October 28-29, 2025
Orlando, FL

TRANSPORTATION SYMPOSIUM

Data and Design:
How Technology is Transforming Surveying, Mapping, and Roadway Design in Transportation Projects

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Transportation Symposium Website
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Opening Remarks

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Agenda

- Opening Remarks
- Current Challenges in Traditional Workflows
- Technologies Revolutionizing the Industry
- Case Studies and Real-World Applications
- Challenges and Considerations in Adoption
- Future Trends in Data and Design
- Questions and Discussion

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Transportation Technology

- **Information Security Management**
- **Office of Information Technology (OIT)**
- **Office of Operational Technology (OOT)**
- **Emerging Technology (ET)**
- **Process and Quality Improvement**

Transportation Technology

Provide Premier Technology Solutions
- Replace Unsupported Tech
- Service Catalog
- Tech Assessment

Culture of Cybersecurity
- Visible Metrics
- Direct Awareness
- Risk Assessment

Ensure Data Governance
- Data Catalog
- Data Maturity
- Enterprise Data Framework

Reduce User Friction
- Simplify Tech Proposals
- Decrease Collaboration-Related Tickets

Attract and Retain Talent
- Onboarding and Offboarding
- Online Presence

AI and Advanced Technology
- Responsible Use Policies
- Safety Considerations
- Process Improvement

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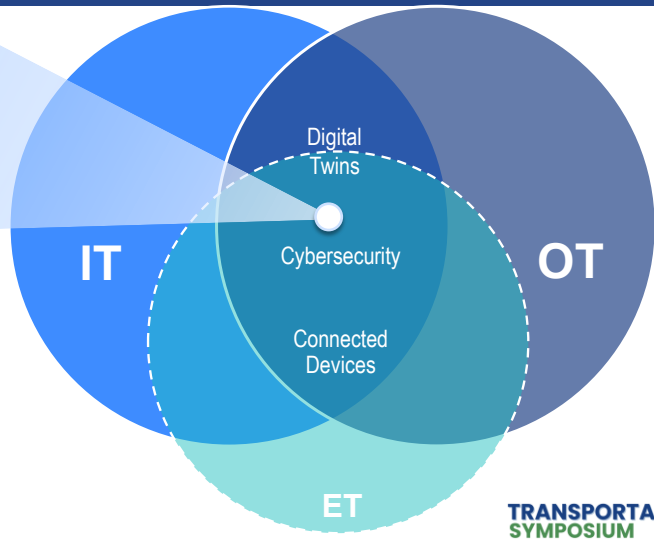
Transportation Technology

- Data Integration
- Disaster Recovery
- Cloud Storage
- Remote Monitoring
- Predictive Analytics
- Movement of People and Goods
- Integrated Supply Chain



Acronyms

IT- Information Technology

OT- Operational Technology

ET- Emerging Technology

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Office of Operational Technology

Survey and Mapping (SMO)

Geographic Information Systems (GIS)

Transportation Data and Analytics (TDA)

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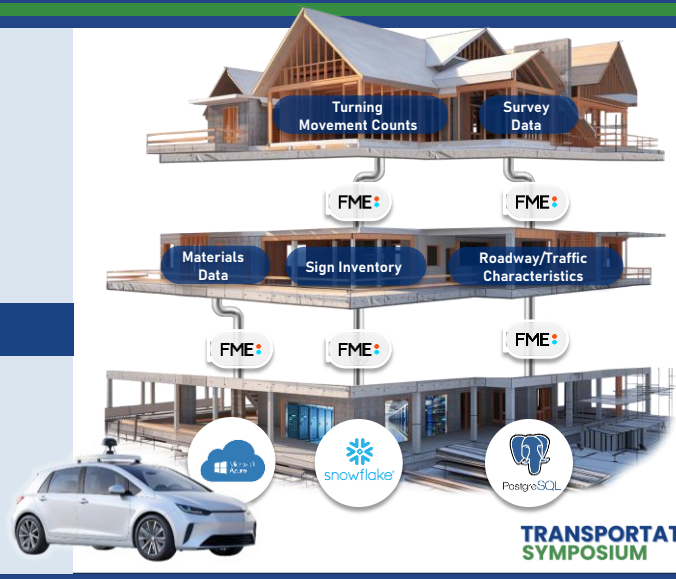
Building a Modern Digital Asset Management System

Anticipated Benefits

- Time efficiency
- Cost efficiency
- Data accuracy
- Data quality
- Safety
- Scalability
- Coverage

