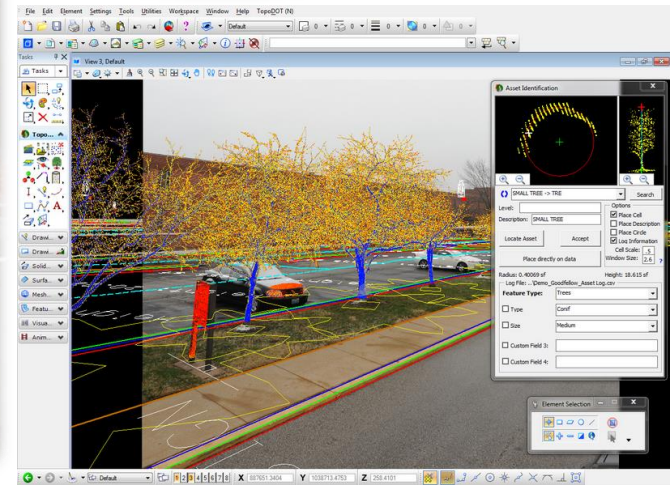
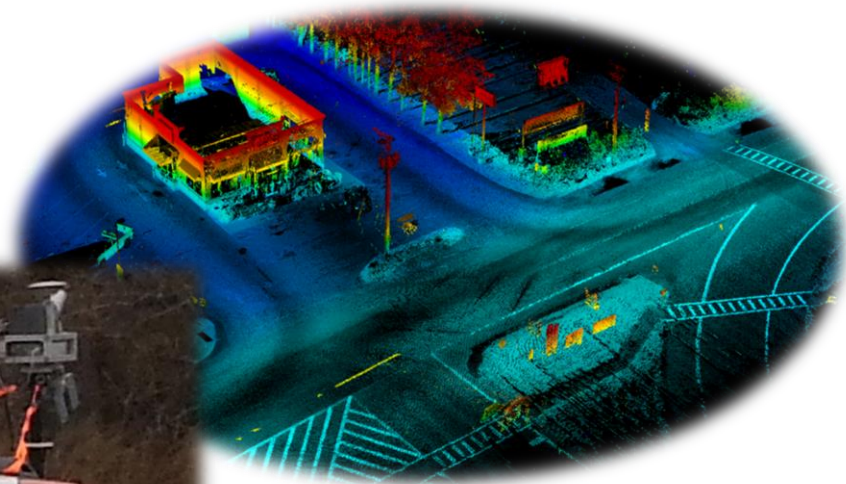




Engineering and
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MOBILE LiDAR - Revolutionized 3D Data Collection

Michael Koterba
3D Laser Scanning
Program Manager

Michael Pianka, GISP
Geospatial Services
Technical Lead

NY GeoCon 2015

About MJ



Engineering and
Land Surveying, P.C.

