3D Laser Scanning to Detect Property Encroachment

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XXV FIG Congress
Kuala Lumpur, Malaysia
16 – 21 June 2014

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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

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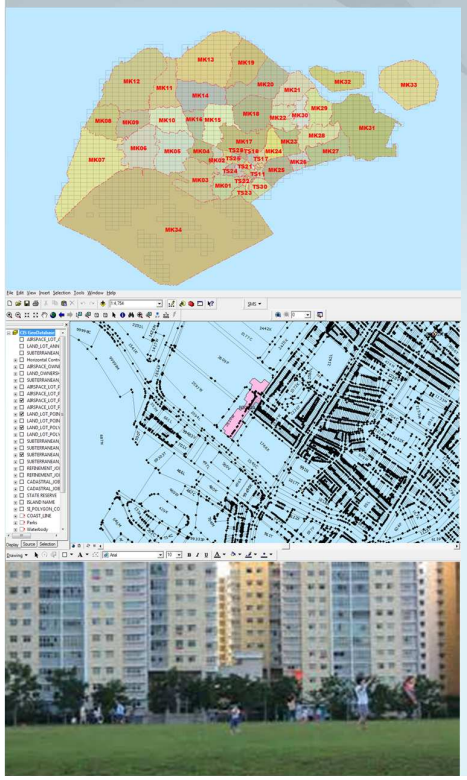
Introduction



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

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

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Encroachment Detection

Conventionally

- Total Stations.
- Traverse based on control markers or RTK.
- Slow and potentially unsafe.

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Conventionally

- 2D encroachment sketch.
- Imagination to relate to the ground features.

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Laser Scanning Approach

3D Laser Scanner

- Records everything line of sight in *x, y, z*
- Zero set-back
- Multifaceted structure

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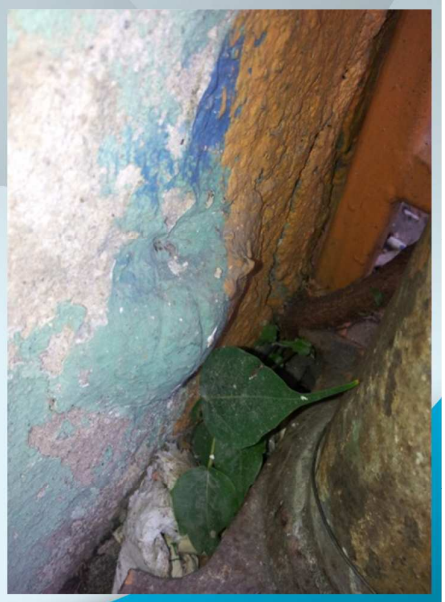

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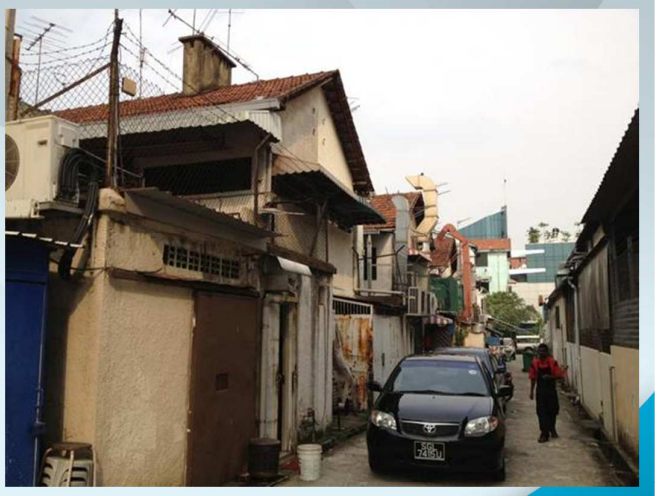

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Data Acquisition & Processing

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.