Current Data Collection Methods

TCI | RCI | Work Program | Field Inventory



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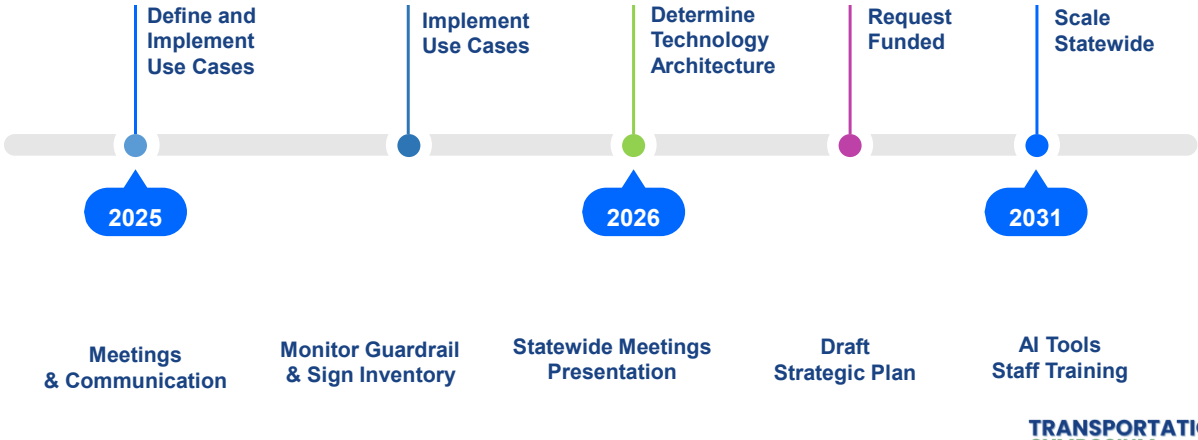
Roadmap to Implementation



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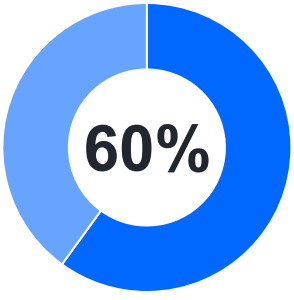
Technology Adoption is Accelerating



60% of design firms use **cloud-based collaboration** for roadway projects

72% 75%+ of transportation agencies now integrate **remote-based surveys** into workflows

LiDAR scanning is **reducing field collection times** by up to 70%

2X Digital twins and BIM adoption expected to **double in the next 5 years**

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Traditional Workflows, Modern Pressures

01 **Projects are Complex**
More data, teams, and moving parts involved

02 **Pace of Work is Accelerating**
Timelines are tighter, and expectations are higher

03 **Systems are Disconnected**
Workflows aren't fully integrated across teams

04 **Legacy Methods Lag**
Manual processes are built for a different era of project delivery

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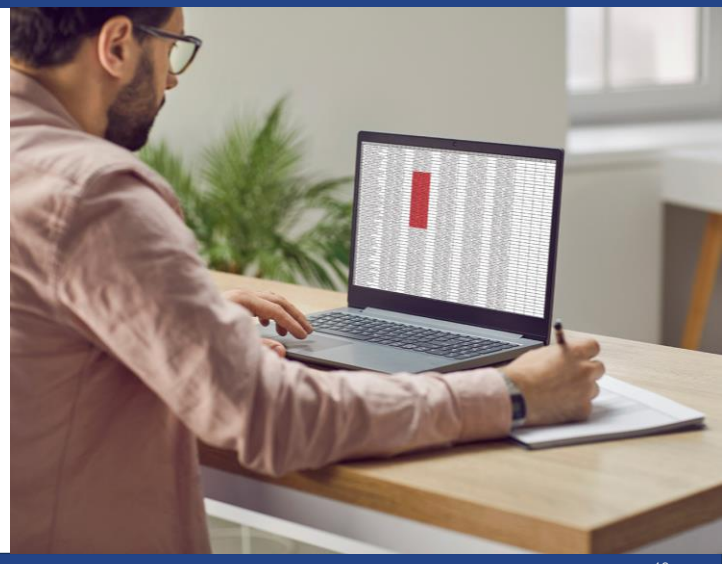
The Limits of Traditional Methods

Manual Entry Risks
Errors increase, verification requires more time

Data Gaps
Incomplete or inconsistent datasets require revisits

Risk Exposure
Crews face hazardous field conditions

Time-Consuming Processes
Data collection delays project workflows



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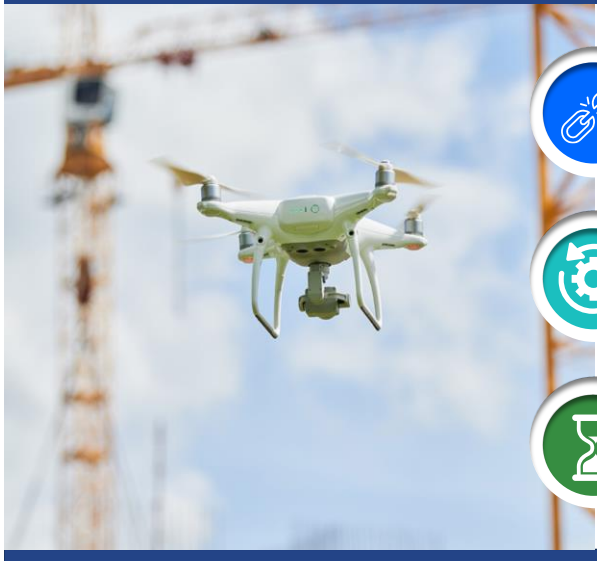
Design and Coordination Limitations



