WELCOME TO THE 2020 FTBA CONSTRUCTION CONFERENCE

"CONSTRUCTION IN A DIGITAL ERA"

Sponsored by:

Tallahassee

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Emerging Technologies Impacting Road Building Industry

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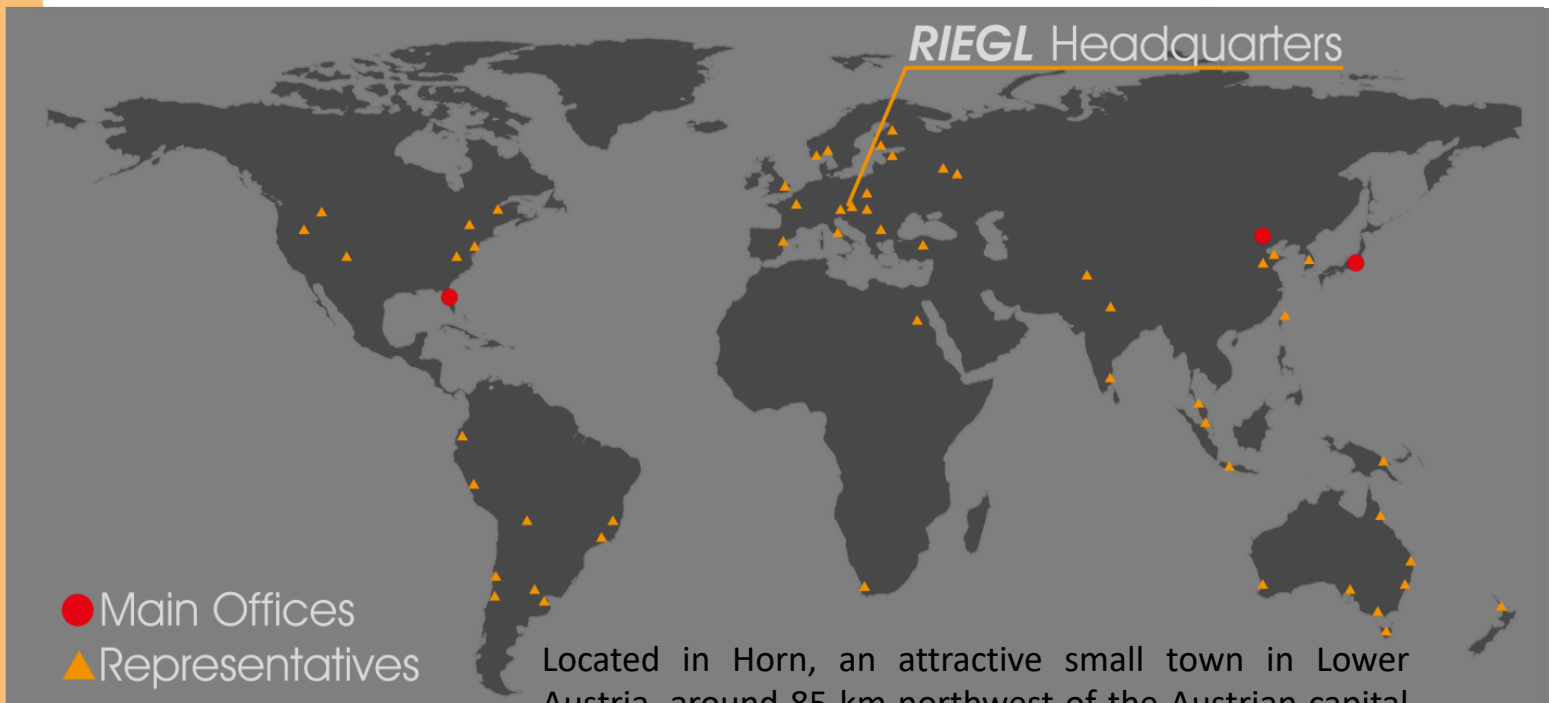
TLS Business Development Manager
RIEGL USA
February 6, 2020

Innovation in 3D

Agenda

- Introduction – About *RIEGL*
- What is LiDAR – Basic principles of LiDAR technology
- LiDAR systems – Different LiDAR platforms
- Applications – Real world applications
- Outlook

About *RIEGL*



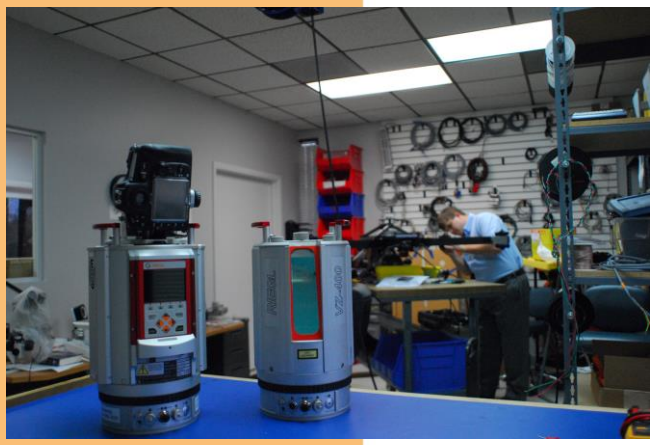
Located in Horn, an attractive small town in Lower Austria, around 85 km northwest of the Austrian capital Vienna, the ***RIEGL*** headquarters is right in the heart of the European Union, with good transport connections in all directions.

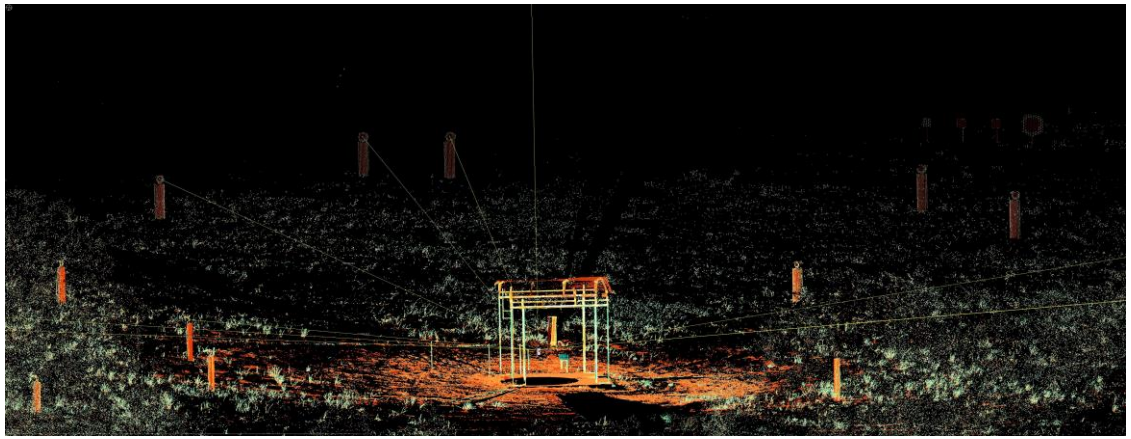
www.riegl.com

About *RIEGL*

The *RIEGL* USA office is located in Orlando, Florida. The Central Florida office carries out sales, marketing, training, and support for North American customers.

In addition to the office, *RIEGL* USA also has a certified 50+ acre scanner calibration field and a service center. With these facilities, *RIEGL* USA is able to offer quick turn-around services for North American customers.