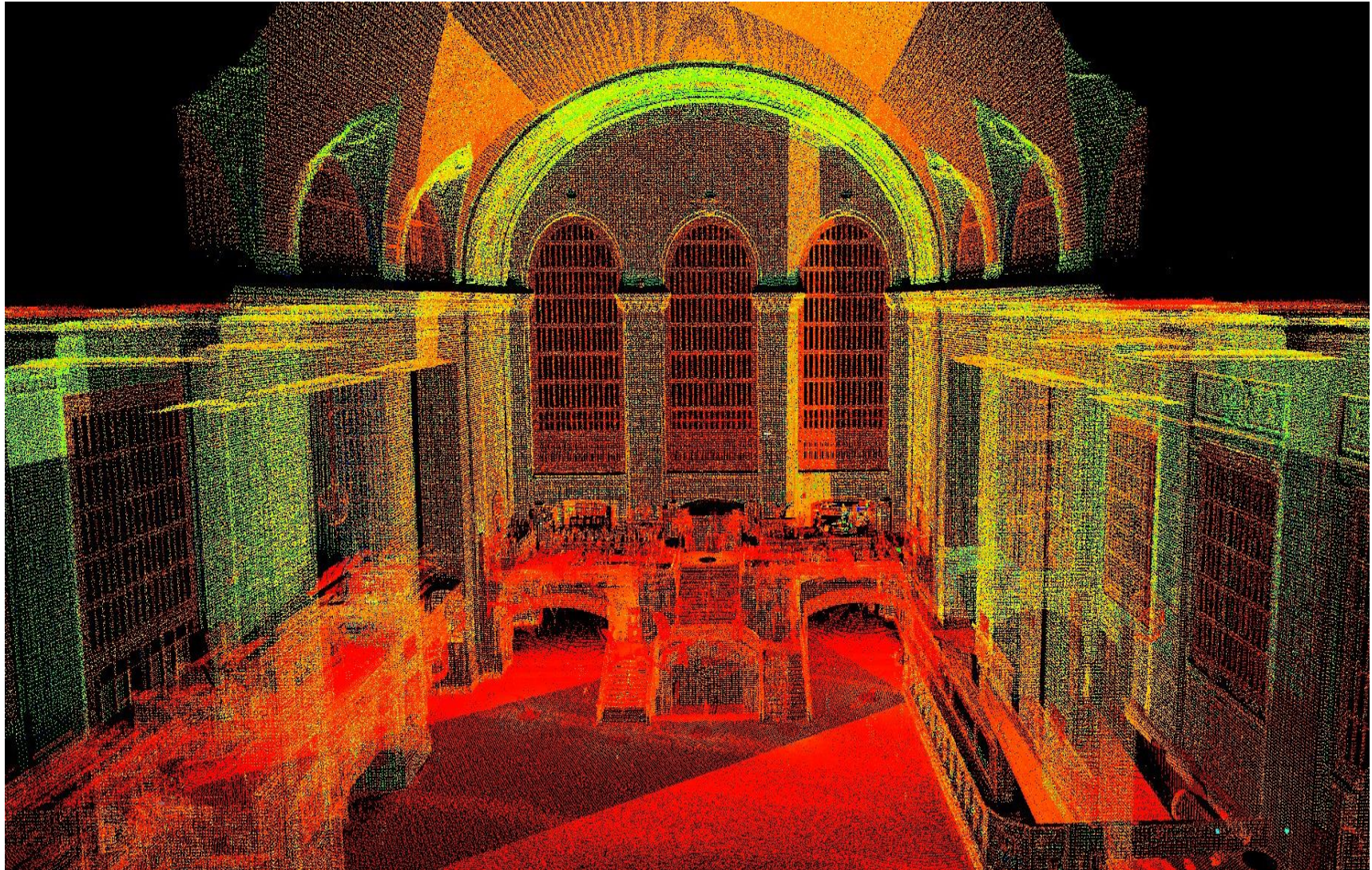
- Engineering and Surveying Firm Headquartered in Saratoga County since 1979
- 2015 marks the hiring of our **100th** staff member
- Providing Engineering, Surveying, & GIS Services to Federal, State, Municipal and Private Clients
- Providing 3D Laser Scanning Services since 2004

About Laser Scanning

Terminology:

- The Processes
 - ✓ 3D Laser Scanning
 - ✓ Mobile Mapping
 - ✓ High-Definition Scanning (HDS)
- The Collection Technology
 - ✓ Light Detection and Ranging (LiDAR)
- The Data
 - ✓ Point clouds (.LAS files – industry standard)

Point Cloud – Grand Central Station



About Laser Scanning

HDS Capabilities:

- Infrastructure
 - ✓ Safe, cost-effective roadway surveys
- Sites
 - ✓ Small sites and sites up to hundreds of acres cuts initial survey costs and reduces site re-visits
- Buildings
 - ✓ Small buildings and tall buildings can be surveyed
 - ✓ Interior and Exterior Scans
 - ✓ Digital photos can be overlaid for added realism

About Laser Scanning

Uses of Scanning:

- Historic Preservation
- Detailed Measurements
- Surveying Hard-to-Reach Areas
- Construction Progress
- Reduce Site Visits
- Record Exact Data
- Hazard Surveying
- Accident Reconstruction



