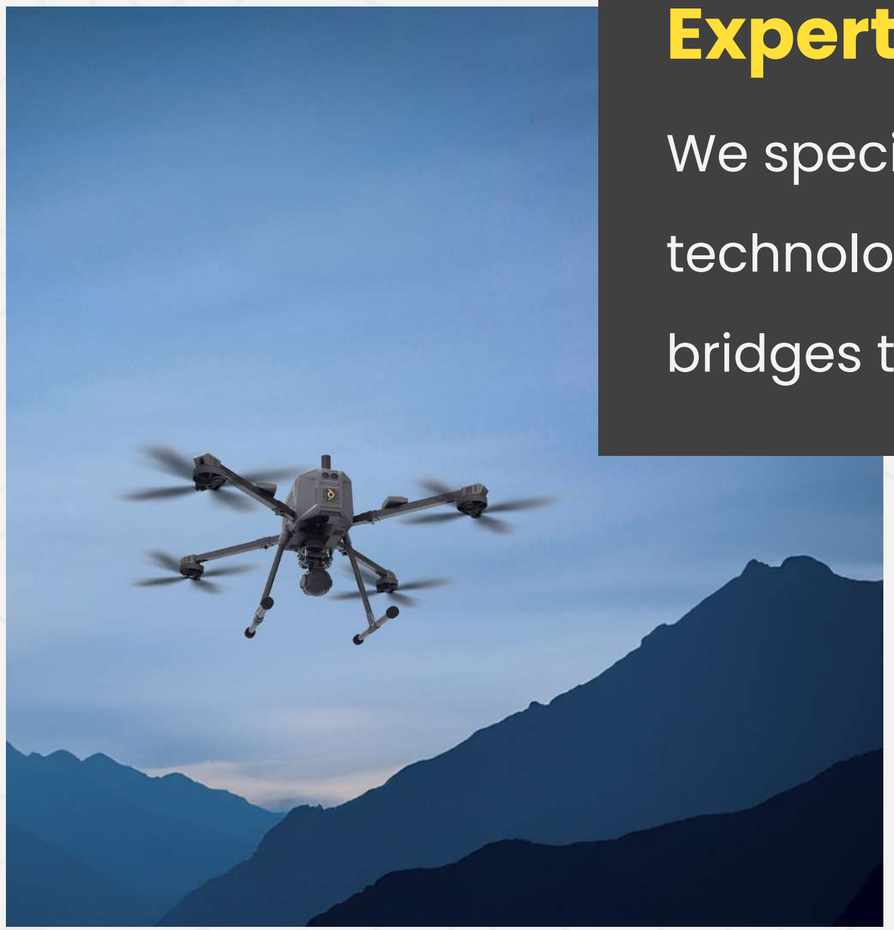
indrones
#RapidGroundTruthing

Transforming Project Planning with Aerial Surveys and Digital Twins

Case Study: METRO LINE 5

Enabling Data-Driven Decisions for the Kalyan to Thane Alignment

Who We Are



Experts in Aerial Intelligence

We specialize in drone surveying, photogrammetry, and LiDAR technologies for large-scale infrastructure projects. Our team bridges the gap between physical reality and digital planning.