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About *RIEGL*

- Over 40 years in the marketplace delivering advanced laser scanning solutions
- In the North American market for over 25 years
- The performance leader in the LiDAR industry
- Most comprehensive portfolio
- Highest performance, quality, reliability, longevity of products, and excellent customer and partner relations
- **Our mission is to satisfy and exceed our customers' expectations worldwide!**

New North American HQ – Winter Garden, FL

Scanning Platforms

TERRESTRIAL 

MOBILE 

AIRBORNE 

UAV 

LiDAR Systems

LASER SCANNERS for TLS

LiDAR ENGINES & SYSTEMS for ULS

LiDAR SYSTEMS for MLS

LiDAR ENGINES for ALS & MLS

LiDAR SYSTEMS for ALS & BLS

LASER SCANNERS for ILS

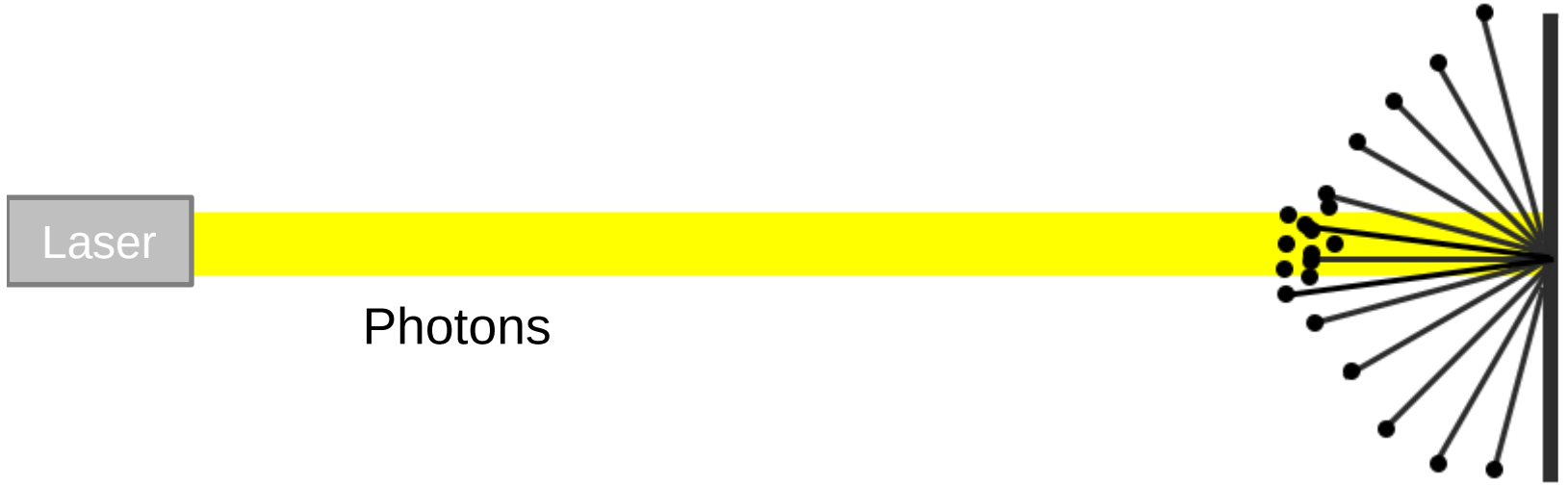
What is LiDAR?

- LiDAR, which means ***Light Detection and Ranging***, is a remote sensing method that uses light in the form of a pusled laser to measure ranges to an object or earth.

- A LiDAR instrument principally consists of a laser, a scanner, and a specialized GPS receiver.

- A LiDAR system can measure an object at ultra high speed and very accurately.

Measuring



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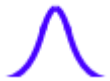
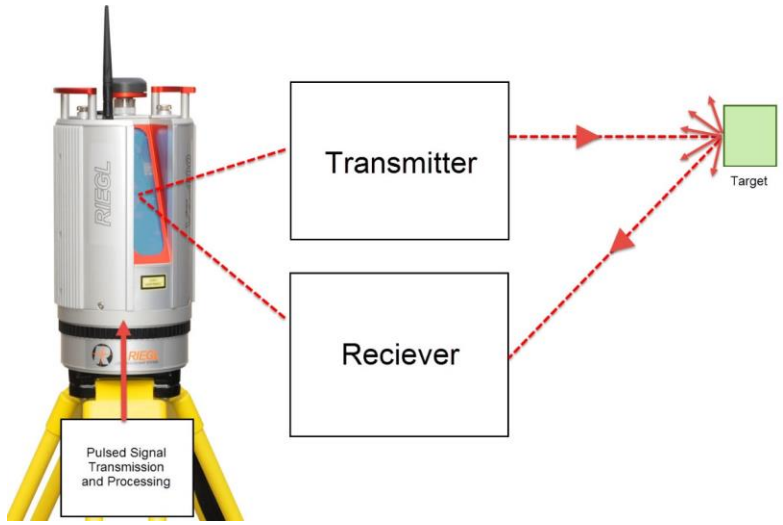

Echo

Time of Flight – Technology

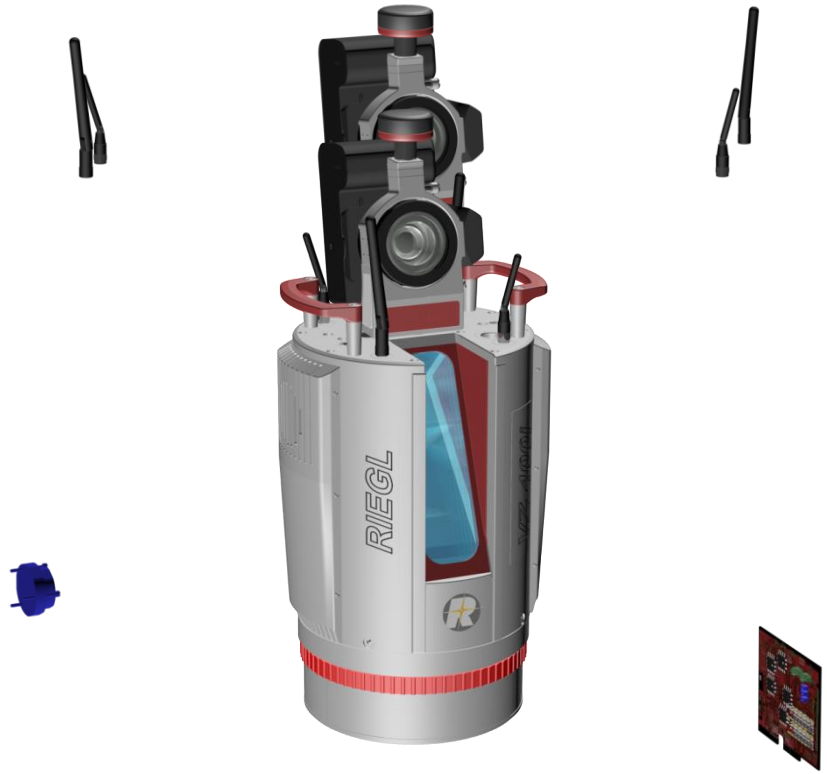
- High ranging accuracy
- Low range noise / high precision
- Highest multi-target resolution
- Valuable pulse shape information for cleaning up point clouds, assisting classification, filtering
- Key to advanced MTA techniques
- Solid basis for radiometric measurements

Advantages:

- Highly reliable
- High speed data acquisition rate
- Ultra long range
- Compact size



Terrestrial 3D Laser Scanner System



LIDAR engine
- echo digitization
- online waveform processing

Data Storage & Interfacing
- internal storage, external storage
- data transfer, reporting

