



## Pikes Peak Post

General Membership Meeting  
February 9, 2021

**DISCOVER  
YOUR ROLE  
IN BUILDING  
AMERICA'S  
FUTURE.**

Jim Brackett, PE, PMP, F.SAME  
President

- Welcome & Pledge
- Welcome New Members
- Upcoming Events
- Guest Speaker
  - Positive Train Control Mapping Presented by  
Merinda Lobato Lidar Project Coordinator/Geodesist Merrick & Co.



# New Members – Joined in January

## Individual Members

Al Adelgren, Faithful + Gould

Megan Baker, Green Building Initiative

Capt Cristina Behrens, US Air Force

Mark Blanchard, Hydrogeologic

Tyler Downes, Colorado Cleanup Corp

David Gatlin, Siemens Industries

John Hudson, Stanley Consultants

Terri Marroquin, Siemens Industries

Amy McGill-Fitzgerald, Siemens Industries

Jose Porras, Siemens Industries

Dawn Resling, Colorado PTAC

Greg Risko, Siemens Industries

Kevin Williams, Stanley Consultants

## Sustaining Member Firms

Green Building Initiative

# Upcoming Events

- March 11 2021 – CDOT’s New Ramp Metering on I-25 in Colorado Springs
  - Joint with ACEC, Institute of Transportation Engineers, SAME PPP
- April – Mega Federal/State/Local Industry Event
- May 11 - Colorado Infrastructure Report – Joint with ASCE
- June 9 – SAME/USACE Omaha District Industry Day

# Engineering and Construction Camp

- Virtual – partnership between SAME Engineering and Construction Camp COI and US Naval Academy
- Applications being accepted



## Positive Train Control Mapping

Presented by

Merinda Lobato Lidar Project Coordinator/Geodesist Merrick & Co.



# **SAME Colossal Colorado** **2021 Engineering & Beyond Panel** **Positive Train Control Mapping**

Presenter: Merinda Lobato



[www.merrick.com](http://www.merrick.com)



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Presenter



Merinda Lobato  
Merrick & Company  
Lidar Project Coordinator  
[merinda.lobato@merrick.com](mailto:merinda.lobato@merrick.com)  
(719) 268-2360

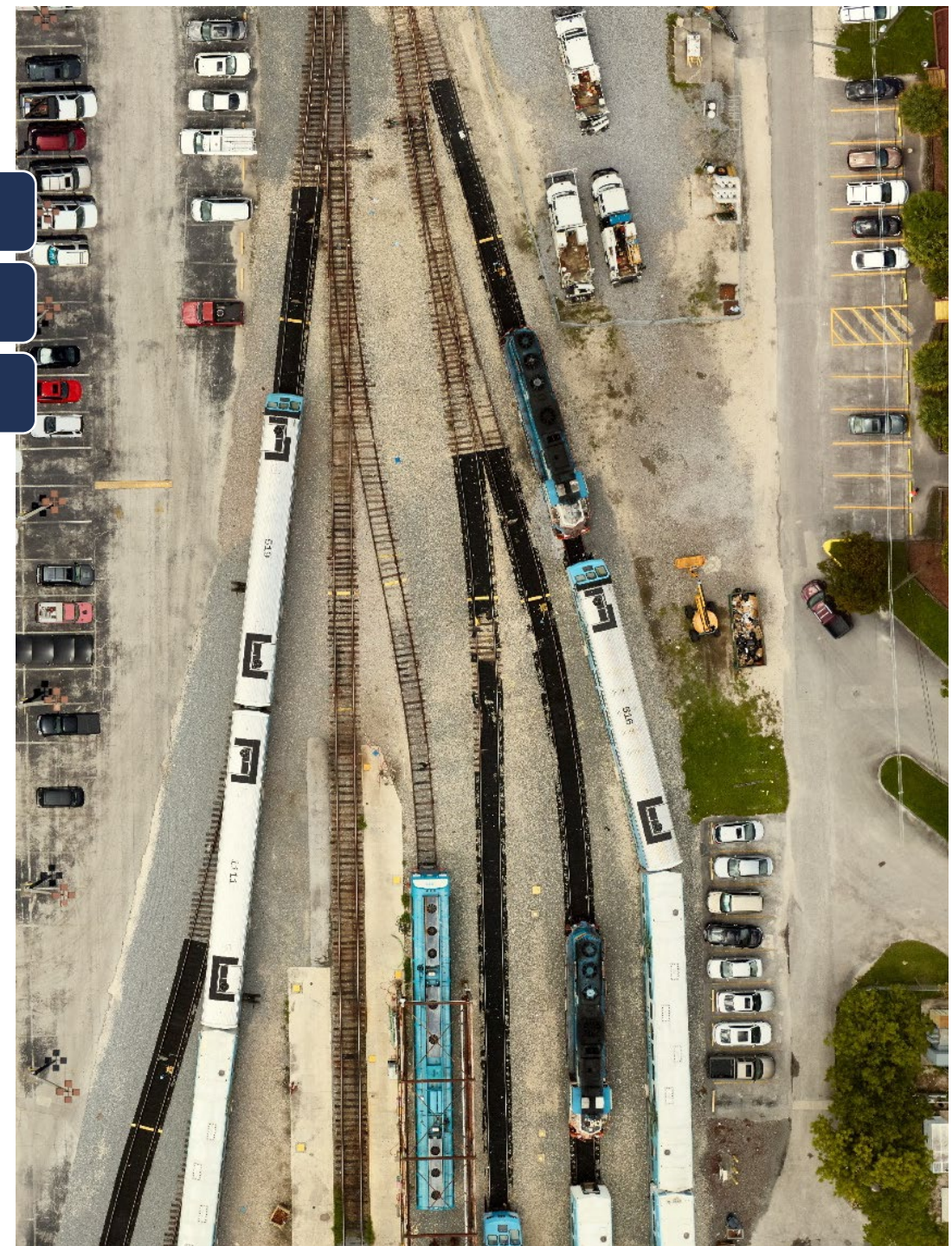
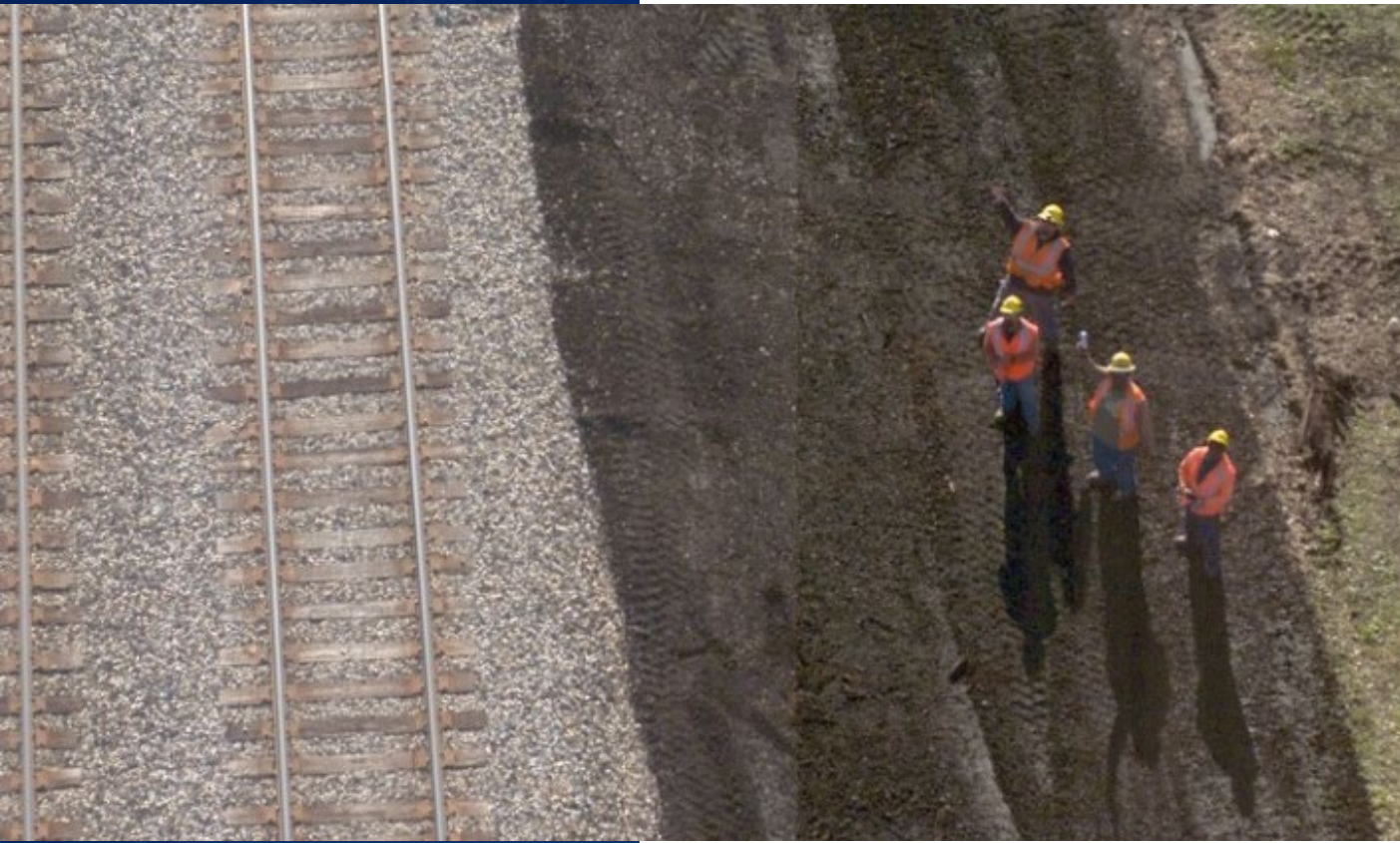
# What is PTC?

