Mobile Lidar for Intersection and ADA Inventories

GIS-T 2018
THE NATURE OF DATA
LITTLE ROCK, ARKANSAS

CONTINENTAL MAPPING CONSULTANTS, INC.

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Overview

- ADA Background
- Approaches to ADA Projects
- Minnesota DOT/Continental Mapping History
- Lonsdale, Minnesota & TH 19
- Project Approach
- Results
- Data Applications
Americans With Disabilities Act

Title II of ADA: “…no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity…”

The ADA requires public agencies with more than 50 employees to make a transition plan:

- Identify physical obstacles
- Describe how accessibility will be achieved
- Include a schedule
ADA Requirements – Roadway Alterations

- Alterations require bringing curb ramps up into compliance.
- Alterations can best be defined as anything that isn’t maintenance.
- Any change to a crosswalk, even an unmarked one, requires an assessment, and upgrade if needed.
- Federal funds need not be involved.
ADA Requirements – Design

- 2010 ADA Design Standards cover slope, location, size, drainage, islands, clear zones...

- Examples:
  - 36” width of ramp and landing
  - 1:12 maximum slope of ramp
  - 1:48 cross-slope maximum
  - Curb ramps at marked crossings must be wholly within the marking
Approaches to ADA Projects

• Traditionally done with boots-on-the-ground
  • GPS can be blocked
• Stationary lidar scanning is an ideal solution, but it can be:
  • Slow and expensive for large projects
  • Needs multiple shots, including in roadway
• Mobile lidar and imagery
Mobile Lidar for ADA: Advantages and Uses

• Other features can be added, as well as imagery to support reporting and reference
• Measurements of size and slope are supported
• Can identify many instances of non-compliance without entering the roadway – first cut at identification
• Also provides information for design requirements in the same project
MnDOT/Continental Mapping History

- High-accuracy mobile lidar
- Stringless paving
- Survey-grade asset inventory trial
- Statewide asset inventory
- Aerial Mapping

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Lonsdale, MN and TH 19

- Approximately 2,000 population
- 40 miles south of Minneapolis
- 65 miles from District office
Lonsdale, MN and TH 19

- TH 19 crosses entire state east-to-west, 200+ miles
- Redesign needed due to increased traffic & safety issues
Project Approach

• Z-value of control points established using digital leveling, points every 500 feet
• Survey-grade lidar and roadway imagery (4 cameras)
• TIN created from break lines and mass points, five-foot minimum
• Features included ramps, crosswalks, roadway surface, building faces, entryways and steps, sidewalks, signs, poles
Survey-Grade Lidar

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CAD Data and Roadway Imagery
Complete CAD Data
Mobile Lidar for ADA Inventory: Results & Recommendations

• Deliverables: LAS files, breaklines, TIN, color imagery, Microstation CADD data
• Completed one week ahead of schedule
• Accuracy was 0.05’ (1.5 cm) at 95% confidence
• Perfect score from MnDOT
• Recommend combining projects where possible
• The longer and/or busier, the more mobile lidar makes sense
Craig Gooding
Sr. Account Executive
cgooding@continentalmapping.com
888.815.3327