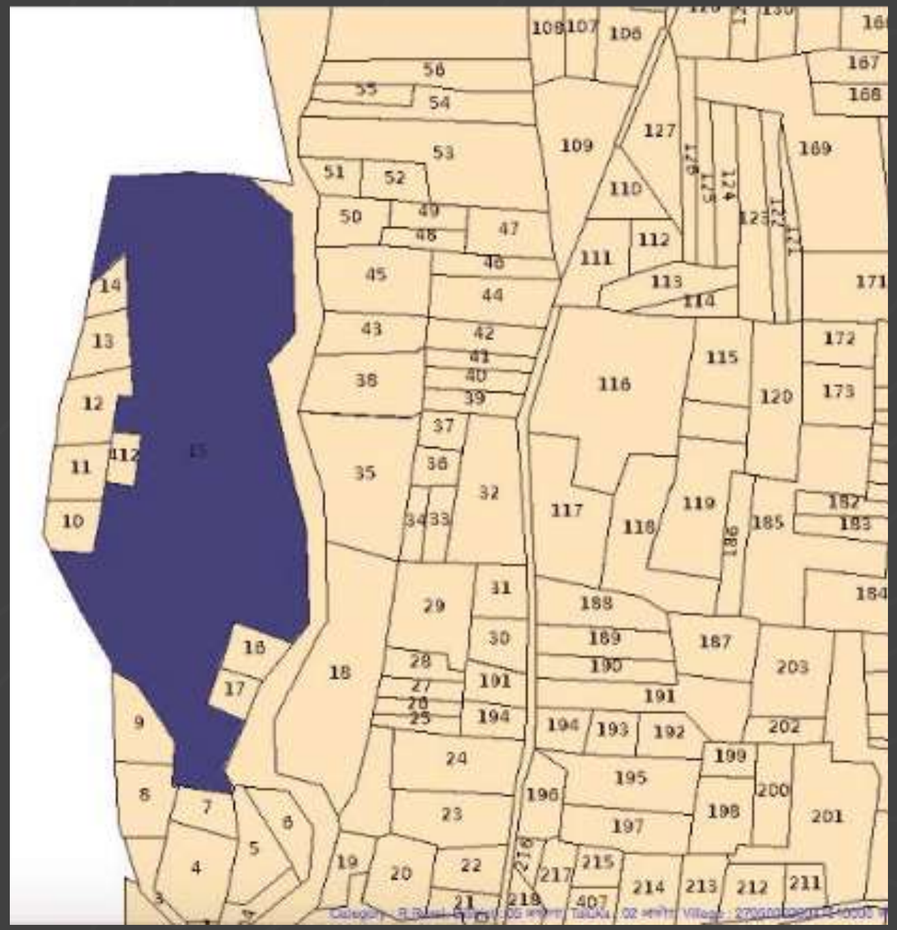
- Precision Engineering
- 3D Reconstruction
- Advanced Data Analytics

The "Old World" Challenge

The "Tikka Sheet"

Traditional land records are maintained on fragmented paper sheets known as "Tikka Sheets".

- **Isolated Data:** Represents very small land parcels with no broader context.
- **Manual Effort:** Project planning requires painstaking manual collation of hundreds of these sheets.
- **Unsuitable:** Completely inefficient for modern, linear infrastructure planning like a metro line.