Disconnected Tools
Survey, mapping, and design systems operate independently

Inefficient Update Workflows
Design changes ripple through slowly and inconsistently

Coordination Delays
Misalignment leads to redesigns, wasting time and effort

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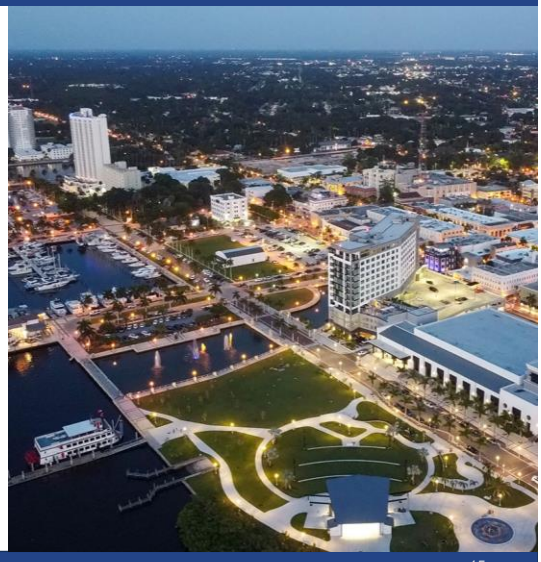
Impacts on Projects

Schedule Delays
Manual processes extend delivery timelines

Cost Overruns
Rework and duplication increase expenses

Quality Risks
Inconsistent data reduces accuracy and reliability

Reduced Effectiveness
Teams spend more time managing problems than advancing design



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Technologies Revolutionizing the Industry

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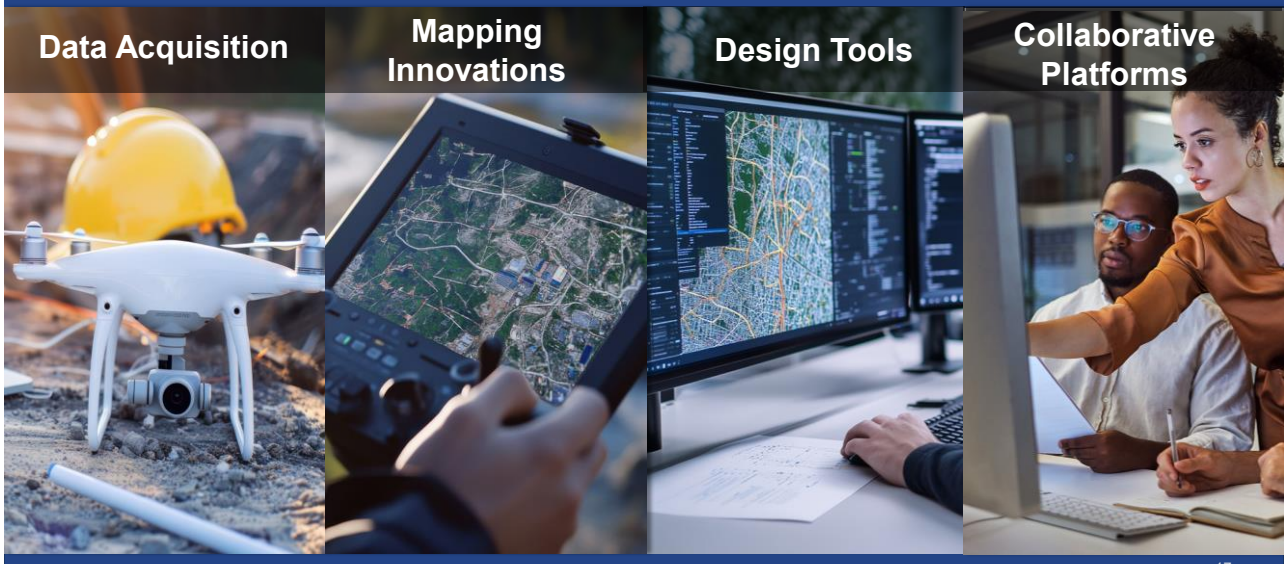
Technologies Revolutionizing the Industry