## Positive Train Control

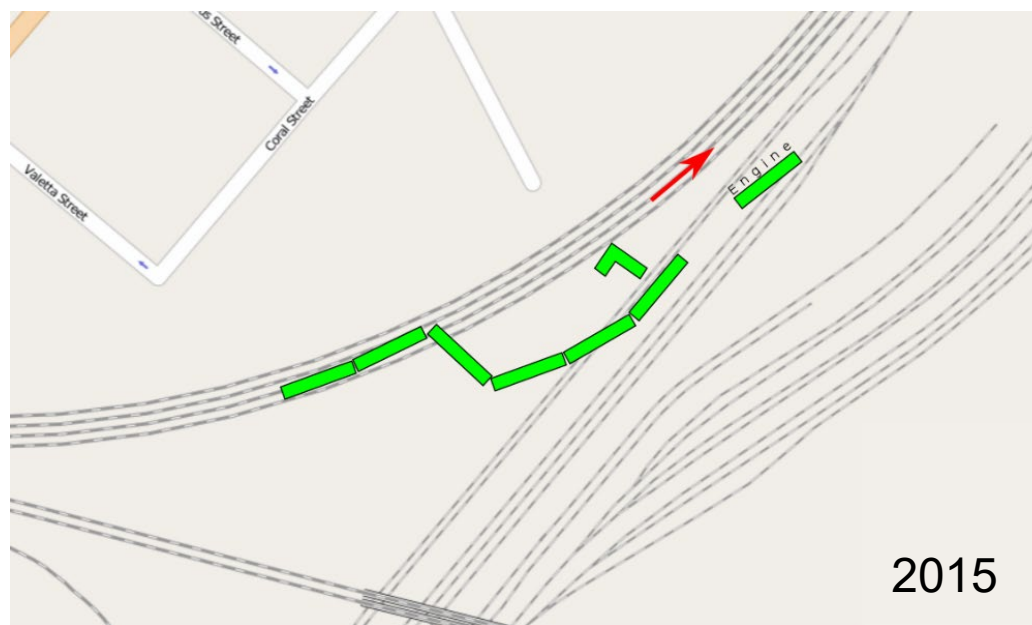
Avoid train-to-train collision incidents