About Laser Scanning

- Time-of-flight (pulsed) measurement

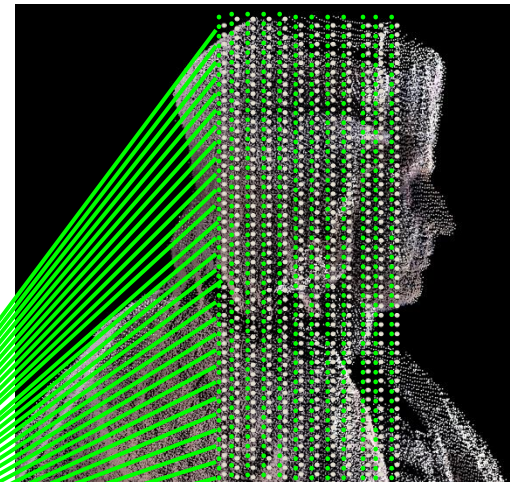
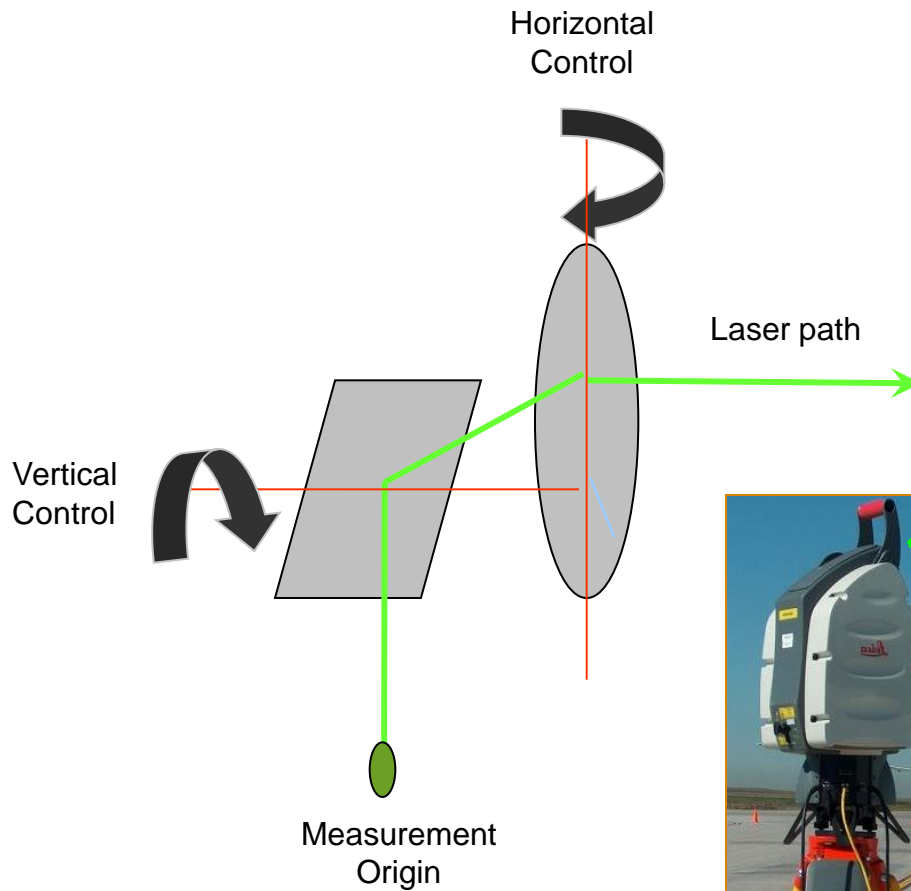