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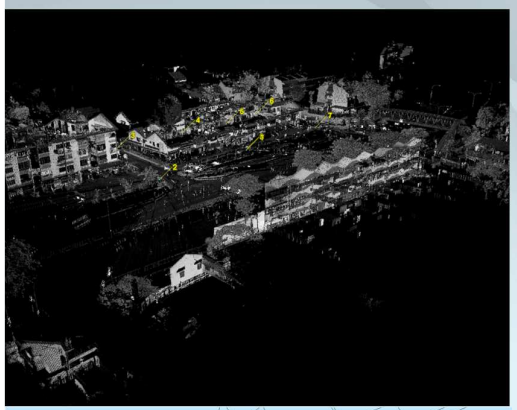

Pre-processing

- Register & geo-reference raw point cloud
- Noise removing
- Extract relevant cadastre boundaries
- Overlay point cloud

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Virtual Survey Using 3D Point Cloud

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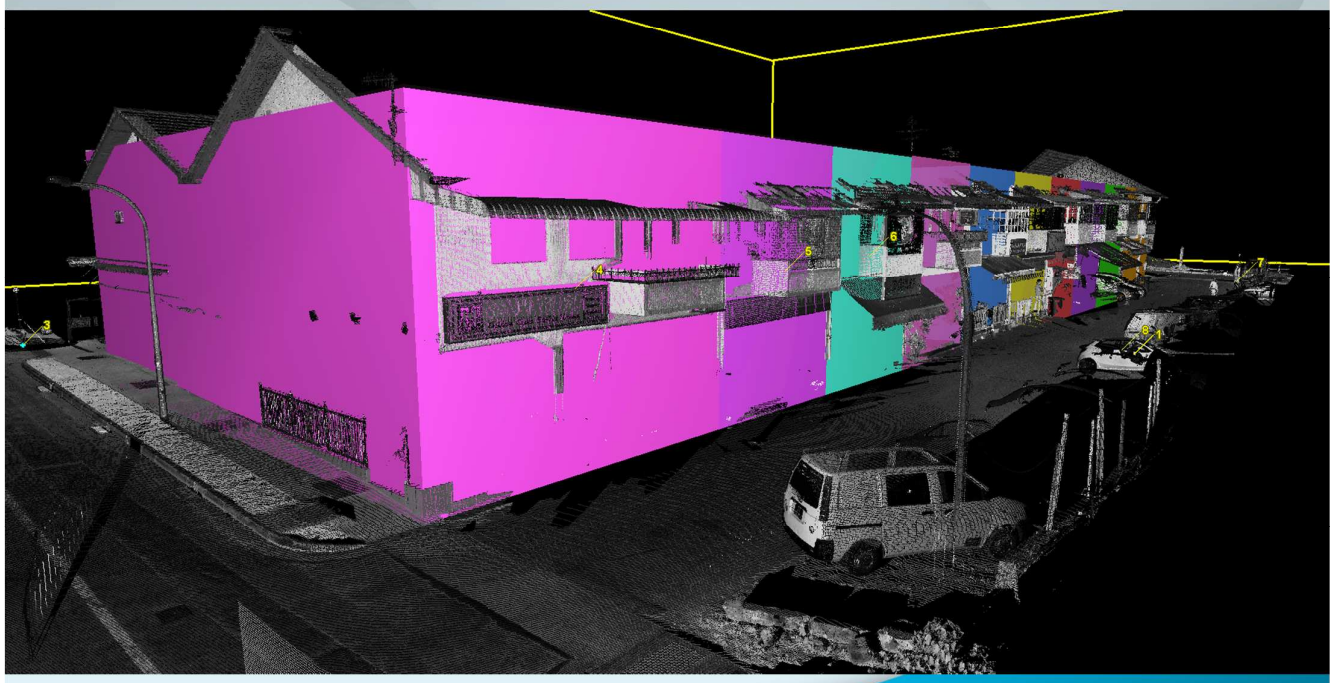

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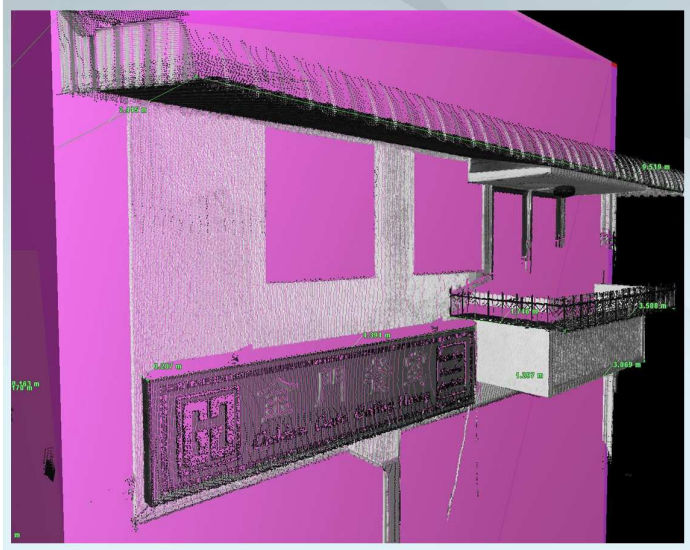