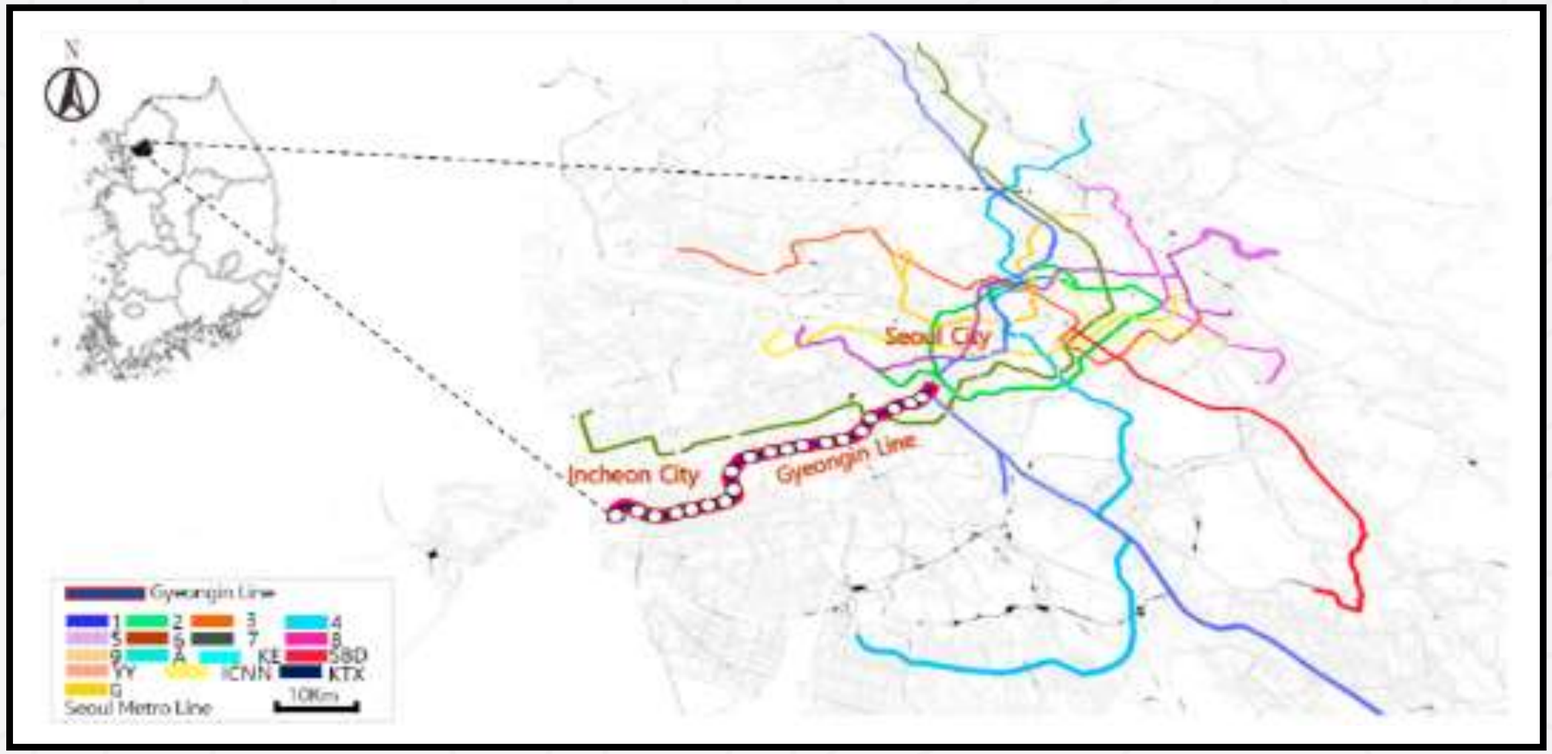


The Digital Gap

2D Maps: Lines on a Void

Digitizing the paper maps gives us a continuous route, but it lacks reality.

- **No Context:** The proposed plan overlays on a black background.
- **Blind Planning:** Project planning requires painstaking manual collation of hundreds of these sheets.
- **Feasibility Risks:** Critical obstacles remain invisible until site visits.



The Survey Bottleneck

Total Station Limitations

We created detailed drawings using Total Station surveys to locate pillars and chainage.

Slow: It took **2 months** with 2 teams to collect this data.

Dangerous: The area was disputed. Our surveyors faced hostility and physical threats from locals, making ground-level data collection extremely risky.

The Aerial Solution

Drone Photogrammetry

We mitigated the risks and delays by deploying drones.

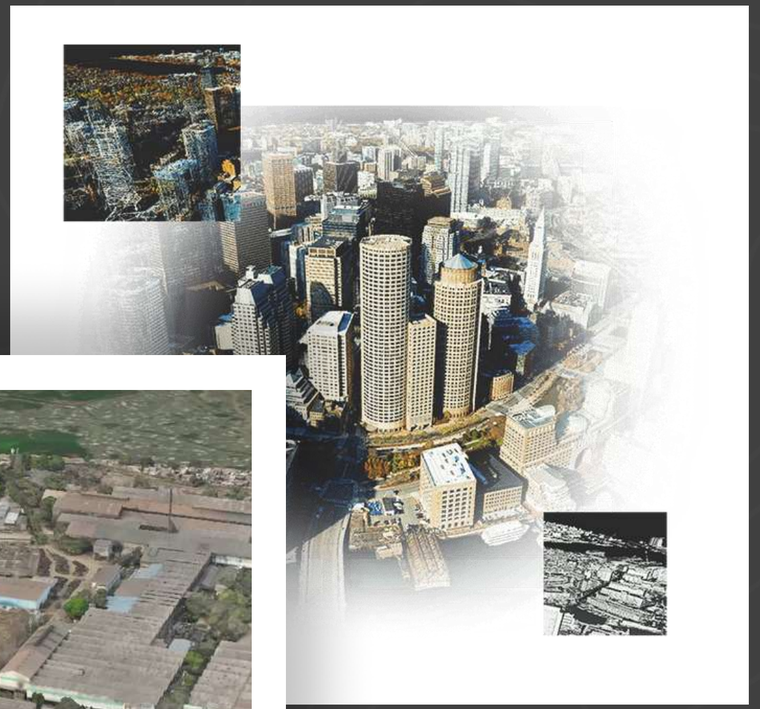
- **Safety:** "Eyes in the sky" allowed us to survey disputed areas without boots on the ground, avoiding conflict.
- **Context:** We created a high-resolution orthomosaic. The background image now provides rich, real-world context for every meter of the alignment.

