Introduction to Static LiDAR Scanning

Presented By: Anthony Falbo P.L.S.
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LiDAR Scanning Overview

- Scanning background
- Applications
- Strengths
- Weaknesses
- Scanning Examples
LiDAR = light detecting and ranging
Types of Scanners

- **Airborne**
  - Aerial Platform LiDAR

- **Terrestrial:**
  - Mobile Ground LiDAR
    - Used by autonomous vehicles
    - Cars/boats
  - Static LiDAR
    - Set up on tripod
Airborne Scanners

Mobile Terrestrial Scanners

Gmv.cast.uark.edu

Techcrunch.com
Static Terrestrial Scanners
Applications

• Land Surveying/Civil Engineering
• Geological/Ecological Monitoring
• City Planning
• Architecture
• Archaeology
• Crime Scene Preservation (Forensic)
• Video Gaming
Land Survey & Engineering

- Structure or Site monitoring
  - Retaining walls
  - Pavement
  - Bridges
- As-Built Surveys
- Historical Preservation
  - Interior and exterior of structures
Geological & Ecological Monitoring

- Mining
  - Monitor unlined tunnel
  - Monitor for support structure deformation
- Analyze hard to reach rock structures
- Slope monitoring
- Measure leaf density of vegetation
- Capture existing stream bank conditions
Survey Control

- Establish survey control
  - Network of control points – known coordinates

- Can provide different coordinate systems depending on need
  - Tied to survey control by spheres and checkered scan targets
Workflow (cont.)

Office
• Process and adjust point cloud
• Classify the point data
  ➢ Most scan processing software automatically classifies or moves like points to specific feature layers

Before Classification with image overlay.
Workflow (cont.)

- Further review of layers is required
- Create classification layers and classify as necessary
Fisher Scanning Examples

• Marcy Pedestrian Bridge Forensic Survey
Fisher Scanning Examples (cont.)
• Calspan Helium Tank As-Built Survey
Fisher Scanning Examples (cont.)

- Thurston Avenue Bridge Topographic Survey
Scanning Examples (cont.)

- Exposed Slide Scan
  (by others)
Strengths

• Assurance
  ➢ Scan data is adjusted to survey control after scans are registered

• Safety
  ➢ Capture valuable data in areas where field crews may not be able to reach
  ➢ Elevated platforms, confined spaces, busy roadways, etc.

• Thorough
  ➢ Generally, no bad shots on break lines or missed features

• Superior to traditional surveying for volume surveys
  ➢ Gets all bulges and voids
  ➢ More accurate with dense point clouds.

• Reduces 2nd trips
  ➢ Point data extends beyond area of interest (data in the can)
  ➢ Able to pick additional features from point cloud
Weaknesses

- Reflective Surfaces
- Snow
- Rain
- Vegetation
- More labor intensive in the office, although, the time balances out.
Questions?
Sources