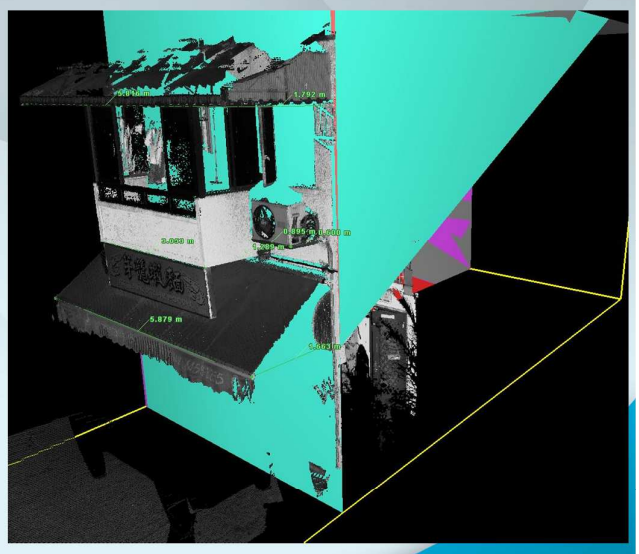

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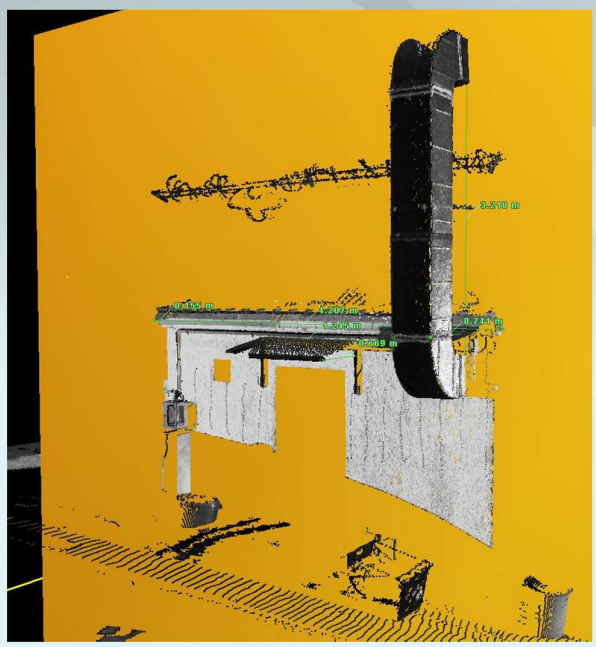