Add-on Camera
- up to 37Mpix

GNSS Receiver
- integrated L1 receiver
- external L1/L2 receiver

Pose Sensors
- tilt sensors, compass
  gyros, barometric sensor

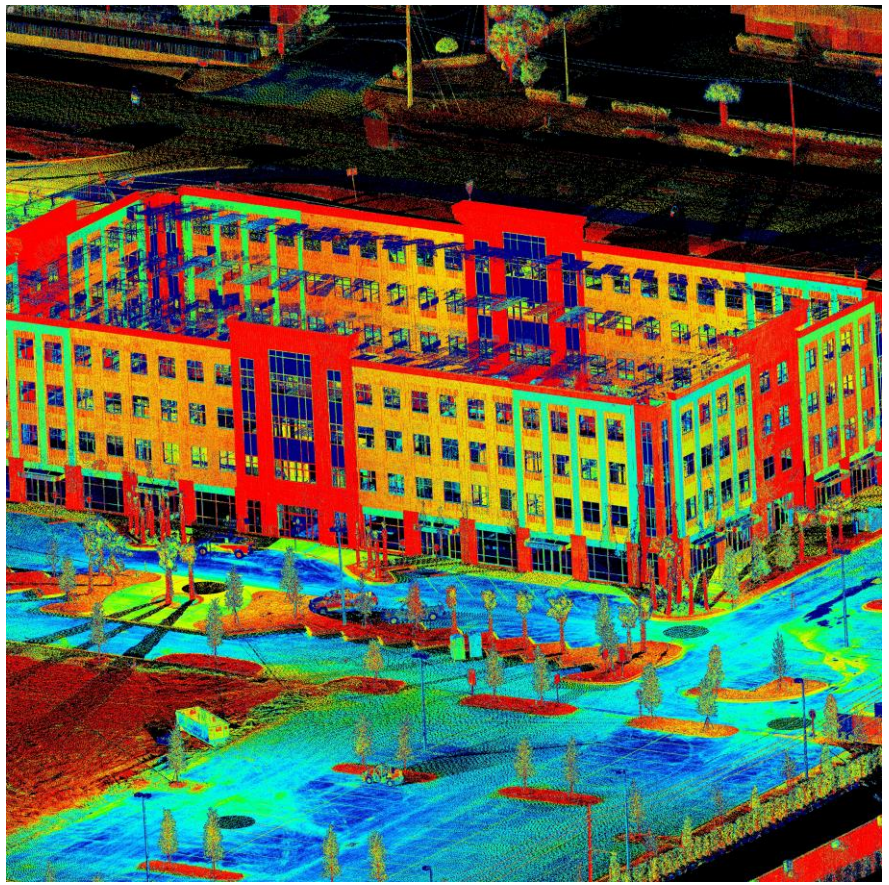
Post-Processor
- real-time data post-processing
- e.g. data conversion, registration

Static Scanning

View types

True color

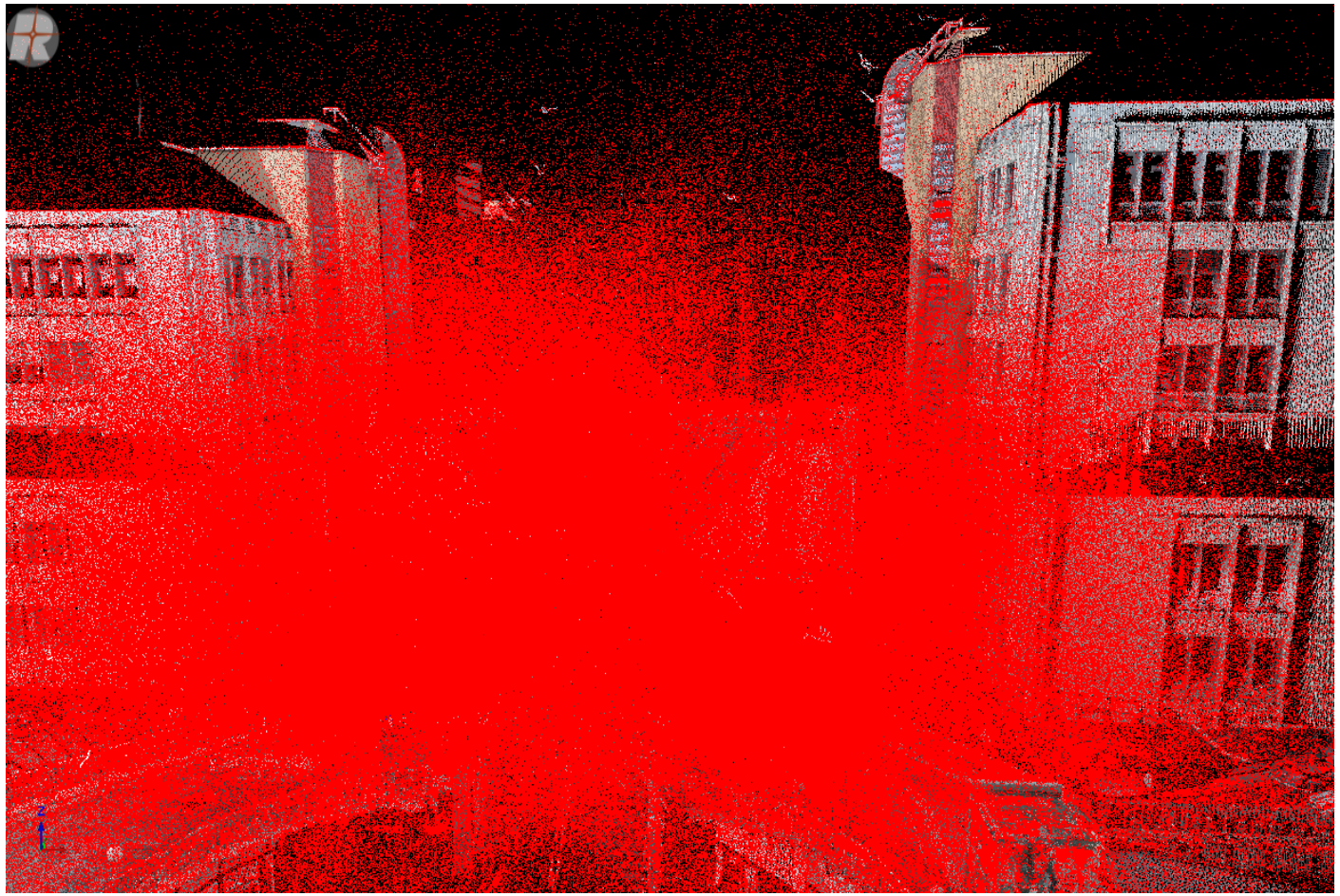
Reflectance

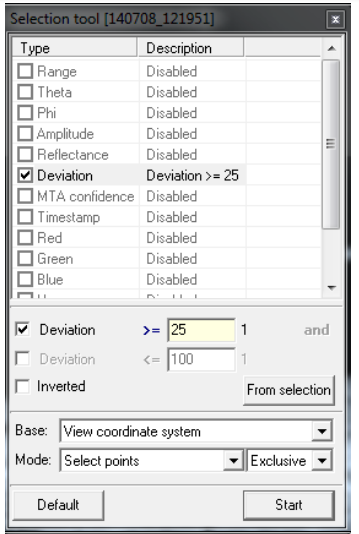


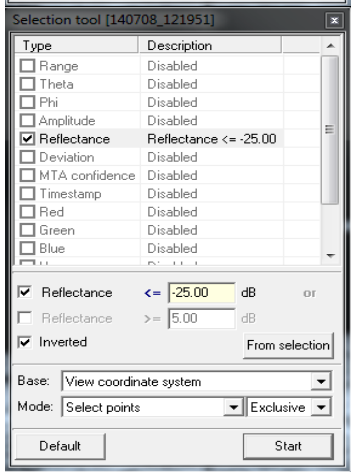
Classification between Vegetation and Ground