Enforce speed and restrictions

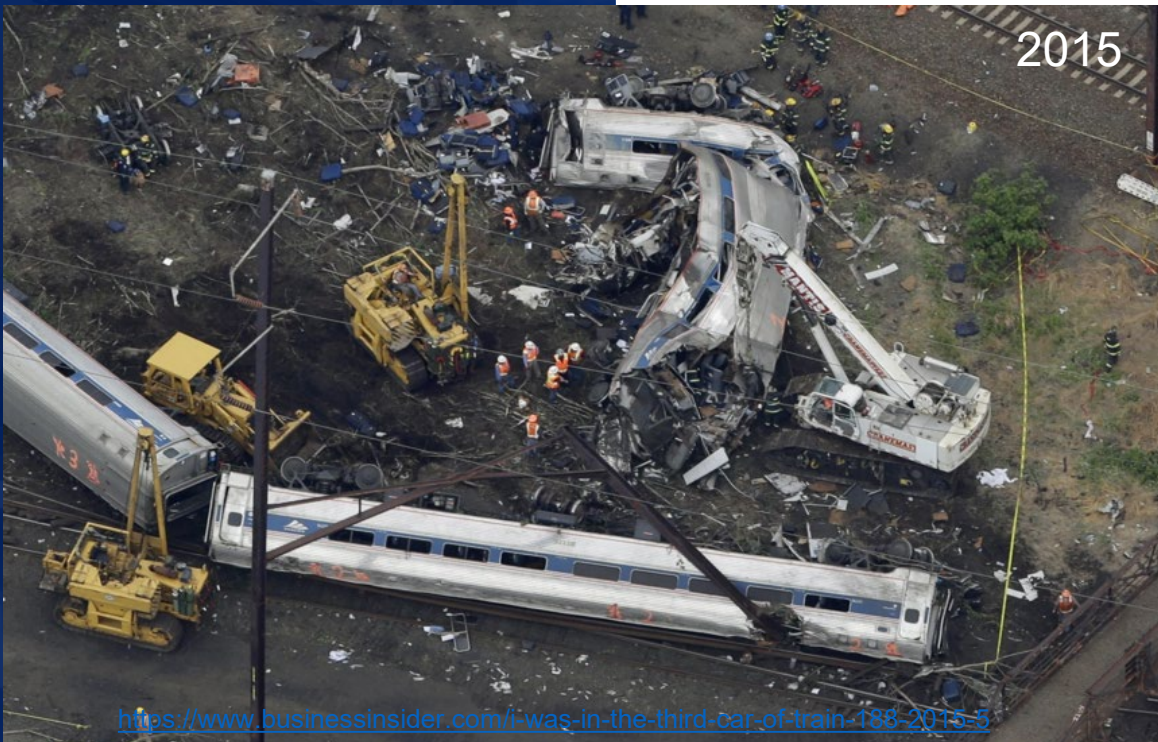
Improve rail work zone safety



# Why do we need PTC?



2015



# PTC required for Class 1 Main Lines

Where is PTC required?

Annually transport 5 million gross tons

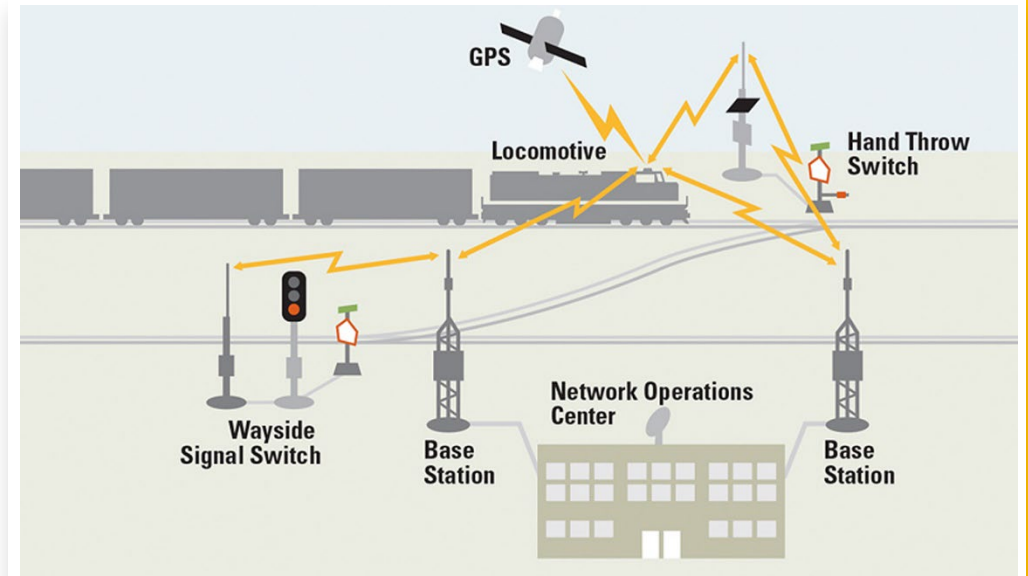
Handle poisonous inhalation hazardous (PIH) materials

Regular scheduled intercity passenger or commuter rail



[List of Class I railroads – Wikipedia, en.wikipedia.org](https://en.wikipedia.org/wiki/List_of_Class_I_railroads)

# Components of PTC



Real-time global positioning system (GPS)