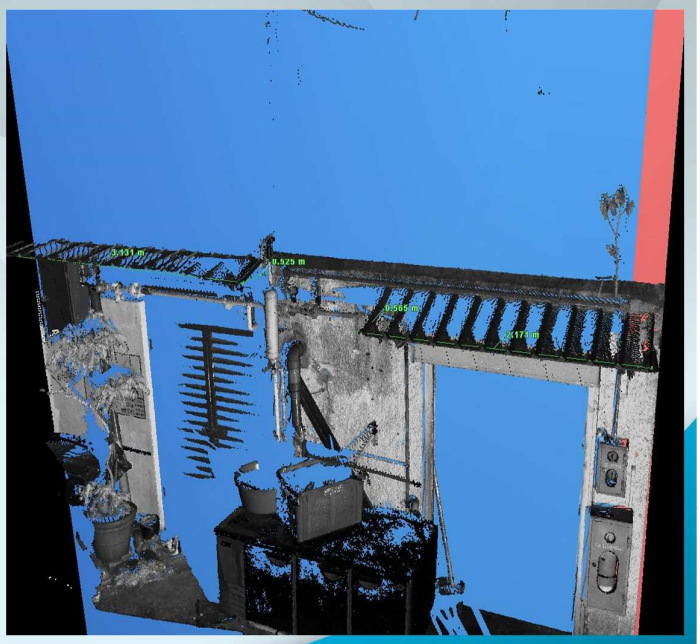

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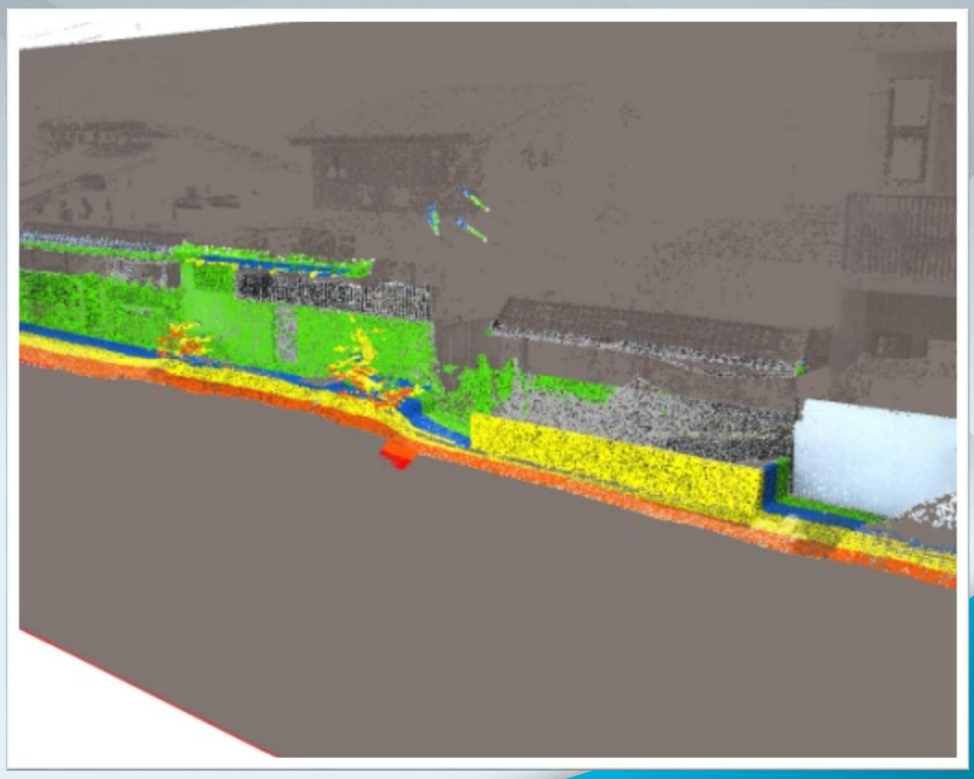
Symbolize by classes

- 0-0.03m
- 0.03-0.5m
- 0.5-1.0m
- 1.0-1.5m
- 1.5-2.0m
- >2.0m



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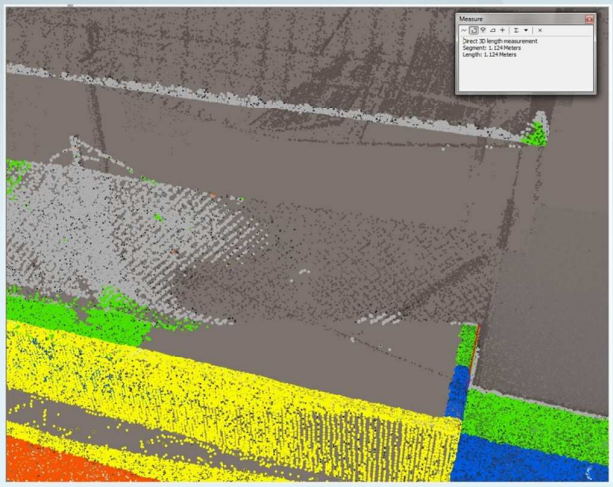
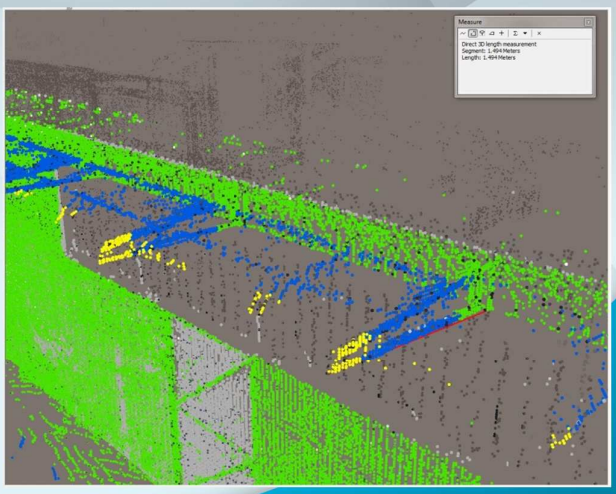
Decisions are made on site or in office?





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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.

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Concluding Remarks

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

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