Scanning in adverse condition

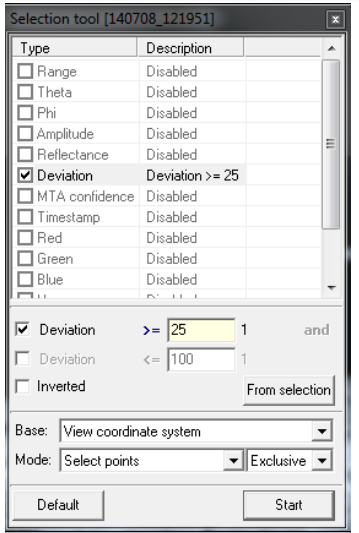
Special filters

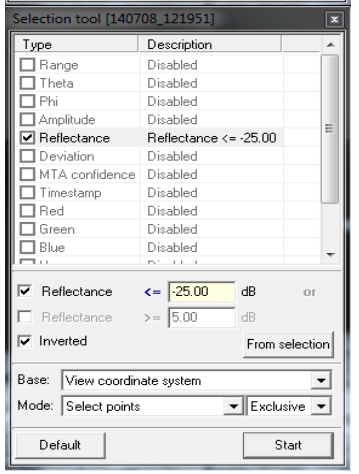






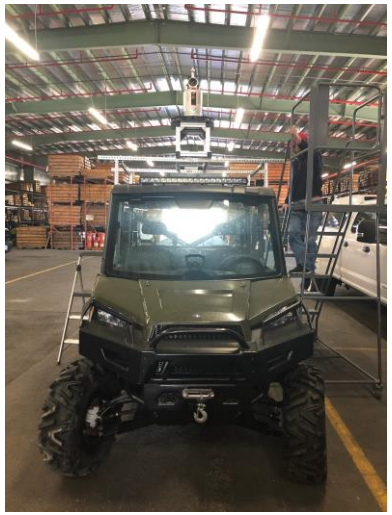
Special filters



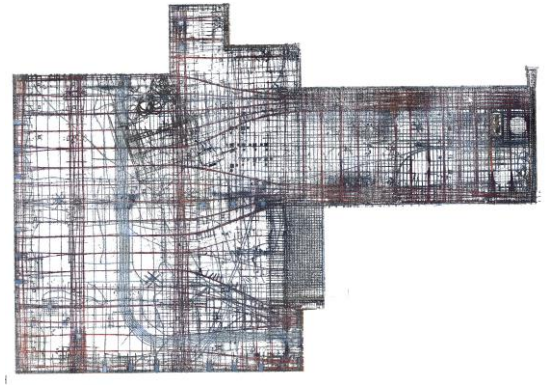


External RTK Integration

Vehicle Mounting Platforms



RIEGL In Construction

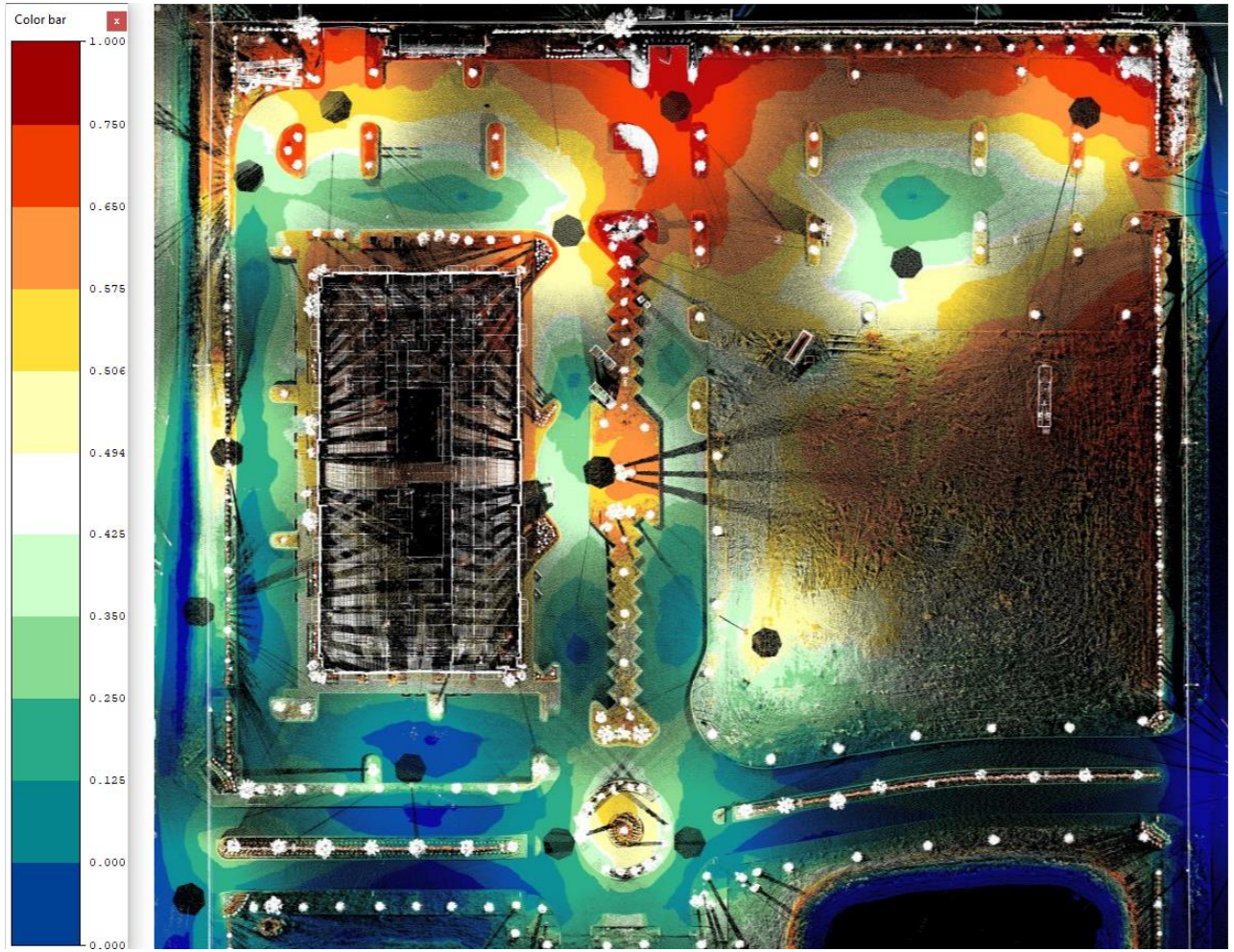


3D Realistic Scene of the Project

Structural Monitoring

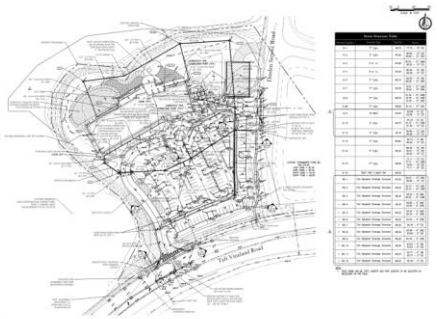
- Use surrounding objects to monitor and measure construction site changes

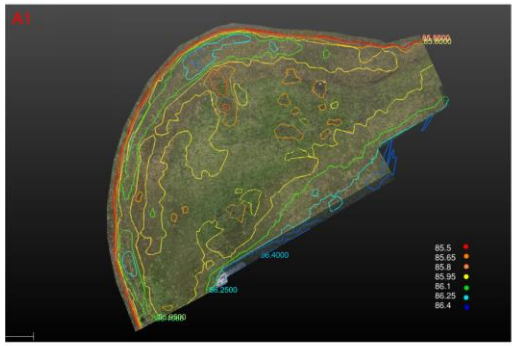
Drainage Survey

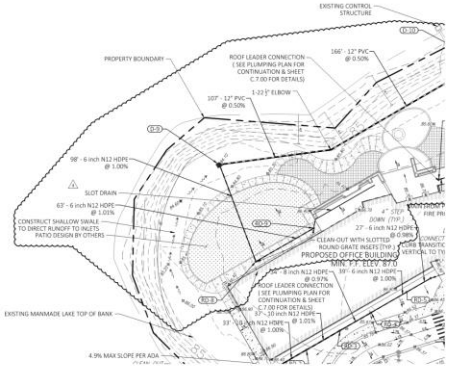


Application – Drainage Verification

- Objective: Improper drainage at two locations after turnover of project. Severe ponding.
- Tool Utilized: TLS 3D laser scanner and unmanned imaging system
- Result: Painted a clear picture for the owner and subcontractor of where the high and low spots were near the drainage areas. The subcontractor has since installed an updated drainage system to alleviate the issue