- Phase-based (continuous) measurement



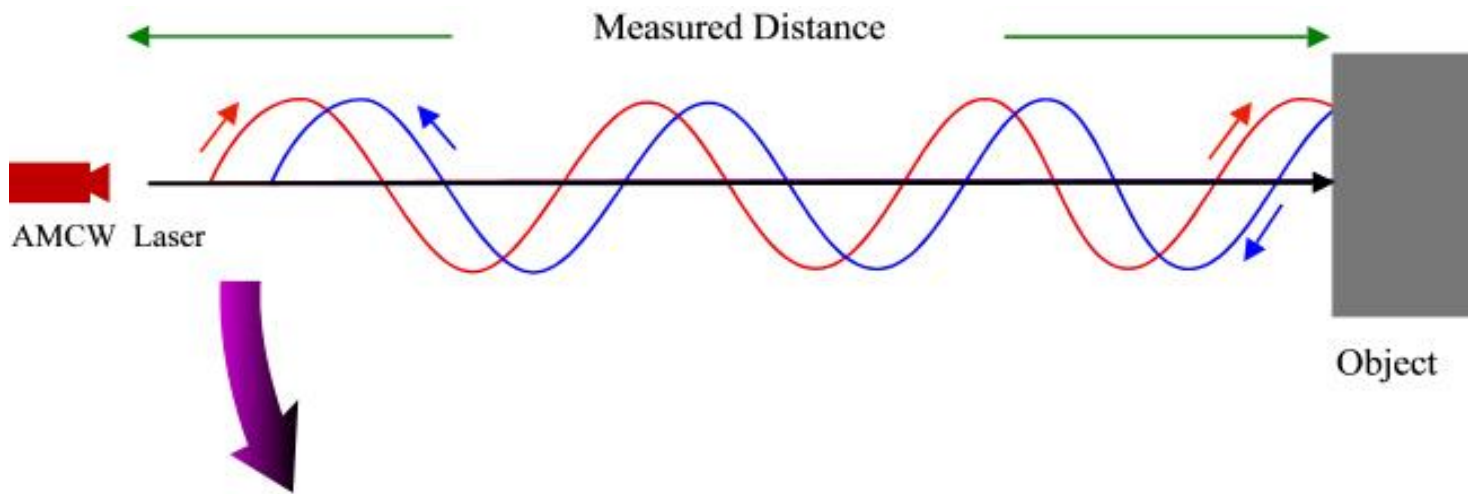
About Laser Scanning

Time-of-flight range measurement: Pulsed



About Laser Scanning

Phase-based range measurement: Continuous



Advantage: Very high speed (>100k pts/sec)

Disadvantage: short range (>50m), requires multiple setups

About Laser Scanning

Benefits of Scanning Include:

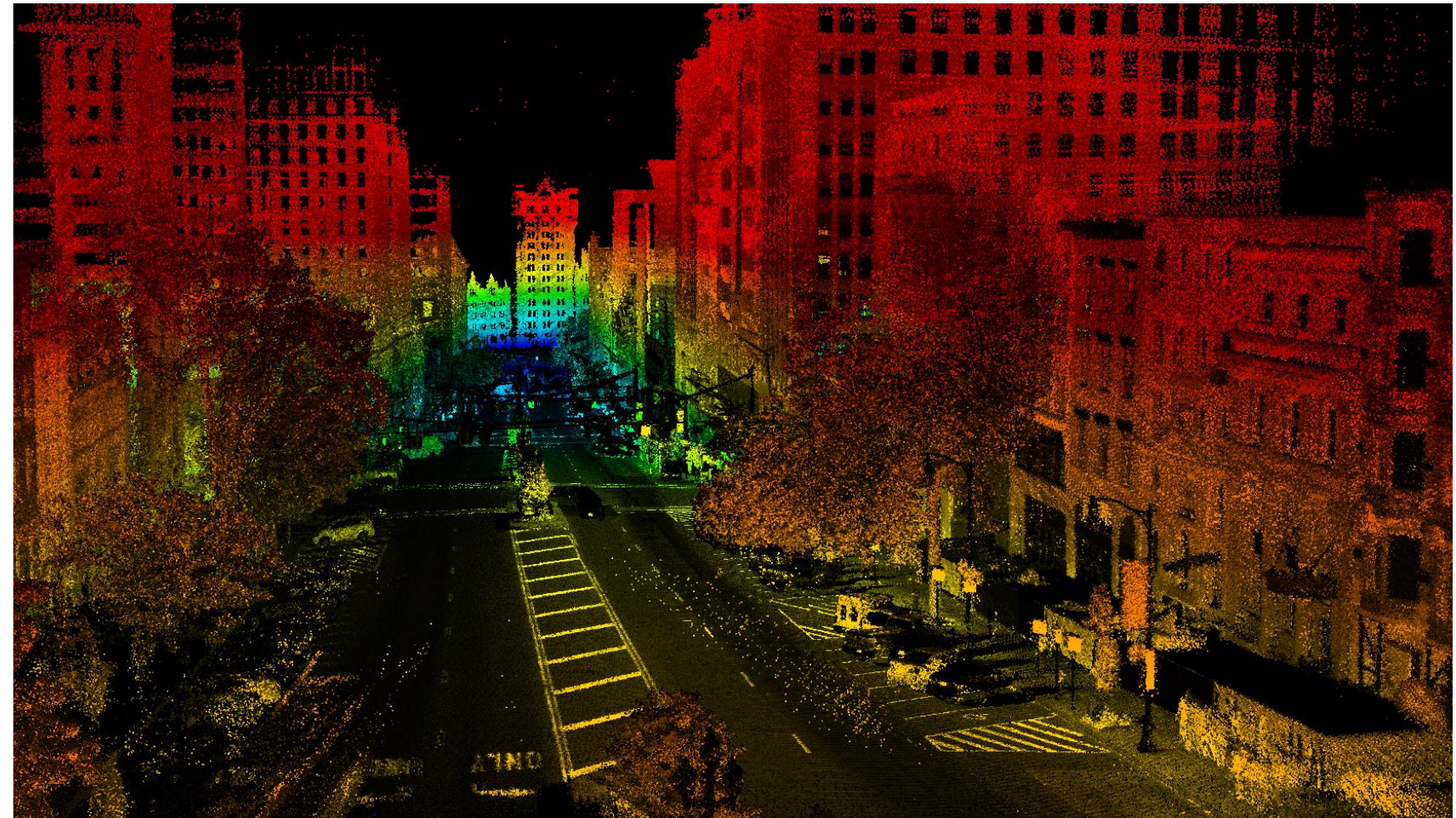
- Immediate real-time information
- Elimination of traffic outages
- Significant overall time-savings
- Reduction in costs
- Attainment of 3/16" accuracy
- Measurement in inaccessible / unsafe areas
- Development of extensive detailed database