Geodatabase of rail assets

Train Engineer

Train with hardware and software

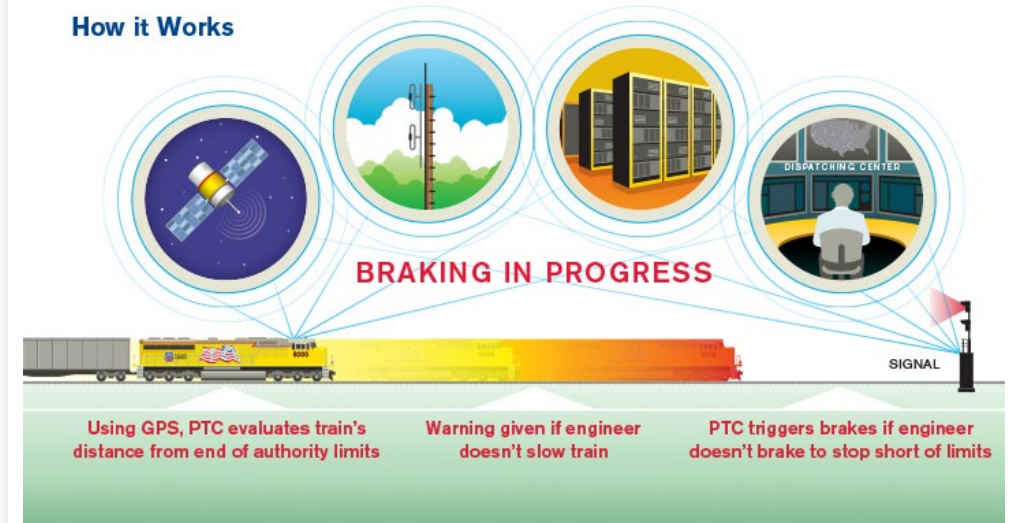
Data Center

Dispatcher

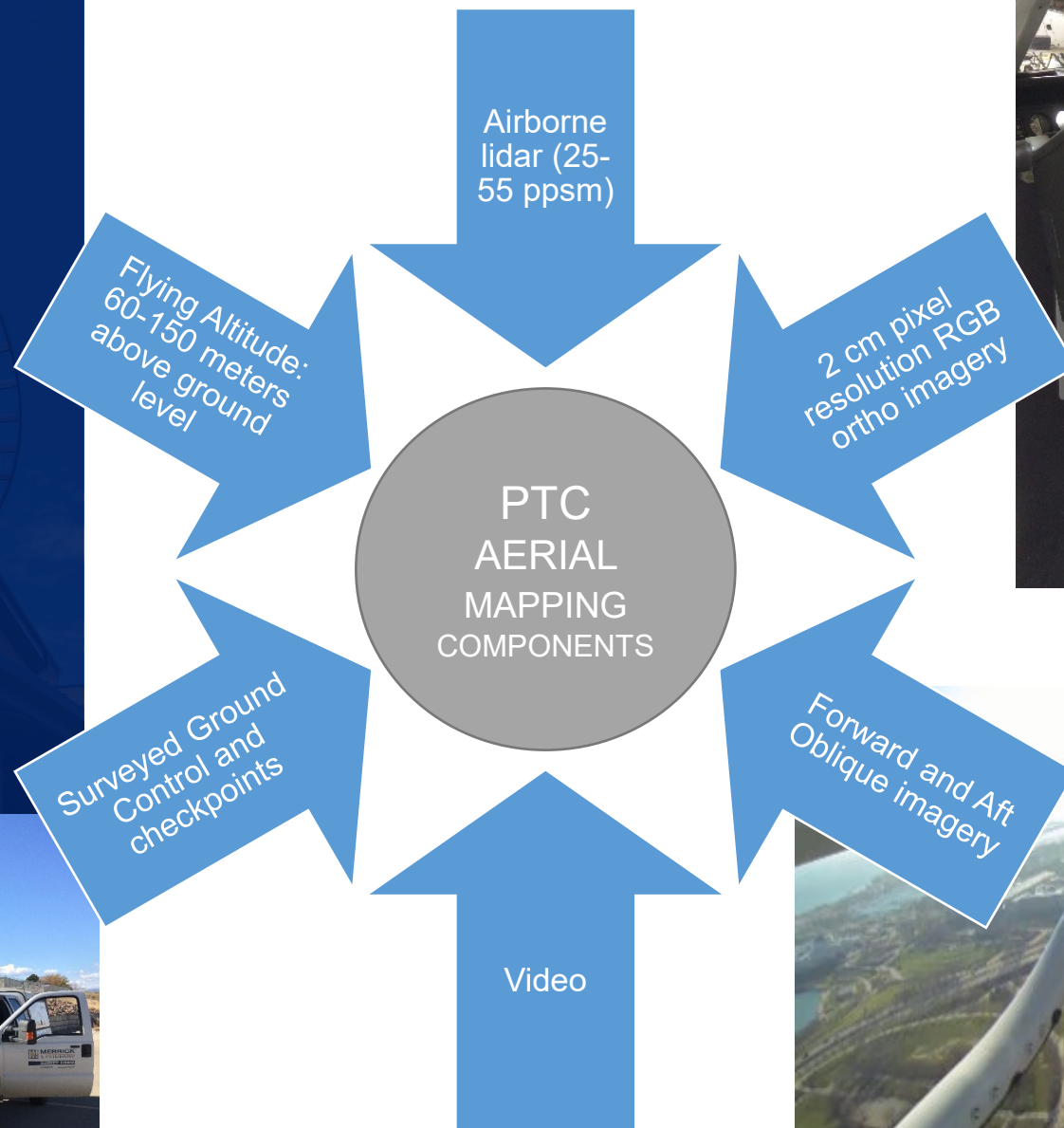
Radio links to transmit and receive data

Rail operation center

## How it Works

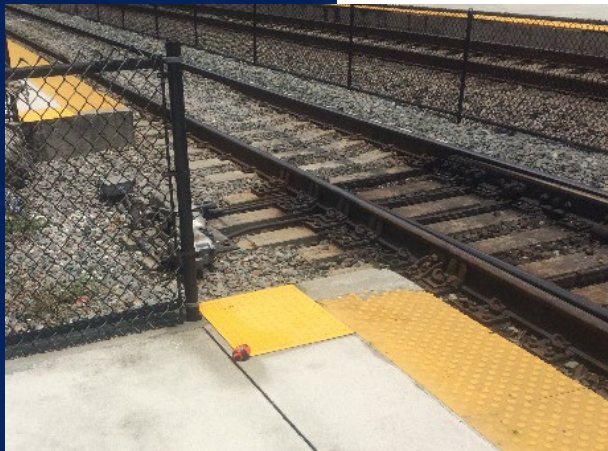


# Helicopter Approach



# Lidar vertical accuracy control report – 3 cm RMSEz

## Accuracy



MARS Control Report

Inputs Control file:

Requirement: ☒ RMSEz 0.03 ☐ Vertical Accuracy

Elevation calculation method: ☒ TIN ☐ Grid ☐ Closest Point

Classifications Included: 2.17

LAS Files - Count: 635

Statistics for Project:

Control Points	41	Average Z Error for Control Point Sample	0.000	PASS
Points with Coverage	41	Standard Deviation (sigma) of Z for Sample	0.030	
Points with Required Accuracy		RMSE of Z for Sample	0.030	PASS
Percent of Points with Required Accuracy		FGDC/NSSDA Vertical Accuracy (at the 95% confidence level)		N/A
Average Z Error	0.000	Achievable Contour Interval		
Maximum Z Error	0.061	FGDC/NSSDA/FEMA Contour Interval	0.1	
Median Z Error	-0.003	ASPRS Class 1 Contour Interval	0.09	
Minimum Z Error	-0.077	NMAS Contour Interval	0.1	

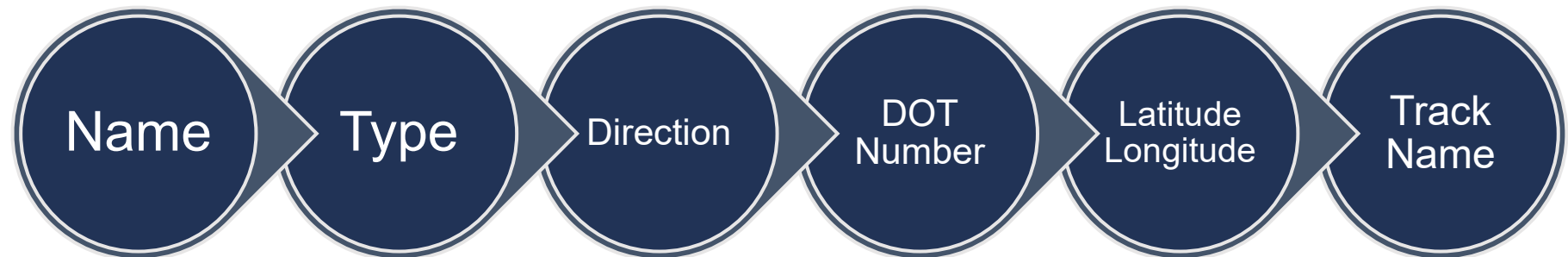
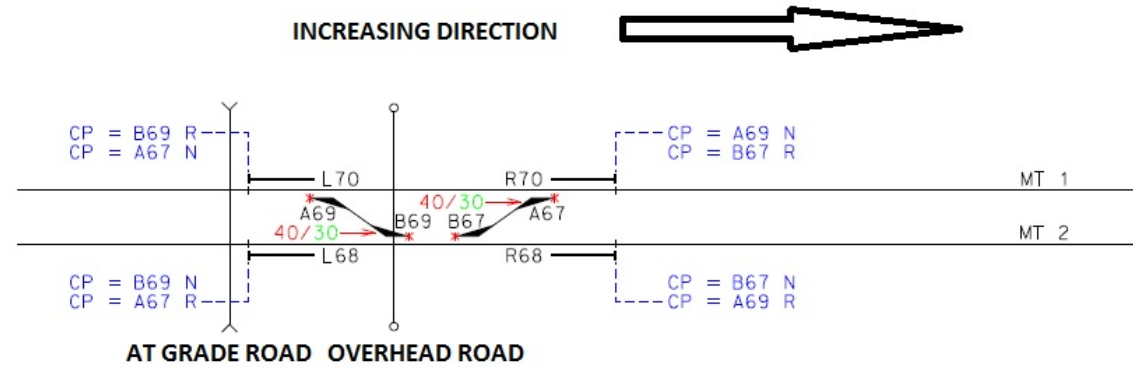
Turn Off Selected Point Turn On Selected Point Help Redraw Thematically