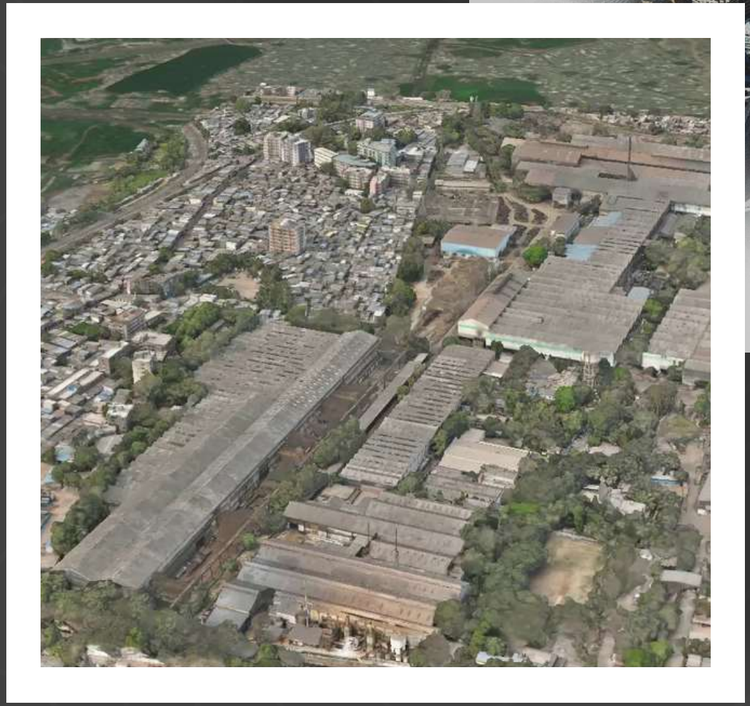
Beyond 2D: 3D Reconstruction

Oblique Imagery & LiDAR

2D is not enough for complex urban environments. The drone captures oblique angles and LiDAR data to build a 3D reality.

- **Accurate Heights:** Measure building heights and clearances directly from the model.
- **Volumetric Analysis:** Precise terrain and structure volume calculations.
- **Real-World Perspective:** Planners can virtually "fly" through the site.





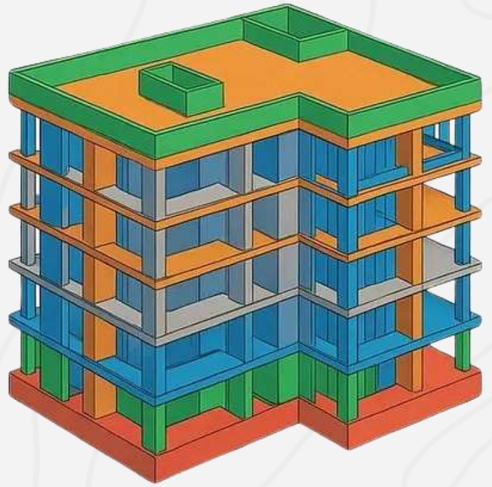
The Digital Twin

The ultimate planning tool. By overlaying the proposed CAD metro model onto our 3D reality capture, we create a Digital Twin. Planners can visualize the functional metro line in its actual environment, assessing impact and feasibility with unmatched clarity.

Construction Progress Monitoring with Drone + BIM Integration

Aerial Visuals

Track Timelines and Quality



BIM Model

Linked to BIM Models

Impact Summary

Speed

Reduced survey time from 2 months to just a few days, accelerating the entire planning phase.

Safety

Completely eliminated risk to human surveyors in hostile, disputed territories by operating remotely.

Clarity

Transformed abstract 2D drawings into rich, actionable 3D intelligence for better decision-making.

Accuracy

Achieved millimeter-level precision with drone LiDAR, surpassing traditional limitations.

Questions?

Thank you.