Mobile Mapping

What if all of this could be accomplished while moving / driving at roadway speeds?



Mobile Mapping



Mobile Mapping

- Travel up to highway speeds
- 1.7 million LiDAR data points per second
- Panoramic street view imagery
- Multiplies advantages of static scanning to greater scales
 - Merged 3D data and imagery produces a visually-rich 3D environment from which accurate measurements can be made
 - Mobile platform scales this capability to large project areas

Mobile Mapping

Mobile Laser Scanners:

- Variety of manufactures
- Utilize GPS observations in combination with inertial positioning
- Results available real-time or post processed

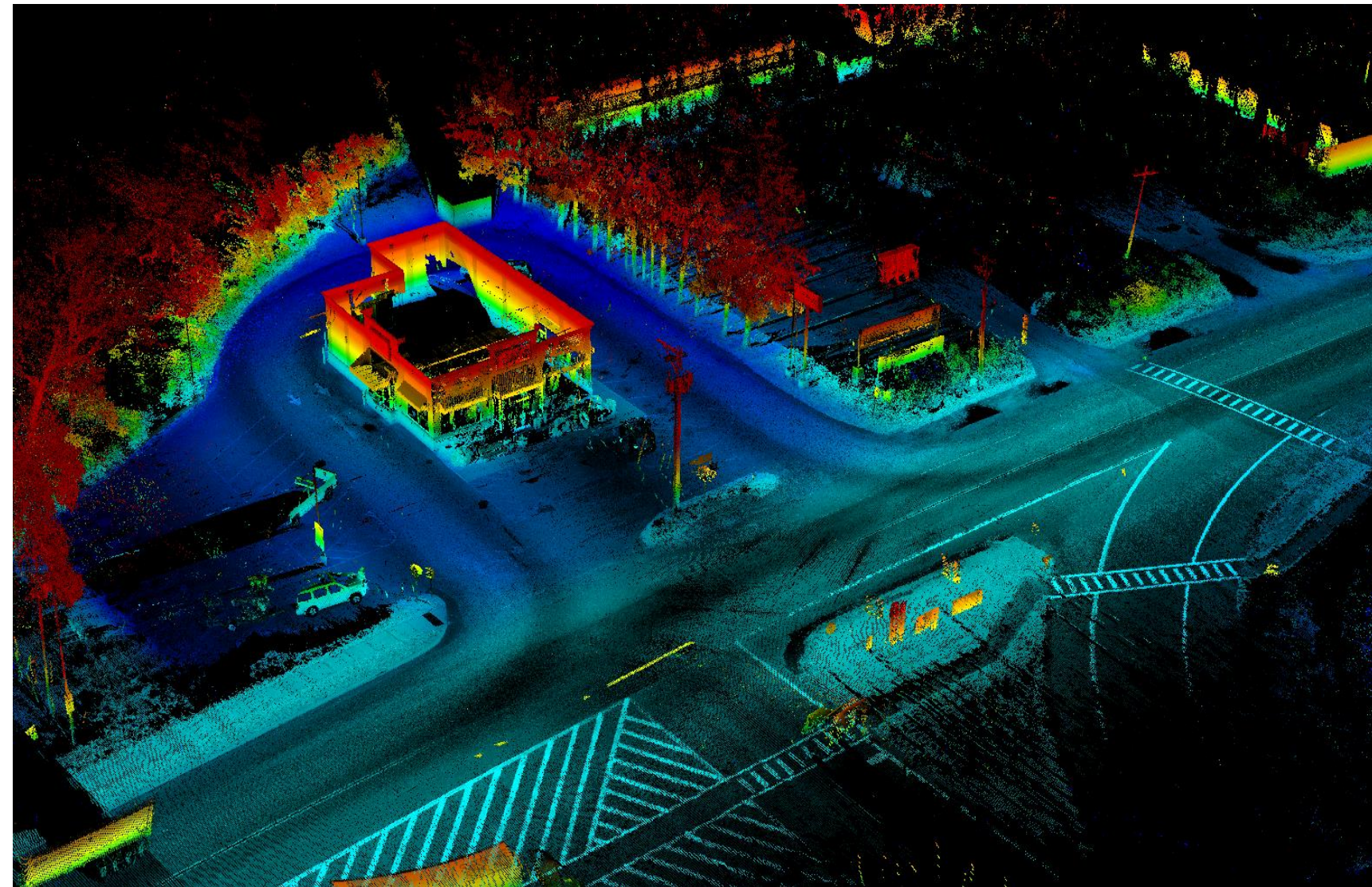


Mobile Mapping