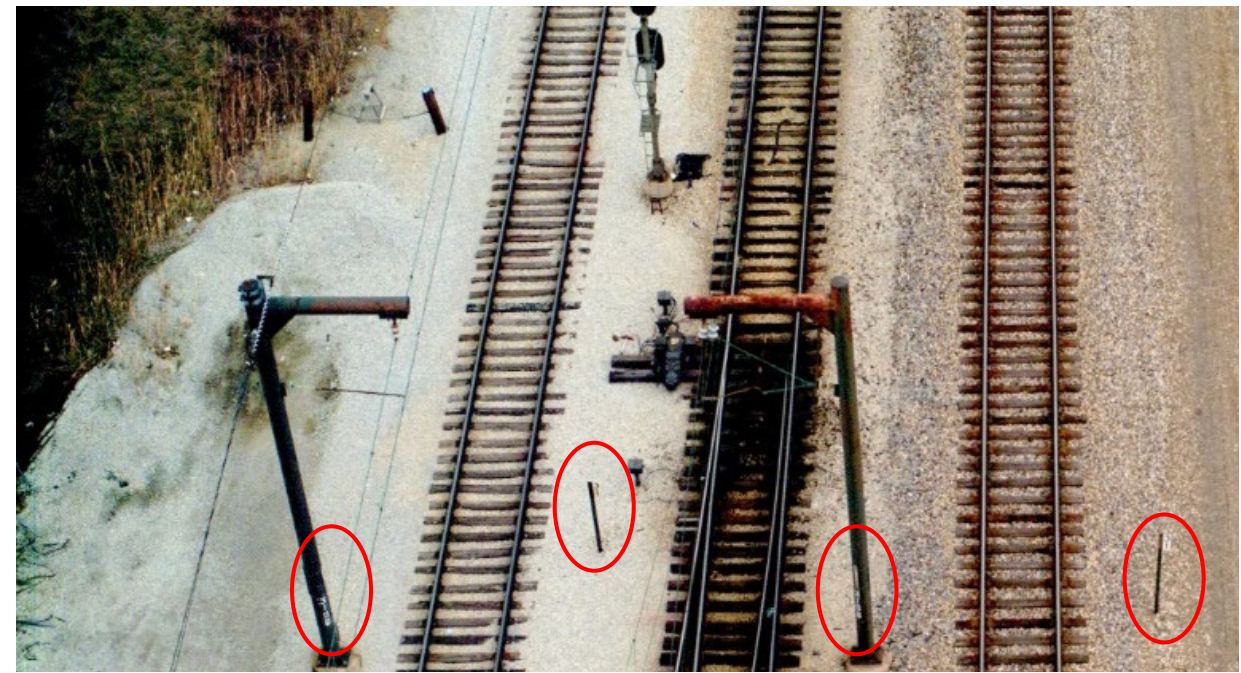
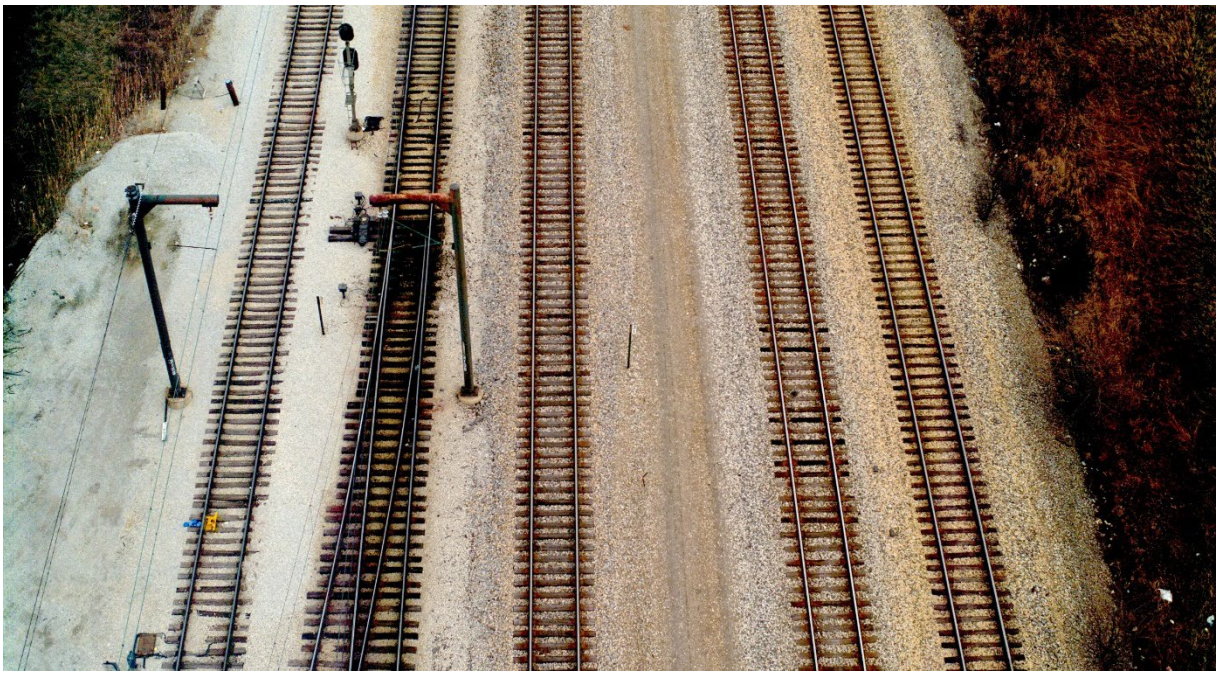
Statistics per Control Point

	ID	X	Y	TIN Coverage	Z of Control	Z from LIDAR	Z Error	Min Z	Median Z
<input checked="" type="checkbox"/>	527	439468.647	4589665.98	Yes	202.665	202.588	-0.077	202.588	202.588
<input checked="" type="checkbox"/>	539	452394.578	4623996.199	Yes	143.857	143.799	-0.058	143.798	143.8
<input checked="" type="checkbox"/>	507	438954.287	4606194.836	Yes	163.553	163.498	-0.055	163.495	163.498
<input checked="" type="checkbox"/>	506	434621.04	4602910.446	Yes	179.543	179.503	-0.04	179.498	179.499
<input checked="" type="checkbox"/>	529	443483.415	4599517.143	Yes	172.018	171.983	-0.035	171.973	171.985
<input checked="" type="checkbox"/>	531	447029.667	4608129.913	Yes	153.674	153.65	-0.024	153.646	153.65
<input checked="" type="checkbox"/>	530	445010.669	4603261.03	Yes	152.228	152.205	-0.023	152.199	152.21
<input checked="" type="checkbox"/>	502	416153.999	4597403.067	Yes	152.546	152.526	-0.02	152.524	152.528
<input checked="" type="checkbox"/>	531A	446990.994	4608102.646	Yes	147.579	147.56	-0.019	147.557	147.56
<input checked="" type="checkbox"/>	522	435624.678	4617736.456	Yes	146.096	146.069	-0.017	146.064	146.066

Attributes added  
to the  
geodatabase  
from the CAD  
Track Chart files

## Geodatabase Attribution and Annotation






Oblique imagery: read and label Catenary pole, Milepost and Speed signs

# ADDITIONAL SAFETY CONSIDERATIONS FOR COVID 19

- Rapid shift to Work From Home
- Town Hall presentations from our in-house Bio Safety Experts
  - Knowledge share, Myths and Truths
- Guidance to individuals to follow CDC guidelines
- Field crew office schedule rotation
- Vehicle travel
- Survey Instruments
- Increased cleaning, fogger disinfecting, quarantine
- Business Unit lead or greater approval required before work travel
  - Masks at all times in public
  - Hotel stay- no housekeeping
  - Take-out food, bring back to hotel
  - Isolate as much as possible
  - Know where people are
  - Be extra diligent

 <b>MERRICK</b>		<b>Merrick &amp; Company - Geomatics/Survey Safety &amp; Job Hazard Analysis Form</b>	
Project No. _____		Date <u>6/15/2020</u>	
Project Name _____		Weather/Temp. <u>88°F</u>	
Site Location <u>FLORIDA</u>			
Party Chief Name: _____		Signature: _____	
Instrument Operator #1: _____		Signature: _____	
Instrument Operator #2: _____		Signature: _____	
Specific Task Description (For Today) <u>TRAVEL FROM Denver</u> <u>TO FORT LAUDERDALE, RENT CAR TRAVEL</u> <u>TO PALM BEACH</u>			
Tailgate Meeting Checklist: Mandatory for survey field crew at the start of work AND as conditions change at project site!			
Additional comments or unique procedures that were discussed during the tailgate meeting: <u>Severe COVID RISK</u> <u>MASK @ ALL TIMES</u>			
ATTENTION! Verify that all field employees assigned to this project fully understand the issues and concerns addressed above and also understand their duties and job tasks for the day.			