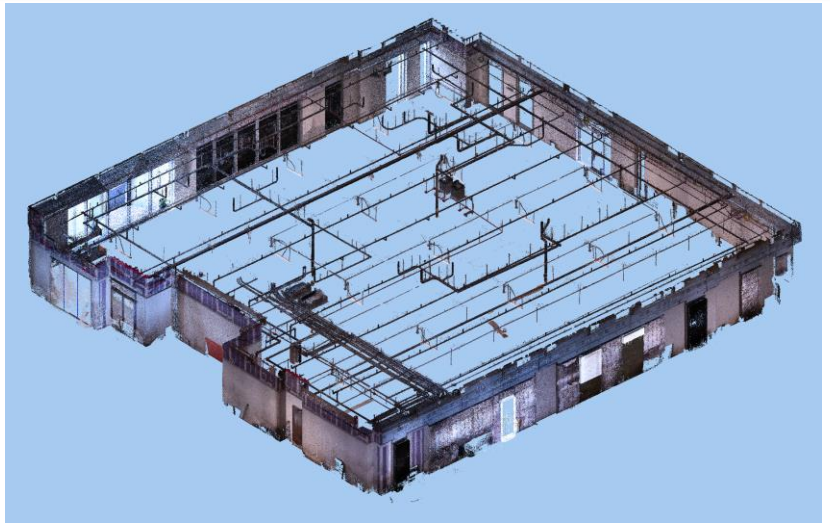


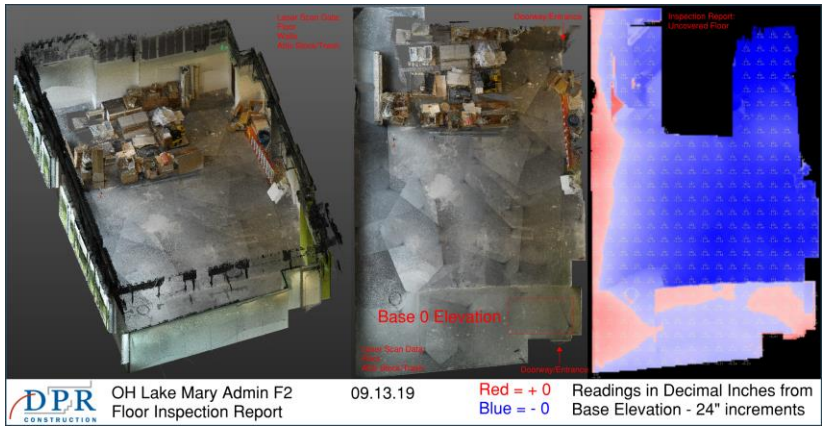




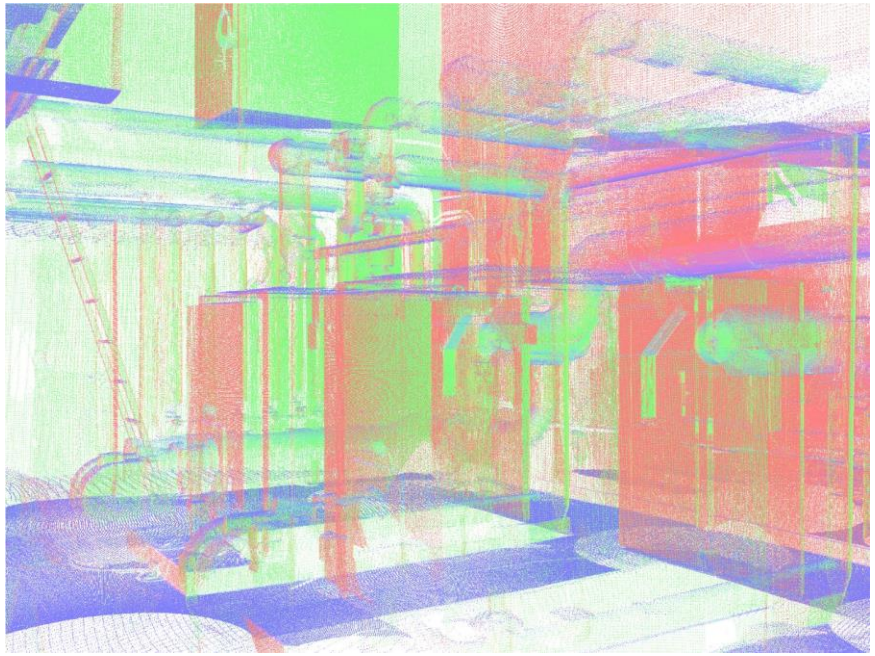
Application – BIM

- Objective: Capture overhead utility data and existing conditions for Architect and Project team for interior buildouts.
- Tool Utilized: TLS 3D laser scanner
- Result: Provided team and architect with data and analysis which will save hours of modeling and as-builting time. Established a baseline for design. Calculated fill to complete concrete in admin room due to previous contractor error.