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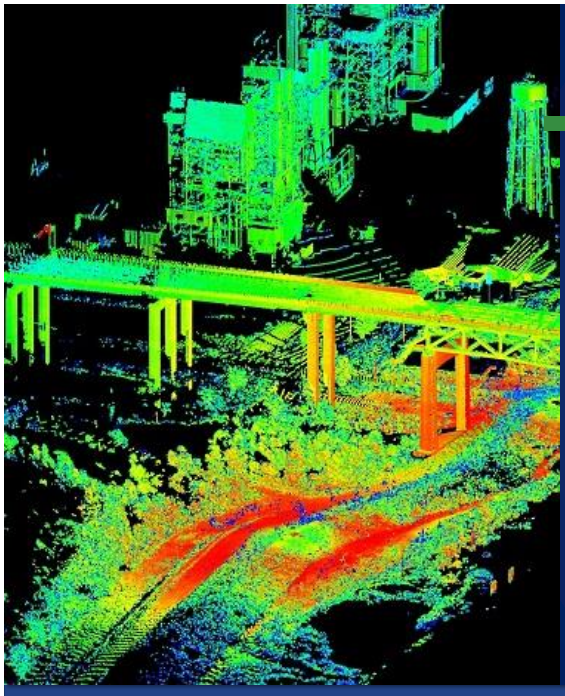

Aerial LiDAR

- Near-infrared laser pulses map land and surface features
- Supports engineering, floodplain mapping, vegetation analysis, infrastructure design
- Point density determines detail and application range
- United States Geological Survey (USGS) quality Levels set minimum standard for spacing, density, and accuracy

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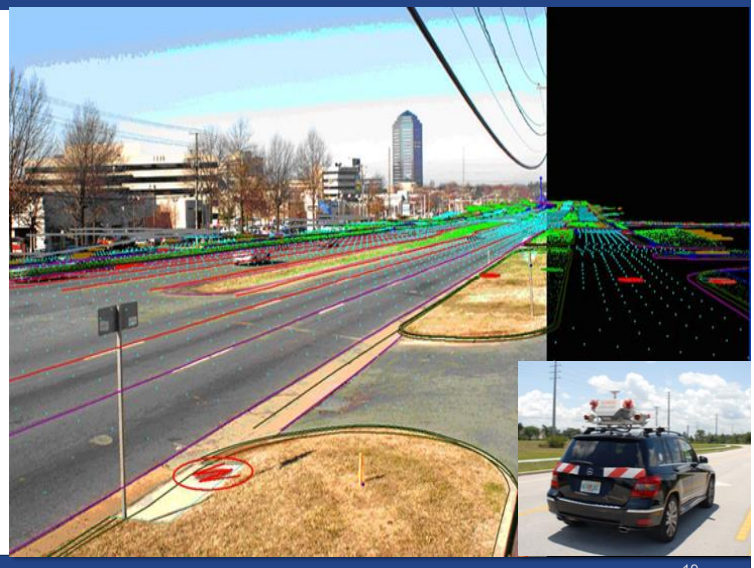
Terrestrial LiDAR

High-accuracy ground-based laser scanning

Enables precise measurement and condition assessment

Integrates with aerial and mobile LiDAR for comprehensive coverage



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Aerial Imagery

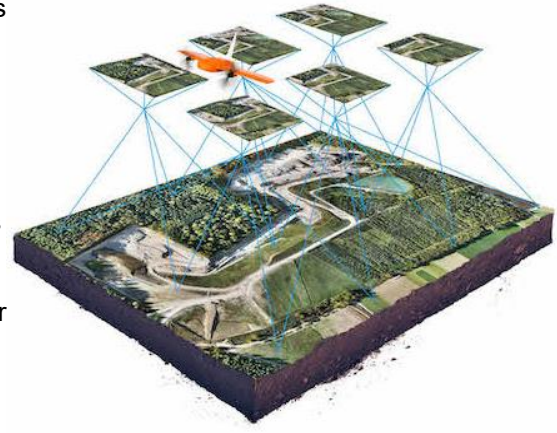
High-resolution imagery from aircraft, drones, or satellites