# OPTIONS TO VERIFY AND COLLECT OBSTRUCTED FEATURES



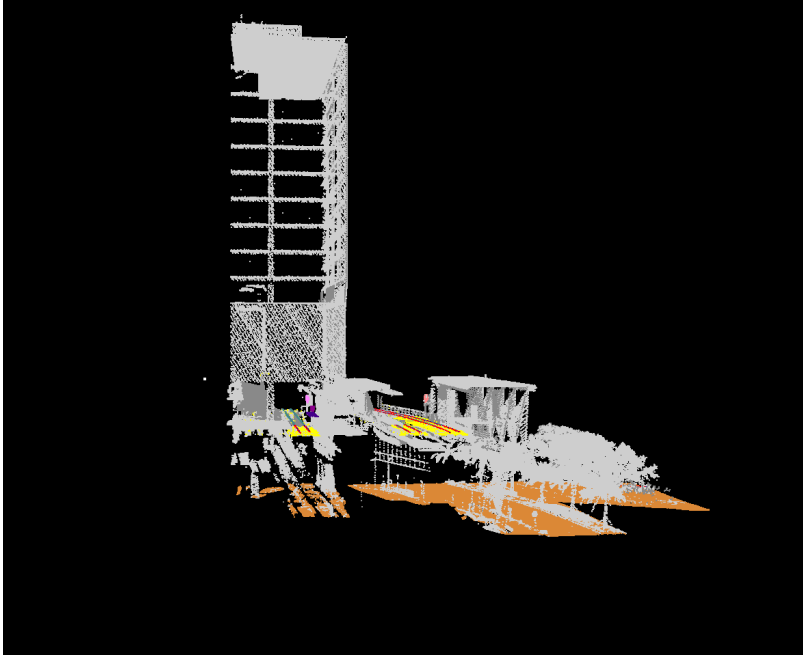
WALK THE TRACK, GO-PRO  
(VALIDATION OF ASSETS)