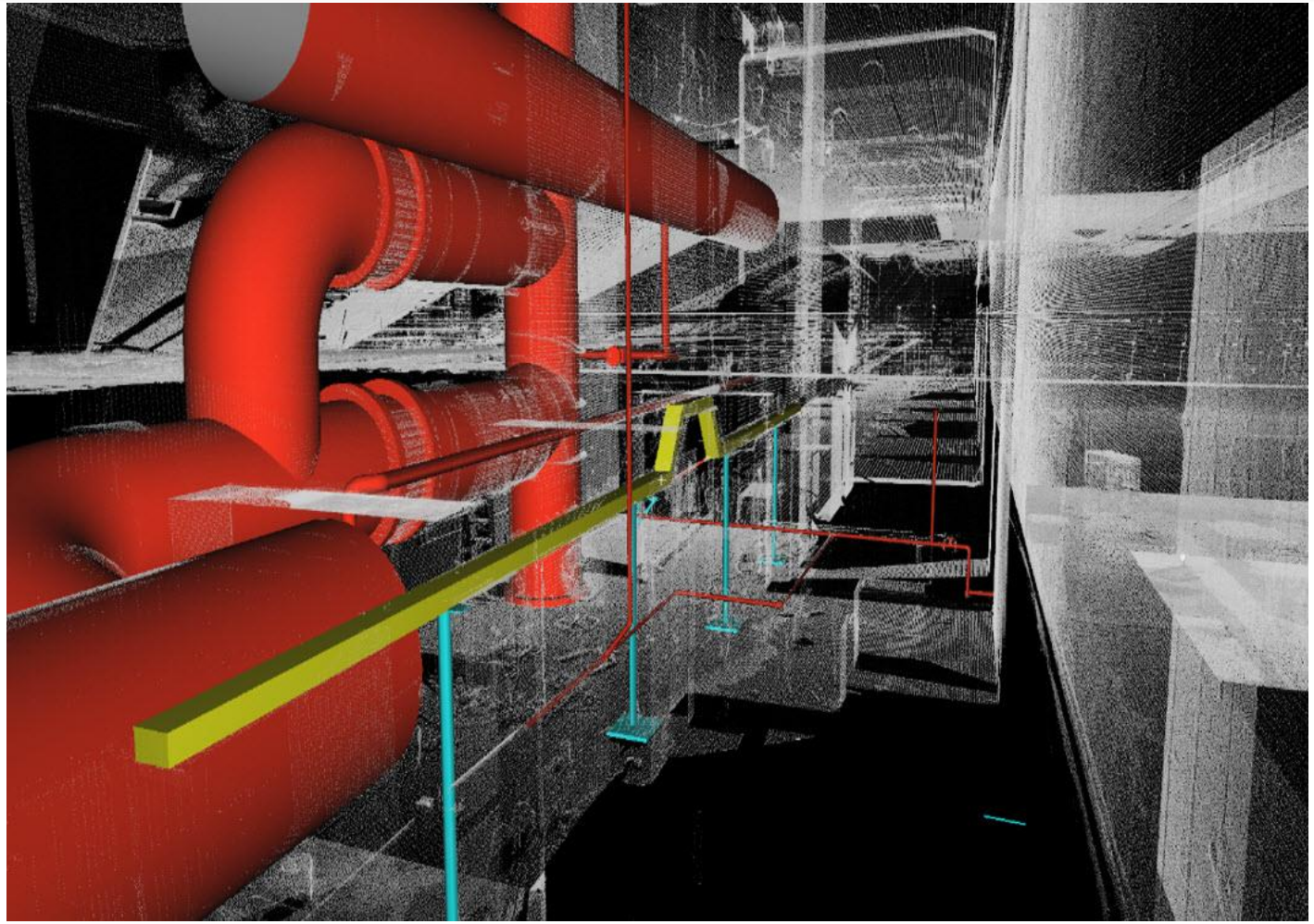




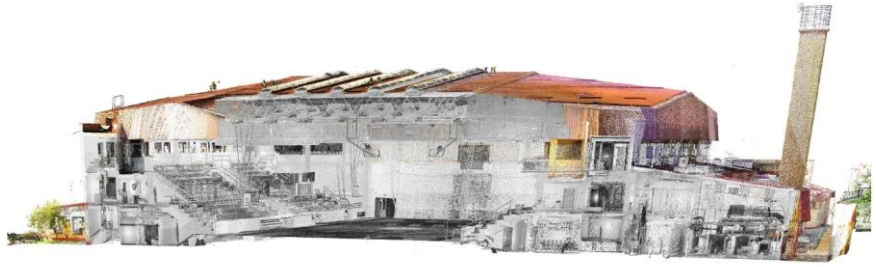
Application – BIM

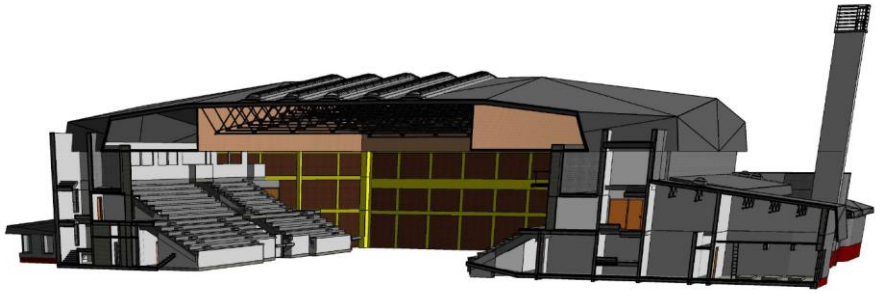


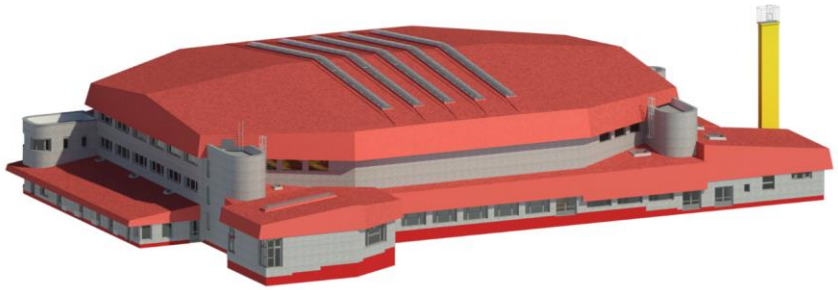
Application – BIM

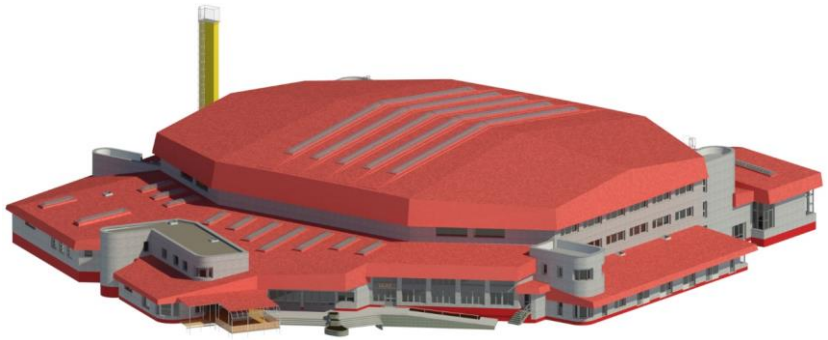


Application – Structural modeling



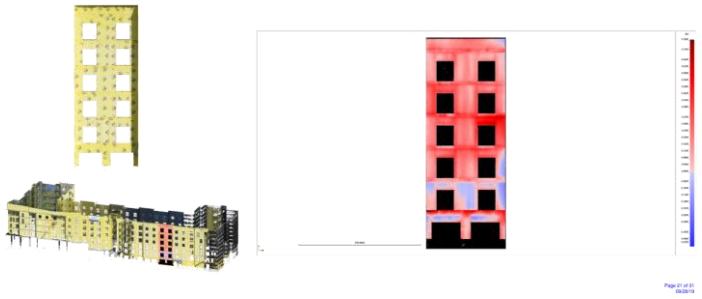






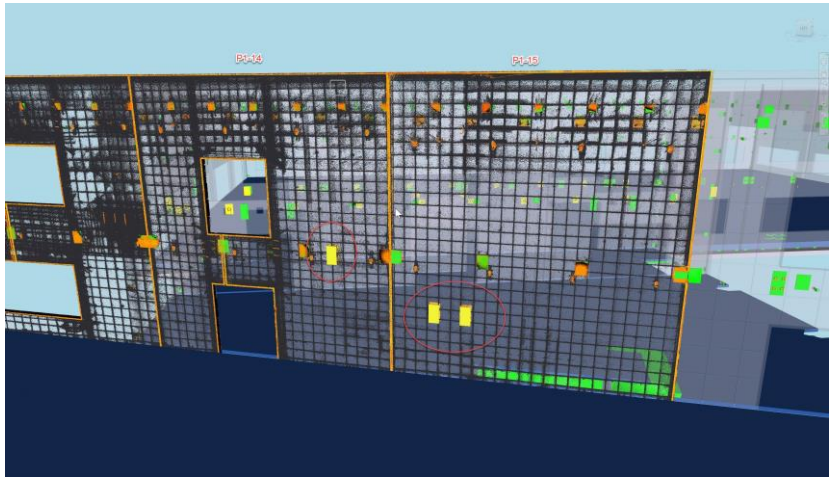
Application- Vertical Wall Plumbness

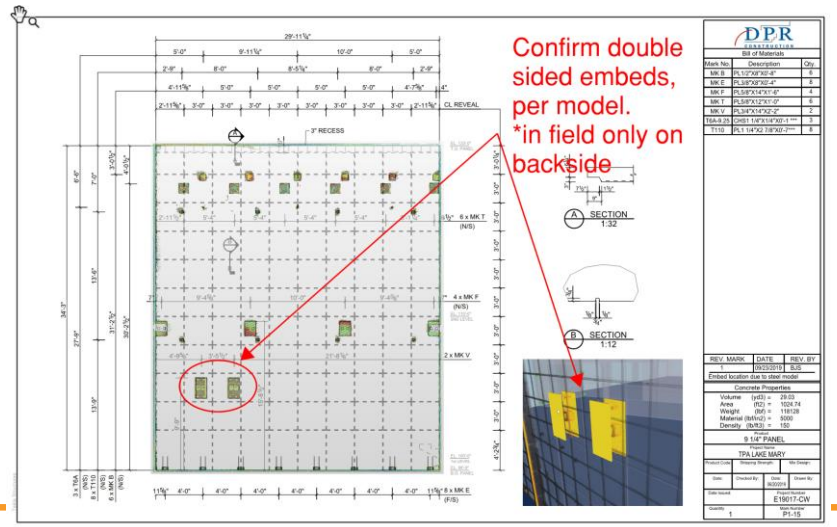
- Objective: EIFS Subcontractor is concerned over DBC Panel lack of Plumbness. Project team wanted to verify how far out of tolerance the panels actually are.
- Tool Utilized: TLS 3D laser scanner
- Result: Provided a panel by panel analysis/heat map which shows the ins and outs of the panels vs a perpendicular plane.



