

Evaluating Collision Investigation and Reconstruction Capabilities with Laser Scanning

GGE 4700 Technical Report

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Overview

- Introduction
- Existing methods
- Collision scene
- Data collection
- Data processing
- Results
- Conclusions

Introduction

- Current methods require long road closures
- Laser scanning offers increased speed and efficiency
- What new information is possible?
- Is accuracy comparable?

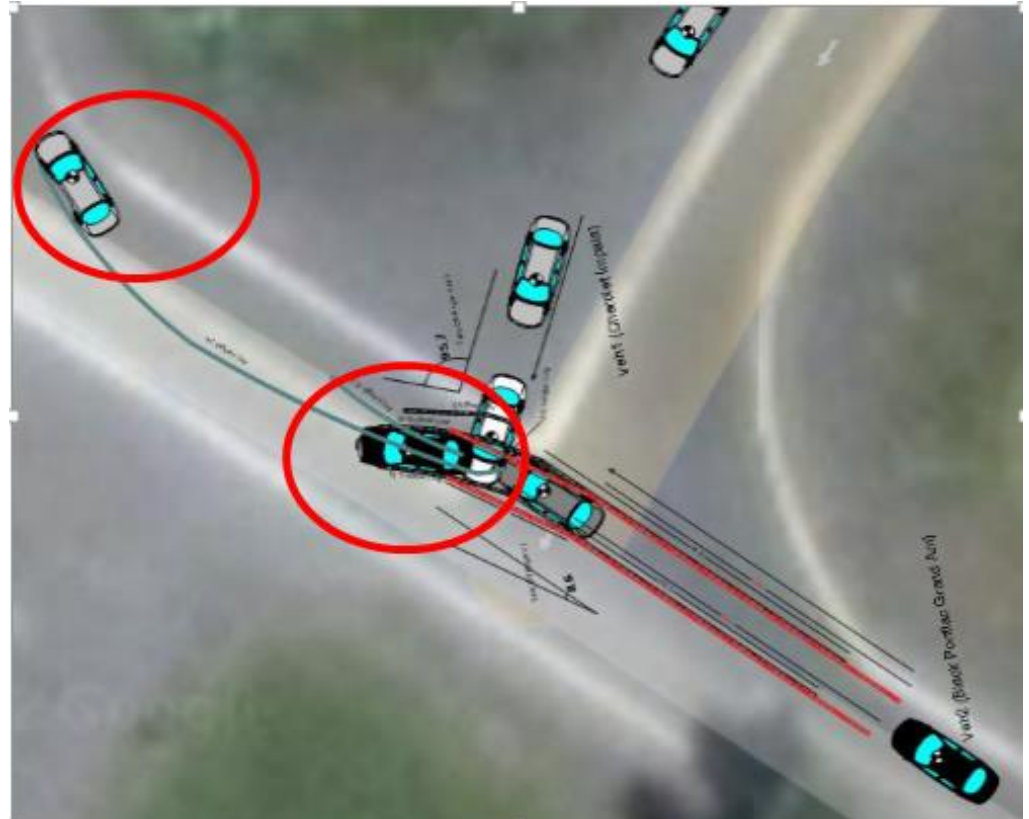


Existing methods

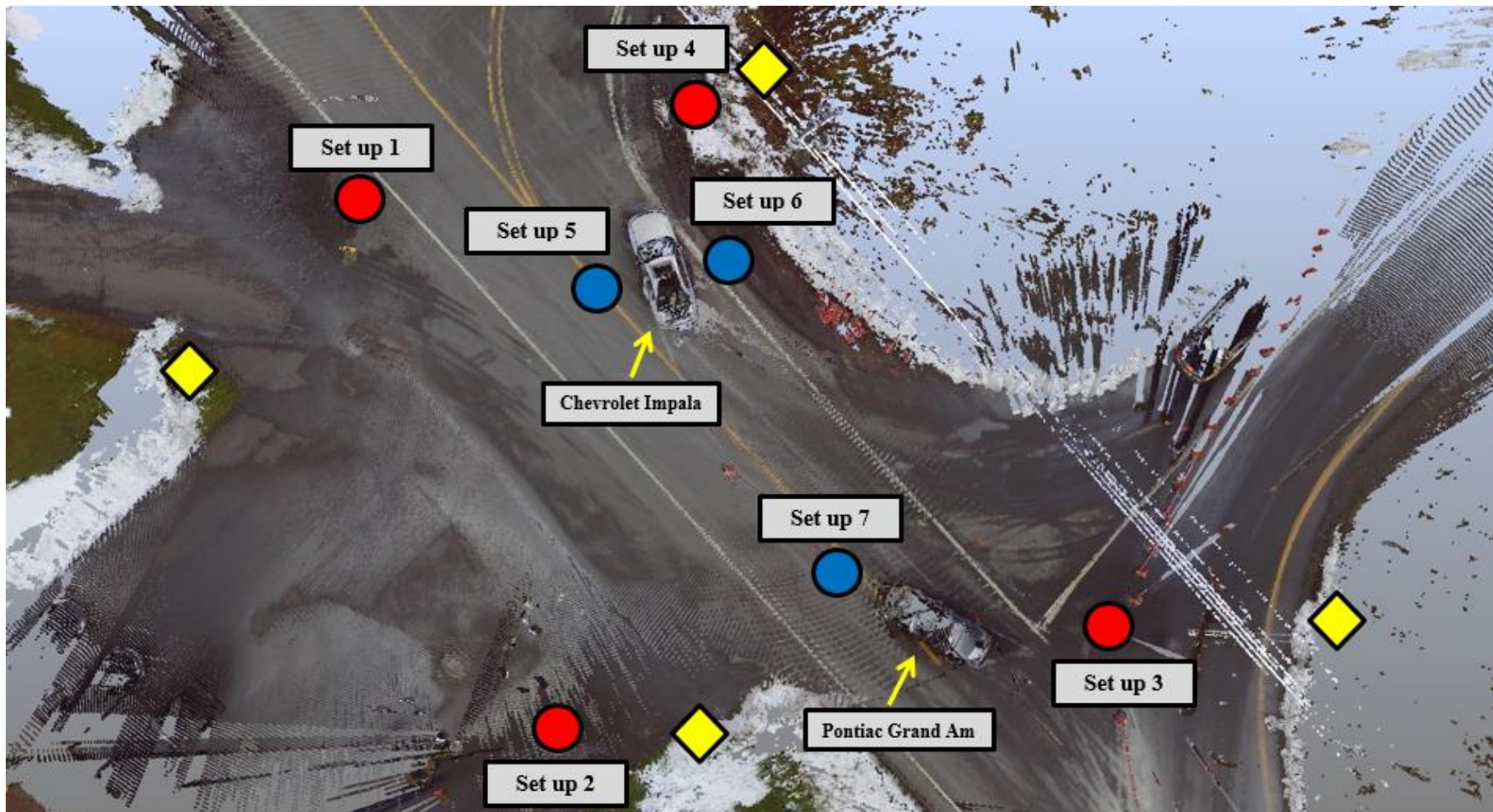
- Measurements of tire skid marks and points of interest
- Current methods:
 - Measuring tape (baseline)
 - Total station
- Diagram
- Photographs

Collision Scene

- 2 cars in post impact position
- Replication of true collision
- Chalk marks replicating tire skid marks