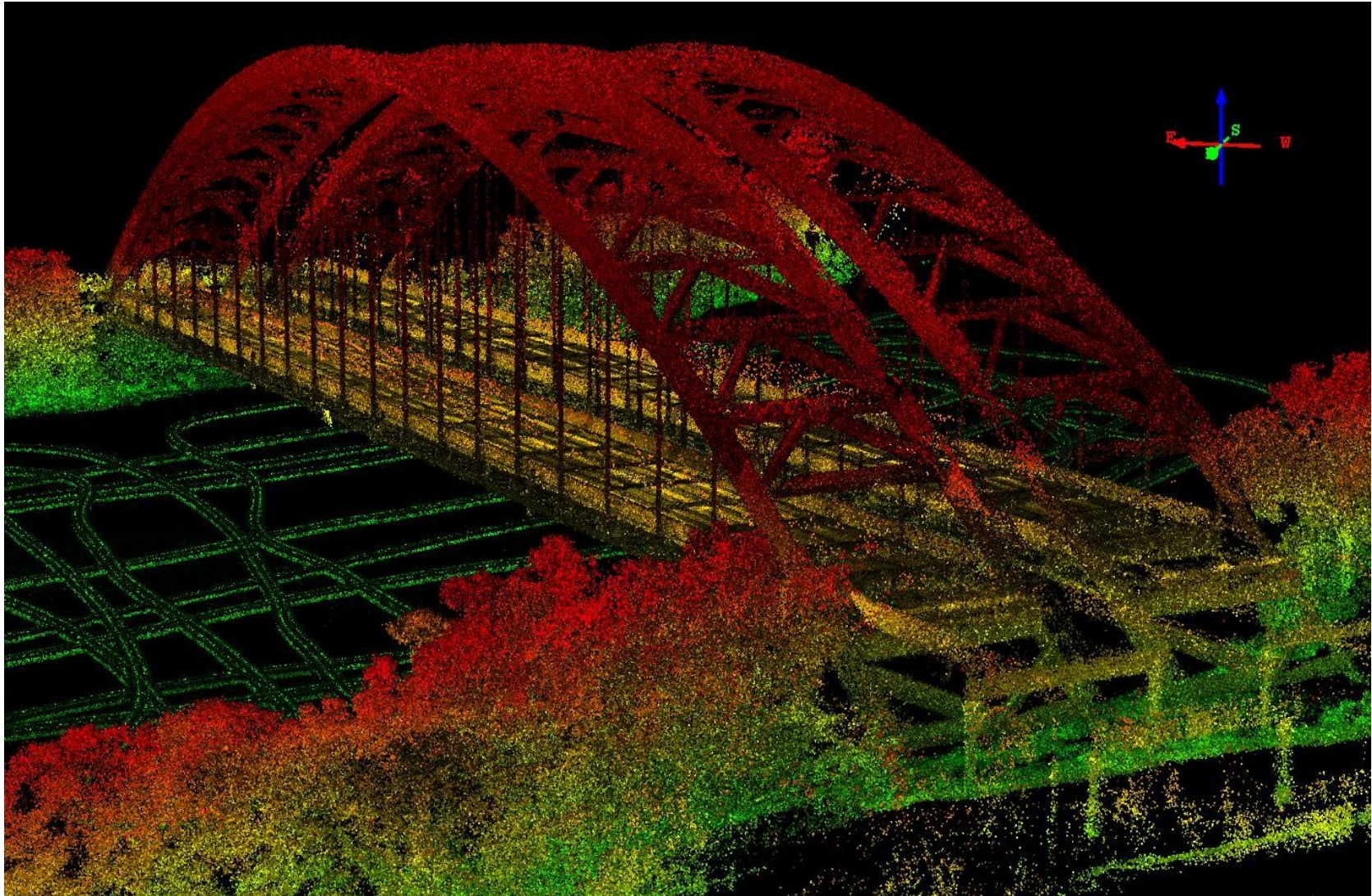
Variety of Mounting Platforms



Mobile Mapping



Mobile Mapping



Mobile Mapping

Big Data!

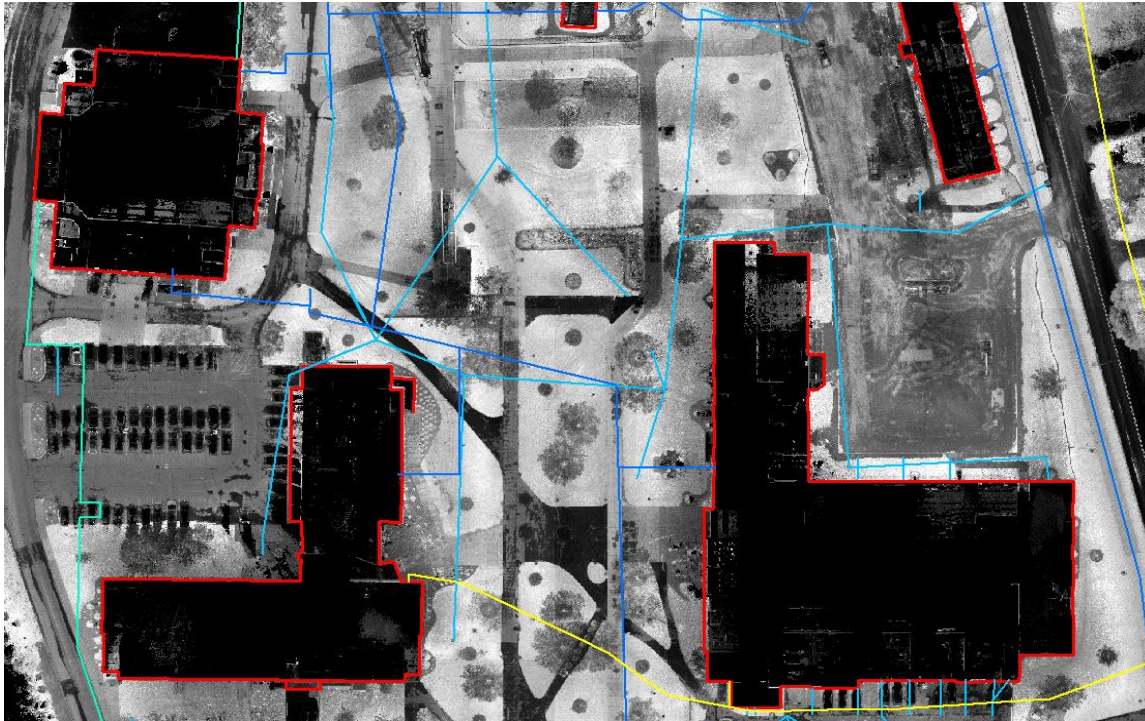
- 1 mile of a roadway lane = approx. 2 GB of point cloud data
- Projects have ranged from 5 to 500 miles...
- Panoramic camera w/ 7 lenses recording HD video
- Data management – GIS