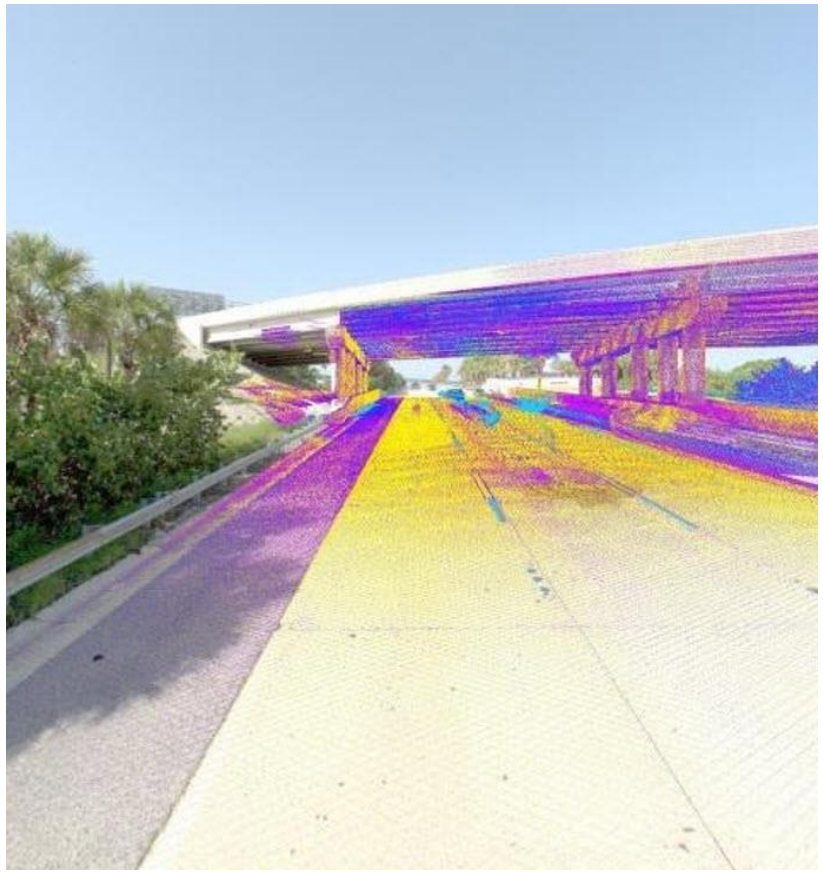
Application – Embeds Verification

- Objective: Analyze tilt panel layout and construction pre-pour to QC check the embeds, blockouts and sleeves to ensure they are in the correct locations.
- Tool Utilized: TLS 3D laser scanner
- Result: Provided a panel by panel analysis and turnaround within 8 hours of completing the scans.
- Potentially saving the team $10K per panel to repour + 8 day curing time for each panel + Crane re-mobilization.
- Identifying issues before (miss alignment of embeds)