Detailed visual data on infrastructure, land use, and environment

Wide coverage for consistent and repeatable observations

Georeferenced data integrates with GIS, LiDAR, and other mapping database

Advanced sensors (optical, infrared, or multispectral) for diverse applications



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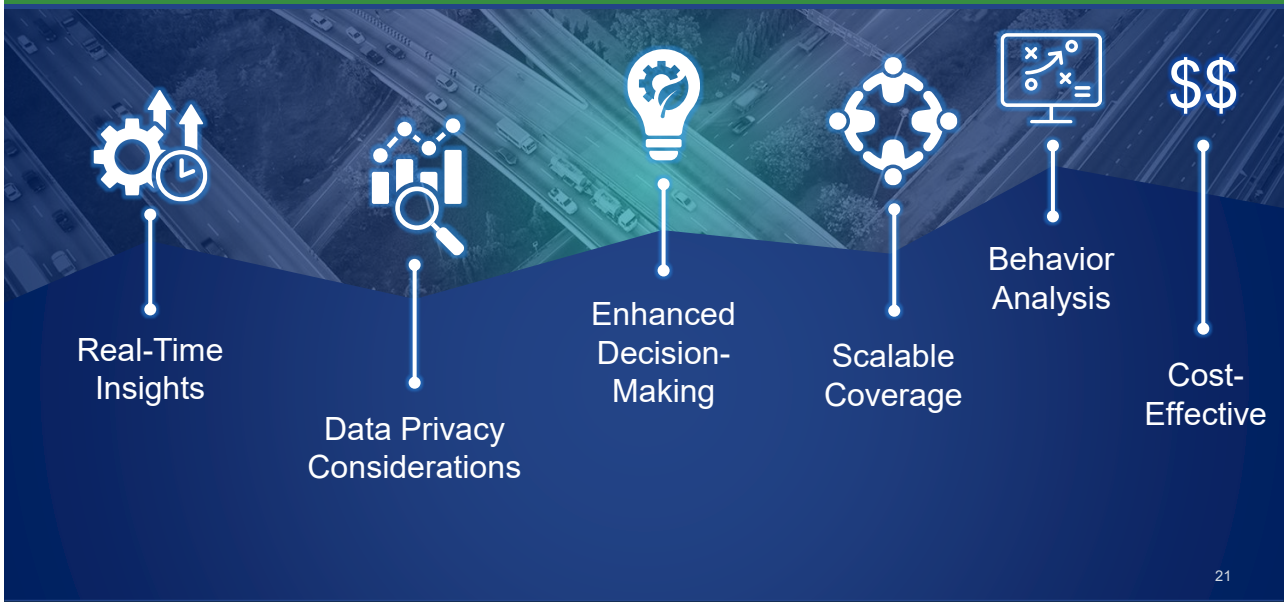
Crowd Sourced Data in Transportation



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Innovations in Mapping – Geo AI

Combines geospatial data with AI

Enhances traffic and infrastructure planning

Supports dynamic routing and emergency response

Adapts to mobility trends like ride-sharing

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Design Tools -Building Information Management

Integration of advanced design tools

Detailed digital models for roads, bridges, and assets

Enhanced project coordination through centralized data

Support for rapid design iterations

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Innovations in Mapping – Digital Twins

Real-time virtual representation of physical transportation assets

Integrates data from sensors, LiDAR, and imagery

Supports simulation and predictive analysis

Enhances asset management and decision-making

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Cloud-Based Sharing Platforms

- Centralized Access
- Real-Time Collaboration
- Integrated Data
- Version Control
- Scalable & Secure
- Efficient Coordination

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Case Studies and Real-World Applications

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Case Studies and Real-World Applications

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Statewide Sign Collection Effort

FDOT lacked a comprehensive, statewide inventory of roadway signs

Sign data was inconsistent and fragmented across districts.

Maintenance and operations can be inefficient without centralized information

Emergency response and hurricane evacuation efforts were potentially hindered.

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Statewide Sign Collection Effort

FDOT needed an innovative solution to address missing and inconsistent sign data.

Traditional inventory methods were inefficient and difficult to scale statewide.

AI and automation offered a modern, data-driven alternative.

FDOT partnered with Blyncsy to implement an AI-based sign detection and text extraction system.

The effort contributes to developing a preliminary statewide inventory intended to support operations and safety, though data completeness and consistency continue to improve.

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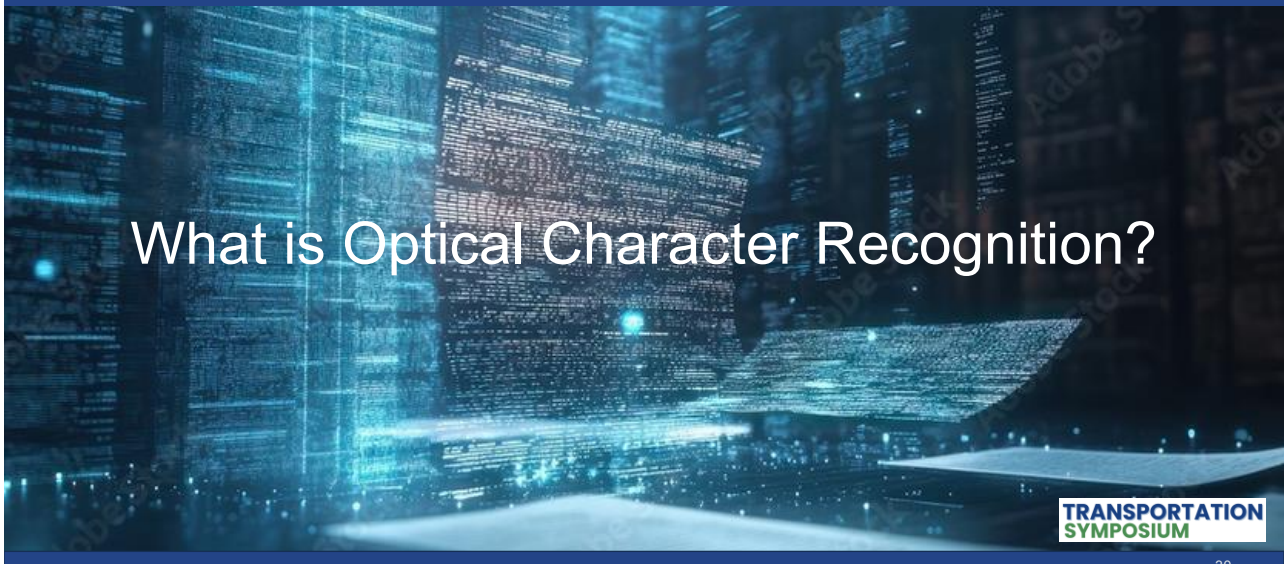
Statewide Sign Collection Effort