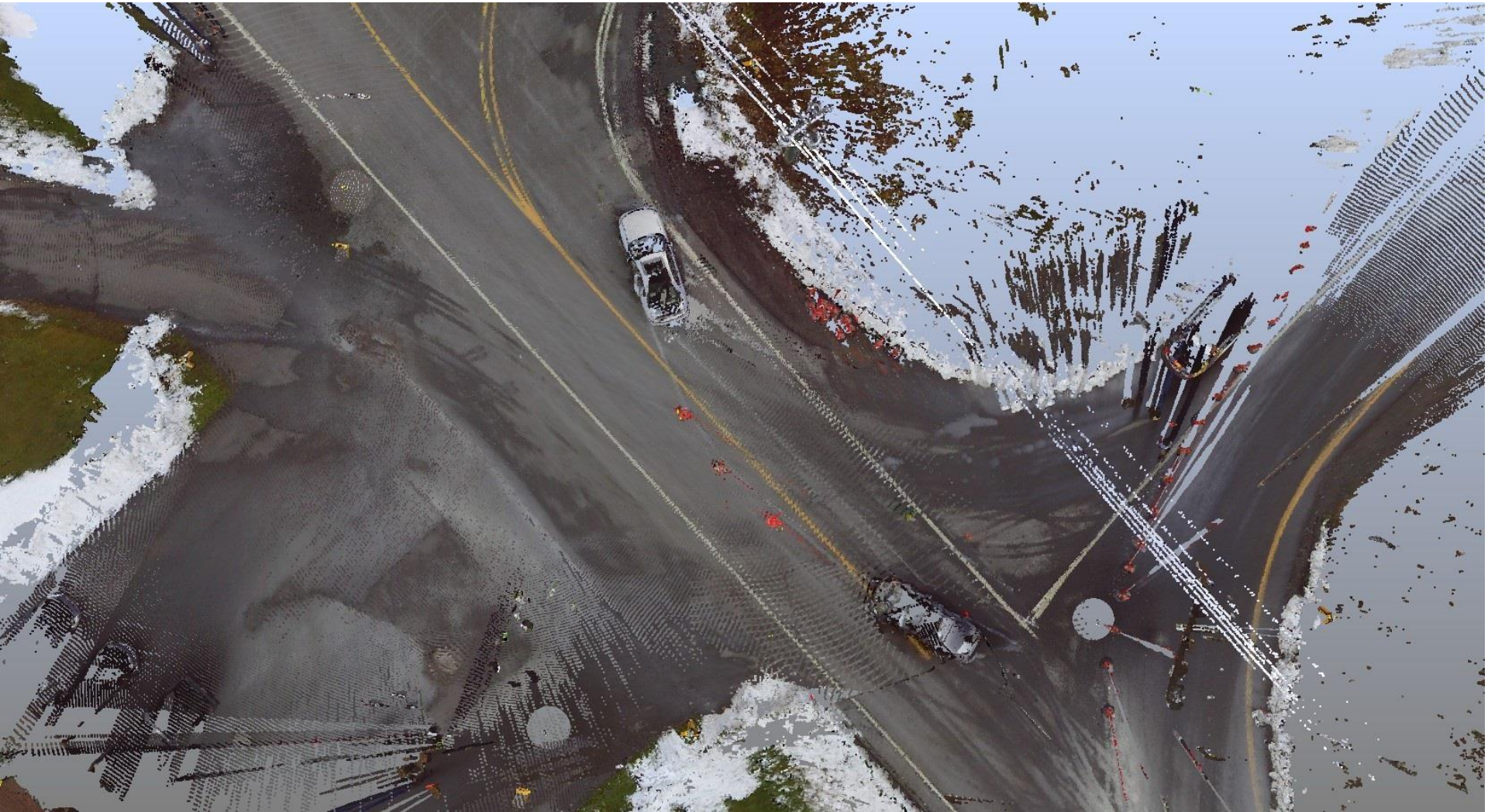
Data Collection



Data Processing

- Trimble SCENE
- Correspondence points: minimum 3 between scans
- Registration
- Apply pictures

3D Model after Registration





Issues Encountered during Registration

- Lack of common scan angle meant no correspondence points were chosen on cars
- Missing data caused discrepancy on Grand Am

Black car discrepancy



Comparison Results

Measurement	Point Cloud (m)	Total Station (m)	Baseline (m)	Difference (cm)
Impala rear tire (driver side)	4.976	5.00	5.07	2 cm (total station) 9 cm (baseline)
Impala rear tire (passenger side)	4.090	4.09	4.16	0 cm (total station) 7 cm (baseline)

Results

- New information possible (3D model)
- Comparable accuracy
- Benefit: capture collision scene and make measurements in office

Conclusion

- With proper planning and education, laser scanning can improve reconstruction and investigation capabilities

Acknowledgements

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