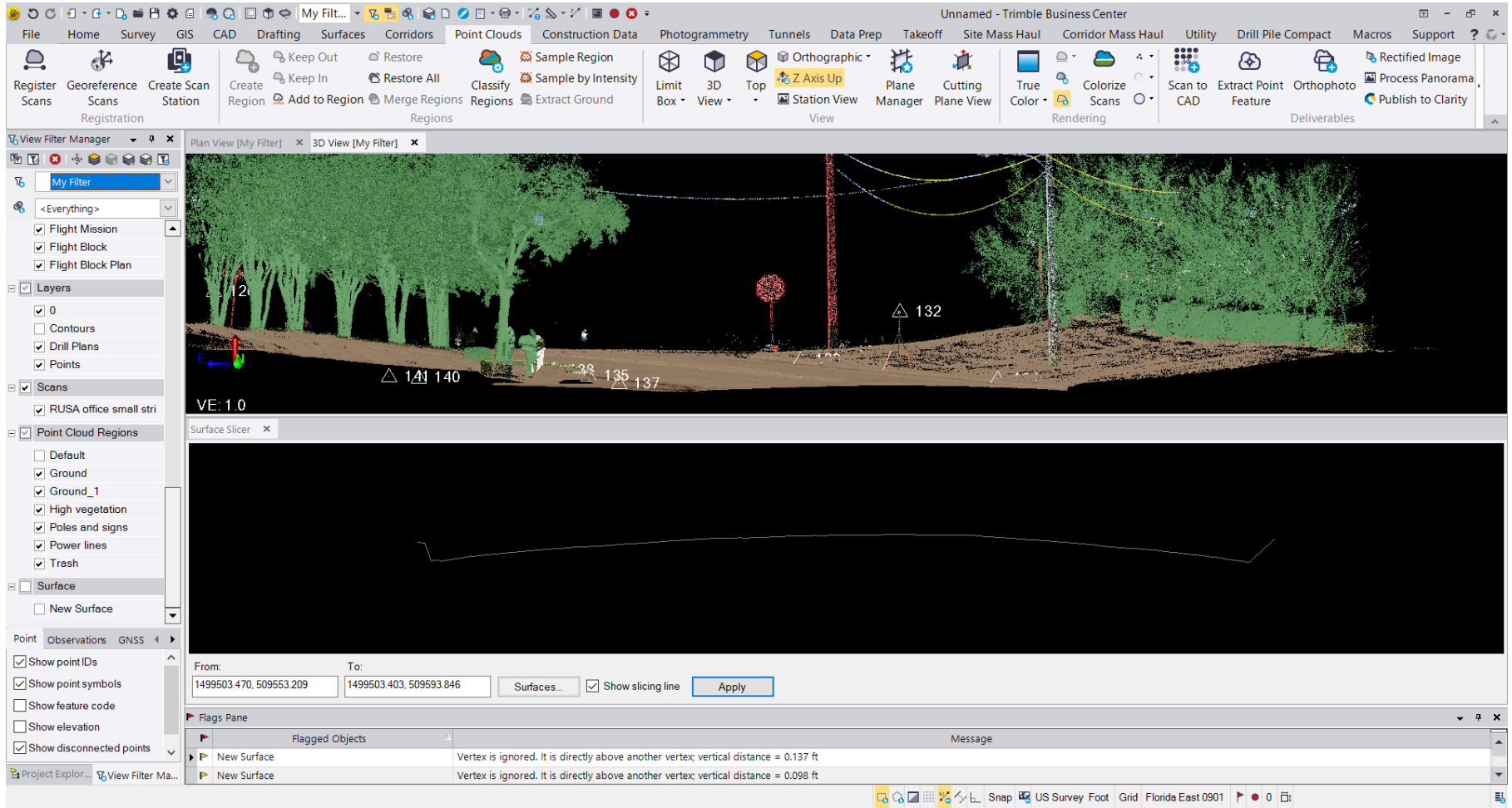




Bridge clearance inspection



Compatible with Existing Software – TBC



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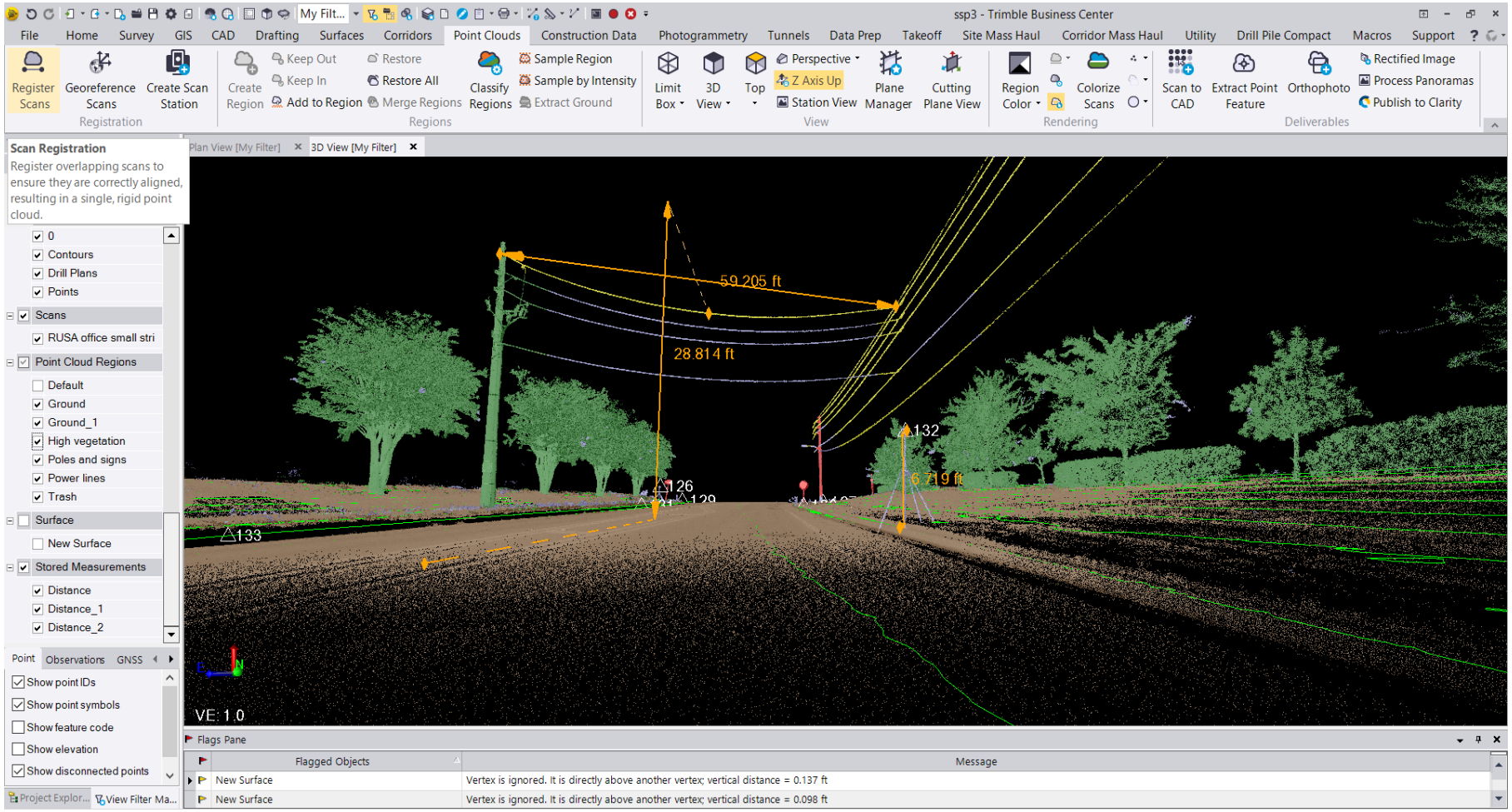

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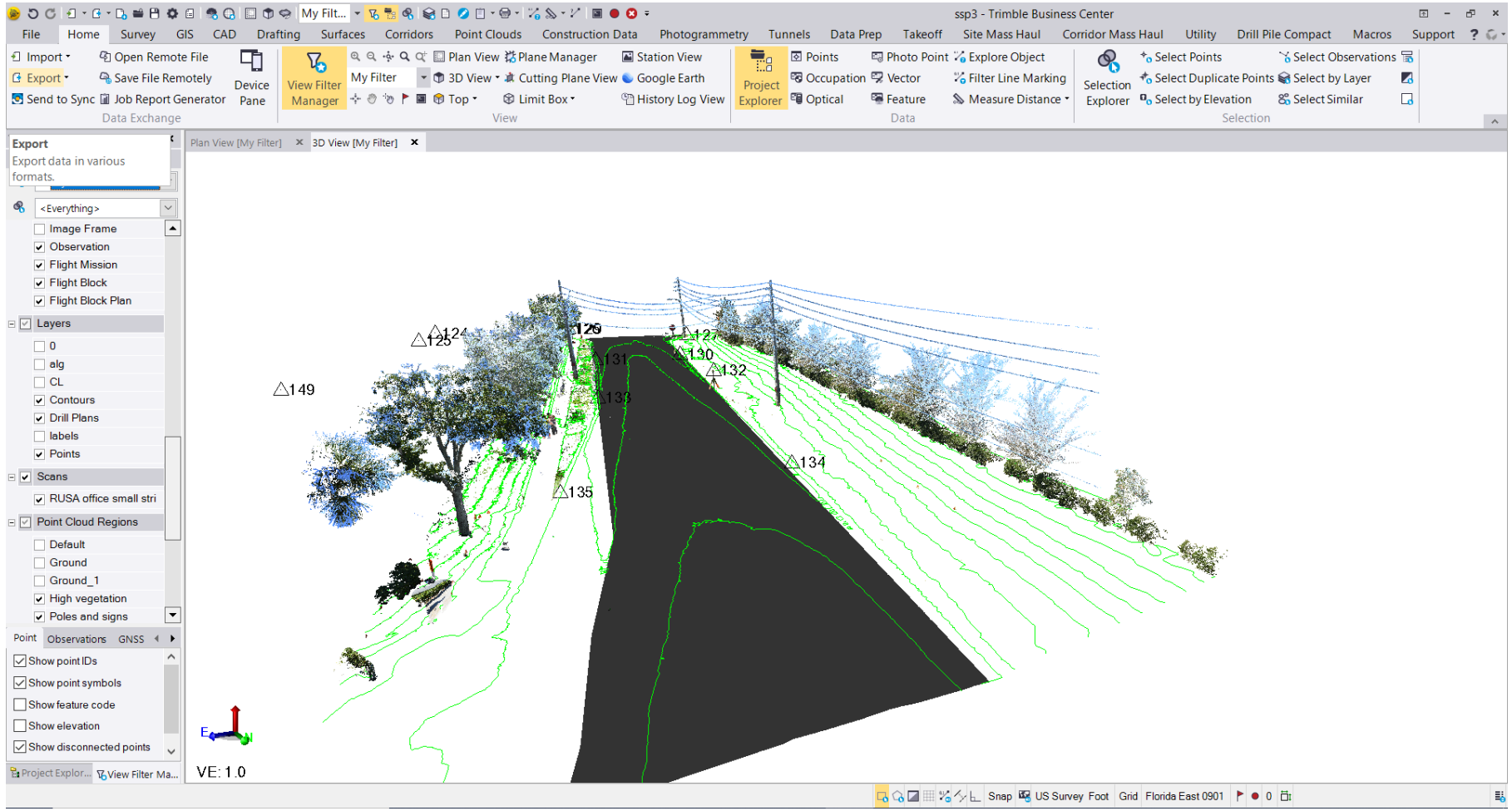

Software – Deliverables

Outlook

- LiDAR technology is widely accepted and used in survey and mapping industries.
- Scanning remotely increases safety.
- LiDAR data are accurate and precise and georeferenced.
- LiDAR technology can be applied to many applications.
- LiDAR data can be used in different software to extract information.

RIEGL®

Thank You!





Innovation in 3D