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Statewide Sign Collection Effort

The OCR system accurately recognized roadway sign text in challenging conditions:

- **Partially visible signs**
- **Small fonts**
- **Symbols like interstate shields**

'INTERSTATE NORTH 295 Orange Park Savannah LEFT ONLY'

'BEGIN SPEED LIMIT 35'

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Statewide Sign Collection Effort

MUTCD Classification Result:

'W6-1'

Signs with and without text were classified by MUTCD code

Spatial locations refined to accurate on-ground positions using image and feature analysis

Sample Validation showed 90.7% combined accuracy

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Advancing PD&E in D6 using Remote Sensing

Covers 764 square miles from Miami-Dade County through Key West

Focus on high-density coastal data collection for resiliency planning

Collaboration between FDOT Central Office and District 6

Supports storm mitigation, shoreline stabilization, and infrastructure resilience

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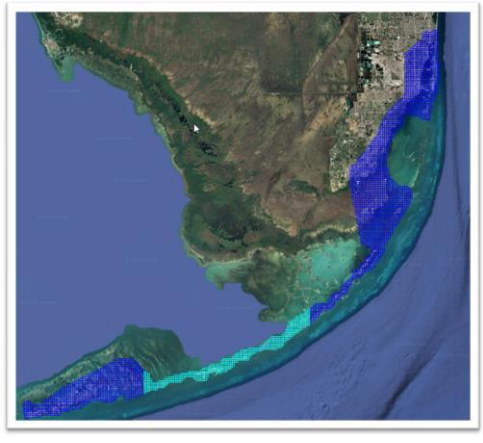
Advancing PD&E in D6 using Remote Sensing

Tile-based scheme (2,500' x 2,500') for optimized data handling

Enables efficient QA/QC, analysis, and external data requests

Data specifications:

- 4-band Ortho GeoTIFF = 3.19 GB per tile
- Classified LiDAR = 7.83 GB per tile
- Developed using internal QAR and analysis processes to ensure early delivery



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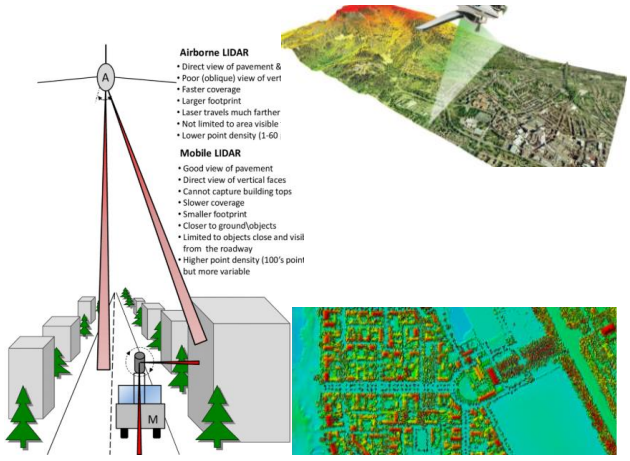
Advancing PD&E in D6 using Remote Sensing

USGS baseline of 2 points per square meter (PPSM)

FDOT enhanced collection of 50+ PPSM – vastly improved detail

Combined aerial and terrestrial mobile LiDAR coverage

Enables detailed terrain modeling for shoreline, elevation, and drainage assessments