Mobile Mapping

Applications:

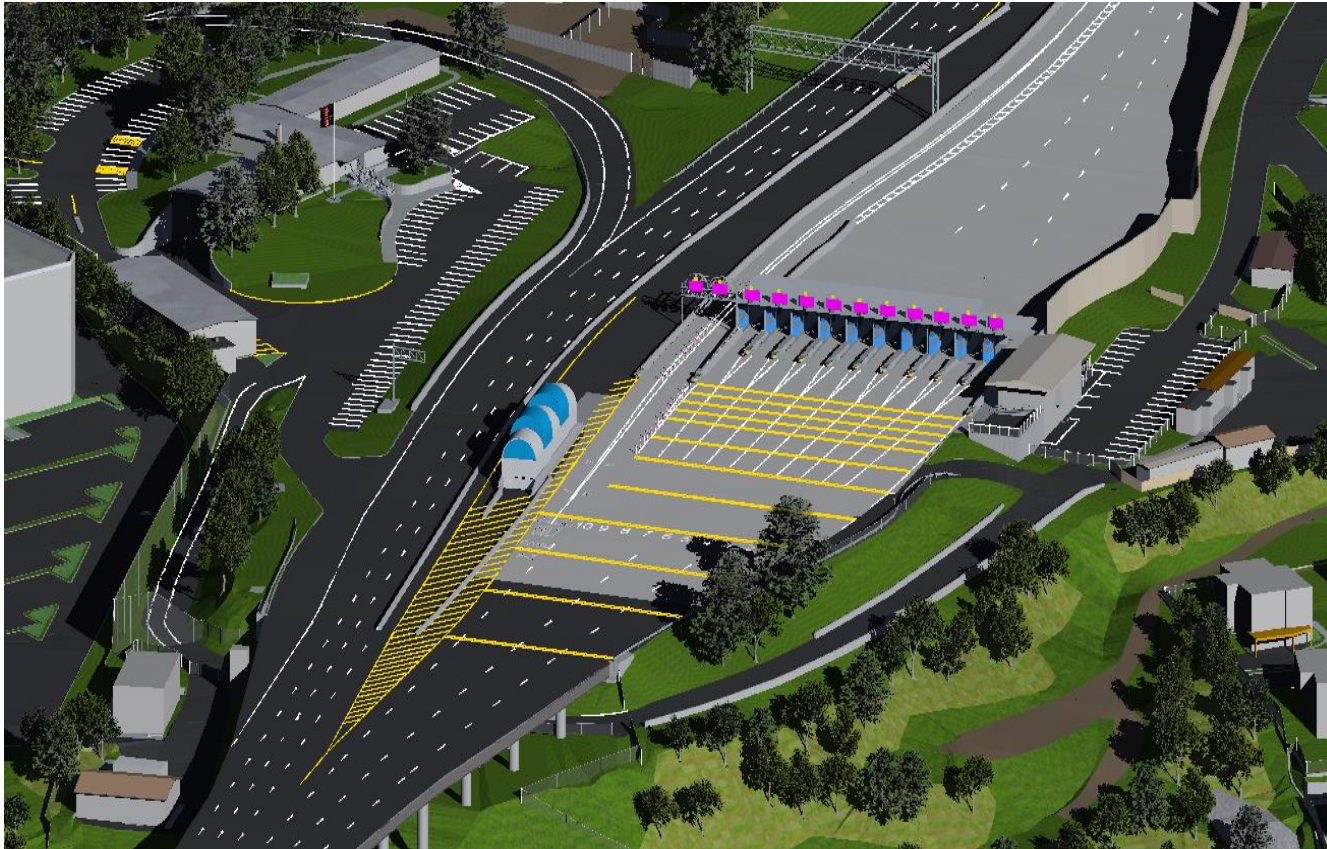
- Asset Inventory / Management
- Facility & Campus Mapping
- Topographic Basemapping



Mobile Mapping

Applications:

- 3D Modeling & Visualizations
- Construction Progress / As-Built Documentation



Mobile Mapping

Applications:

- Street-Level Panoramic Imagery



Questions?



Engineering and
Land Surveying, P.C.

Thank You!

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- Michael Pianka, GISP
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- MJ Engineering & Land Surveying, PC
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