3D Laser Scanning to Detect Property Encroachment

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Outline

Introduction
Evolution in Surveying Techniques
Encroachment Detection
Virtual Survey Using 3D Point Cloud
Benefits of TLS in Encroachment Detection
Concluding Remarks
**Introduction**

SLA manages approx. 14,000ha State lands & 5000 State buildings.

- Building Management & Land Management teams.
- Land Survey Division.

**Encroachment Detection**

Conventionally

- Total Stations.
- Traverse based on control markers or RTK.
- Slow and potentially unsafe.
Conventionally
- 2D encroachment sketch.
- Imagination to relate to the ground features.

Laser Scanning Approach
3D Laser Scanner
- Records everything line of sight in $x$, $y$, $z$
- Zero set-back
- Multifaceted structure
Data Acquisition & Processing

Purpose of survey
• To record the whole scene.
• To identify the possible encroachments.

Scanning method
• Common targets and traverse workflow.
• Coordinates based on survey markers or RTK.
• Setup at optimum location for best coverage.
• Total time on site was less than half a day.

Pre-processing
• Register & geo-reference raw point cloud
• Noise removing
• Extract relevant cadastre boundaries
• Overlay point cloud
Virtual Survey Using 3D Point Cloud
Symbolize by classes

- 0-0.03m
- 0.03-0.5m
- 0.5-1.0m
- 1.0-1.5m
- 1.5-2.0m
- >2.0m
Decisions are made on site or in office?

Benefits of TLS

- Fast, accurate and comprehensive.
- Improve productivity.
- Shift the decision making from the site to the office.
- 3D measurement in “virtual survey” mode.
- Safer – non-contact – away from danger.
Concluding Remarks

• Usage & workflow of TLS in encroachment detection.
• Overlaying of point cloud with GIS cadastral survey boundaries.
• Improve productivity, reduce risk & avoid omissions.