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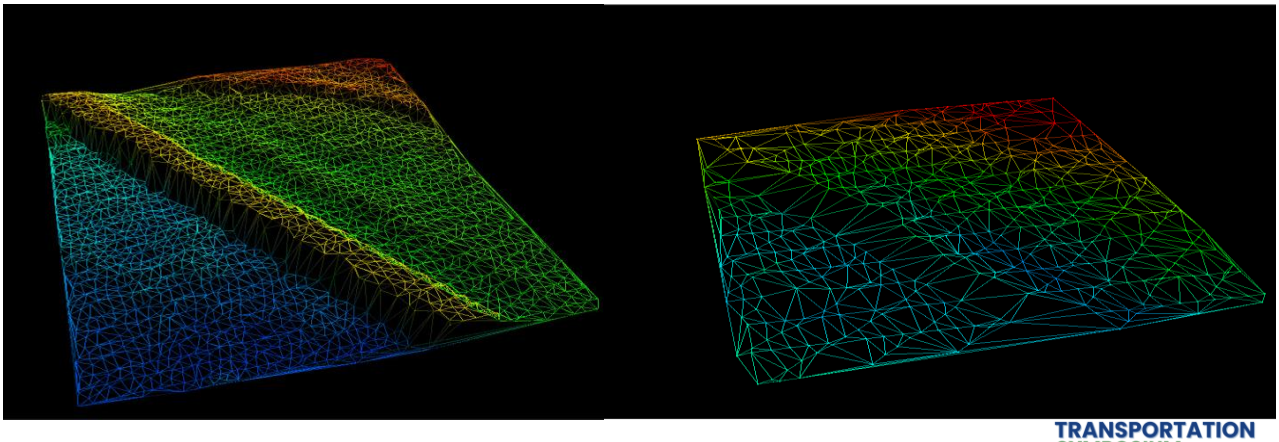
Advancing PD&E in D6 using Remote Sensing

FDOT LiDAR **50+ PPSM**

USGS LiDAR **8 PPSM**



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Advancing PD&E in D6 using Remote Sensing

West Summerland Key

Ortho Photo

Site Photo

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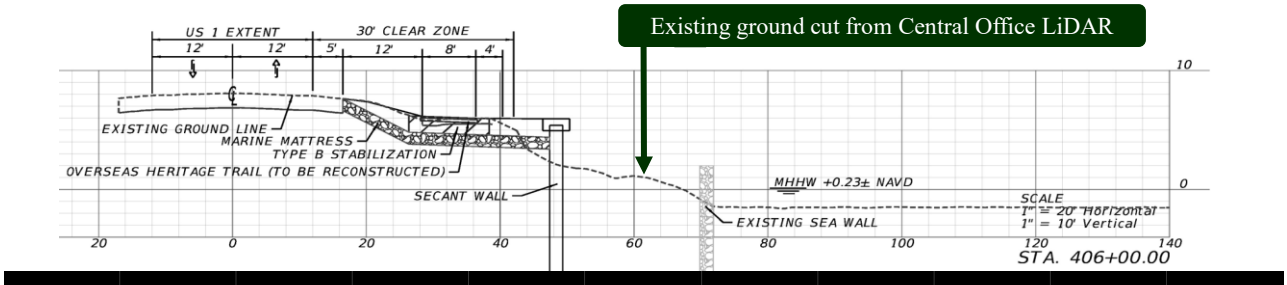
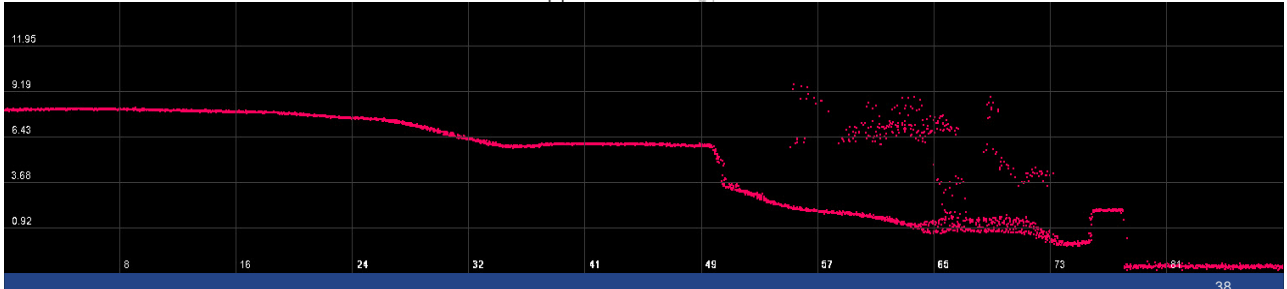
Advancing PD&E in D6 using Remote Sensing





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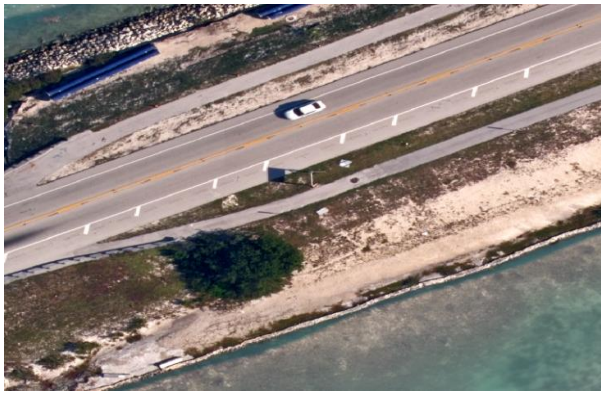
Advancing PD&E in D6 using Remote Sensing

Tea Table/Indian Key

Ortho Photo



Site Photo

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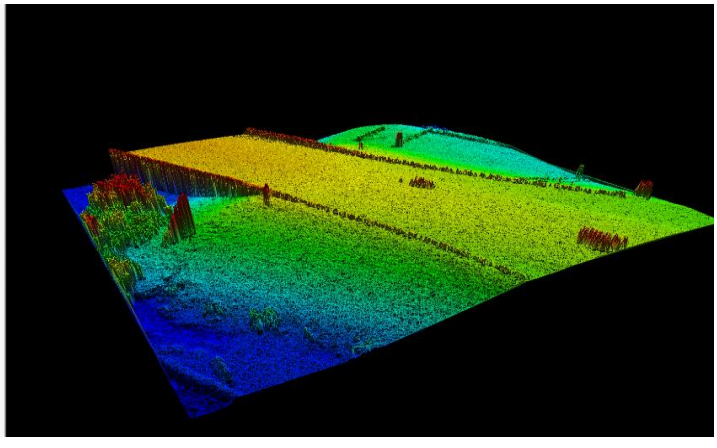
Advancing PD&E in D6 using Remote Sensing

Tea Table Bridge Abutment



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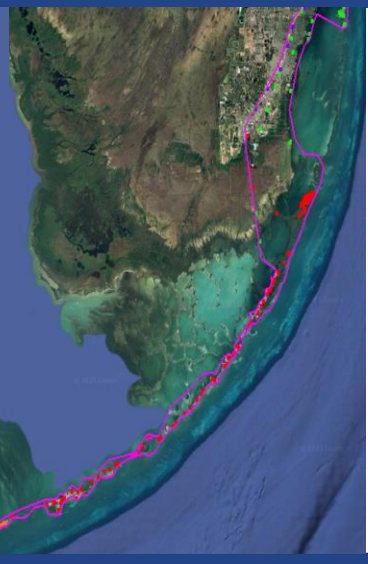
Advancing PD&E in D6 using Remote Sensing

Central Office Surveying and Mapping's Verification using Control Check Points from various sources:

- 170 Existing Florida County Digital Orthoimagery Program (FCDOP)
- 55 Existing District Topographic Cross Sections
- 47 Newly Collected



Validation through control and check points

Ensures consistency across multiple data sources

Central Office Surveying and Mapping leading verification

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Challenges and Considerations in Adoption

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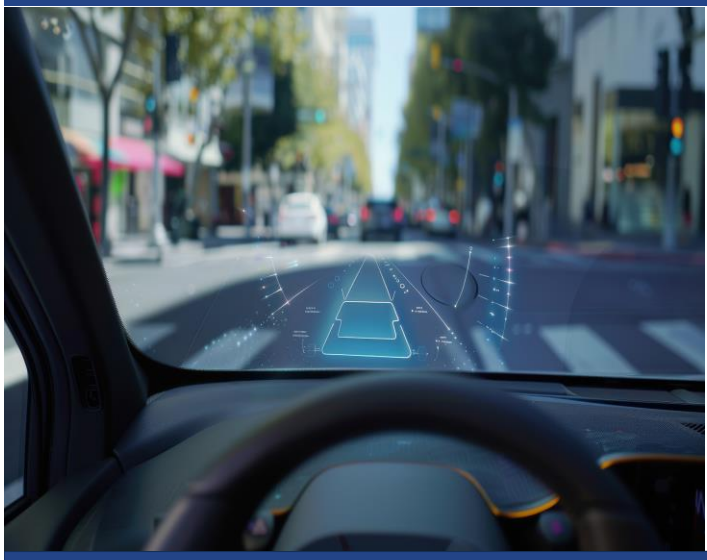
Challenges and Considerations in Adoption

- **High** implementation costs
- **Limited** workforce training
- **Legacy** system compatibility
- **Resistance** to change
- **Stakeholder** engagement
- **Ongoing** support and education

Future Trends in Data and Design

Augmented Reality



- **Real-time** data overlays
- **On-site** infrastructure visualization
- **Enhanced** field inspections
- **Immersive** design reviews
- **AR-based** training simulations
- **Interactive** public engagement
- **Improved safety** and efficiency
- **Streamlined** decision-making

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Virtual Reality

- **Immersive** design visualization
- **Virtual** walkthroughs
- **Training simulations** for field crews
- **Safety scenario** modeling
- **Improved collaboration** across teams
- **Reduced design errors** and rework

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Connected Infrastructure

- **Real-time monitoring** of infrastructure health
- **Early detection** of structural stress and wear
- **Smart traffic flow** and congestion management
- **Automated alerts** for maintenance and safety issues
- **Enhanced** vehicle-to-infrastructure (V2I) communication
- **Support for autonomous** and connected vehicle systems
- **Improved emergency response** coordination

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Questions and Discussion

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Safety Message

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