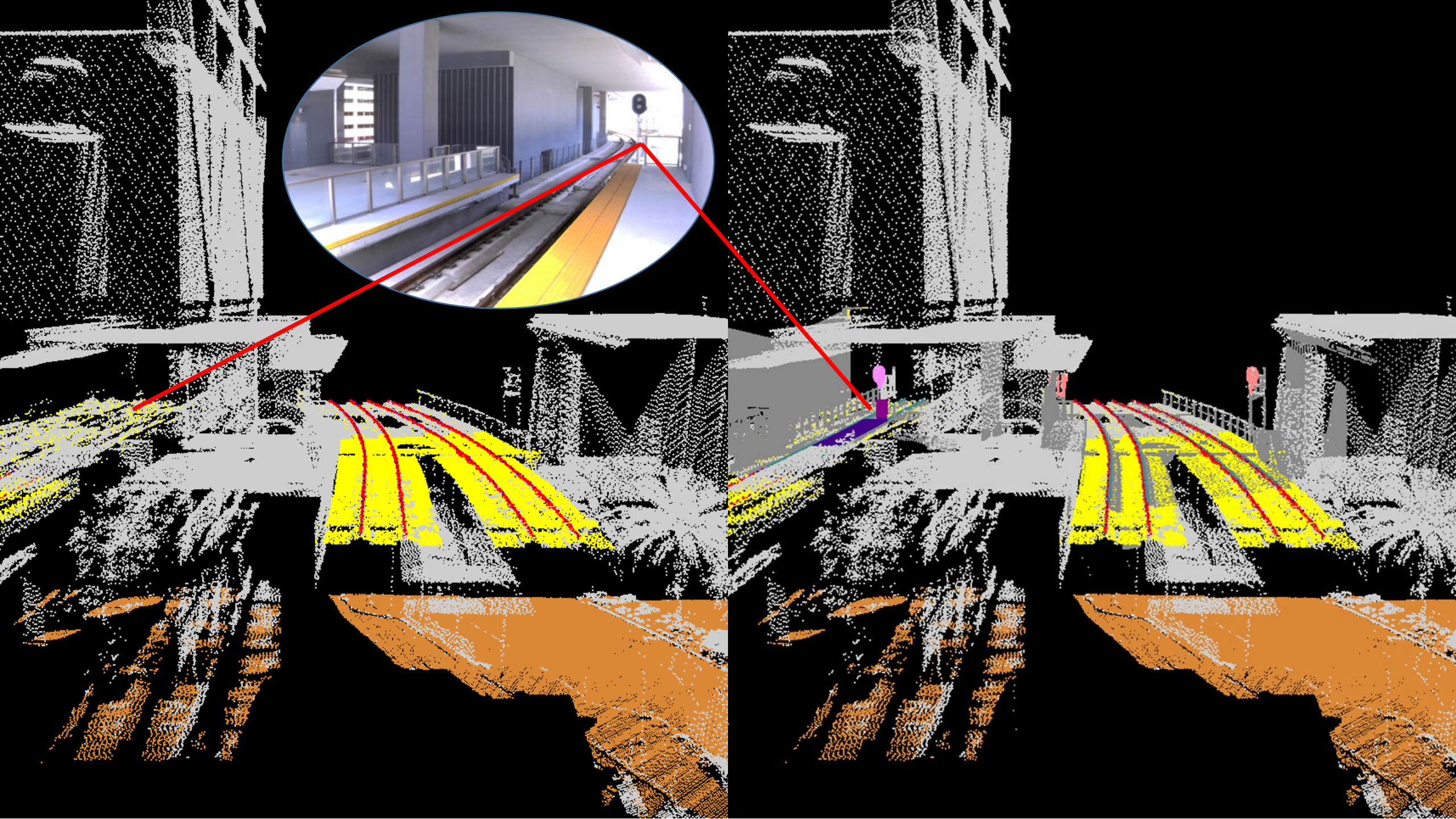


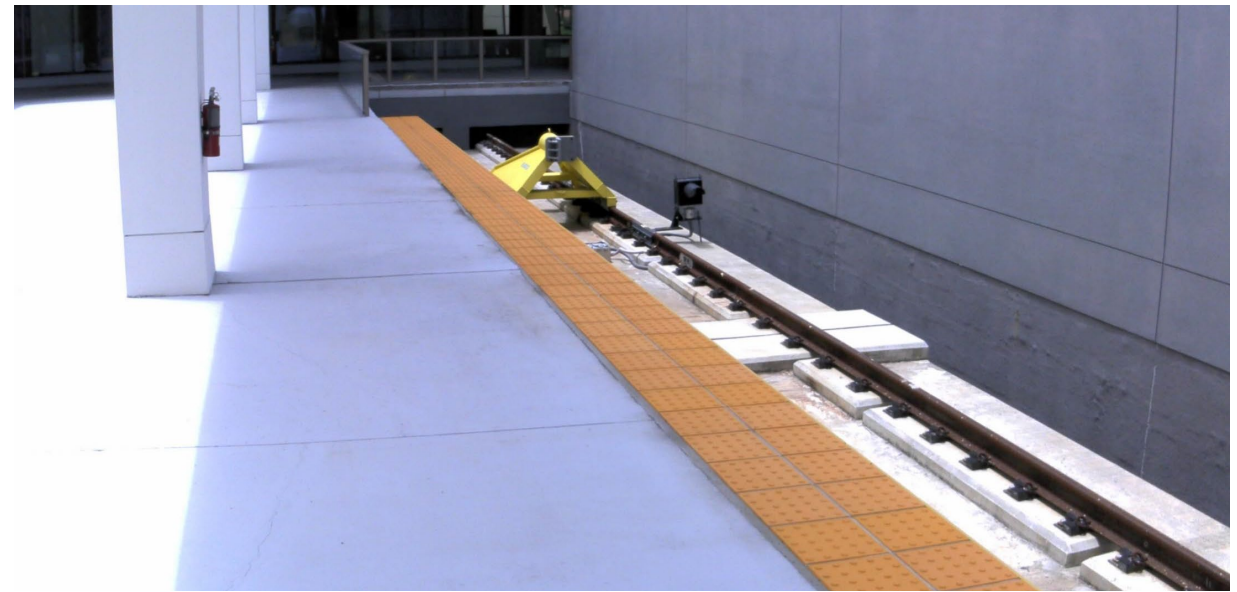
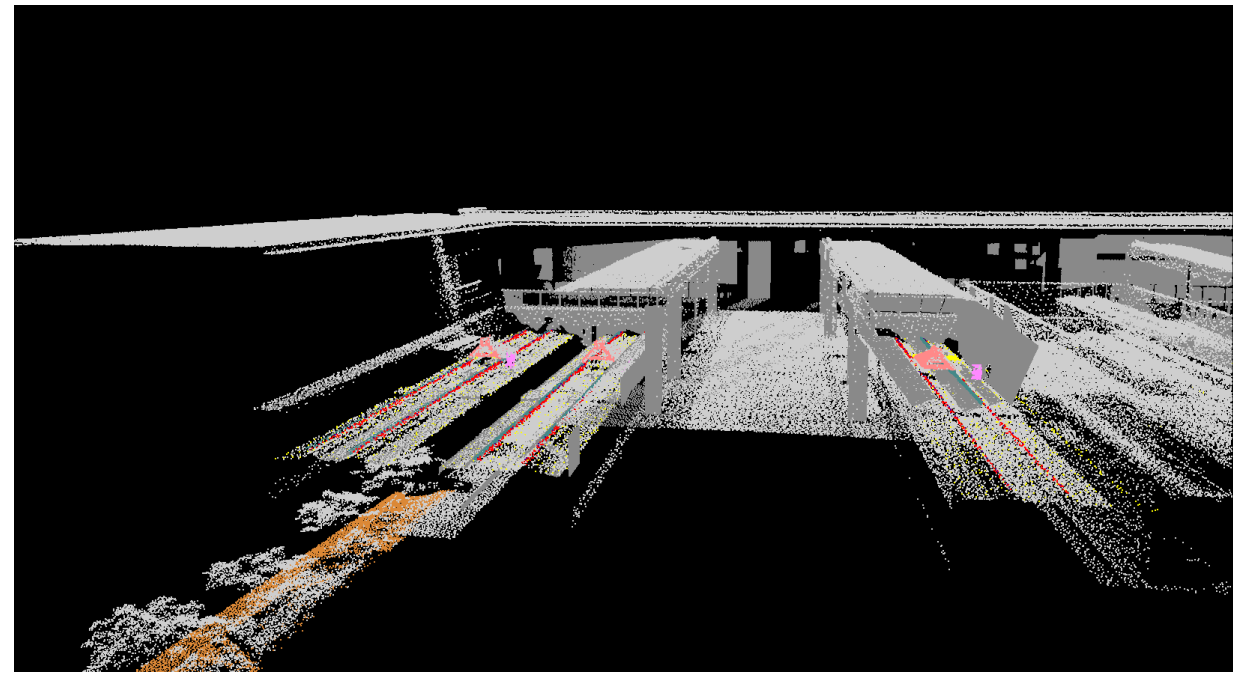
TERRESTRIAL LIDAR  
CONVENTIONAL SURVEY



MOBILE COLLECTION OF  
LIDAR AND IMAGERY FOR CITY  
AREA AND TUNNELS

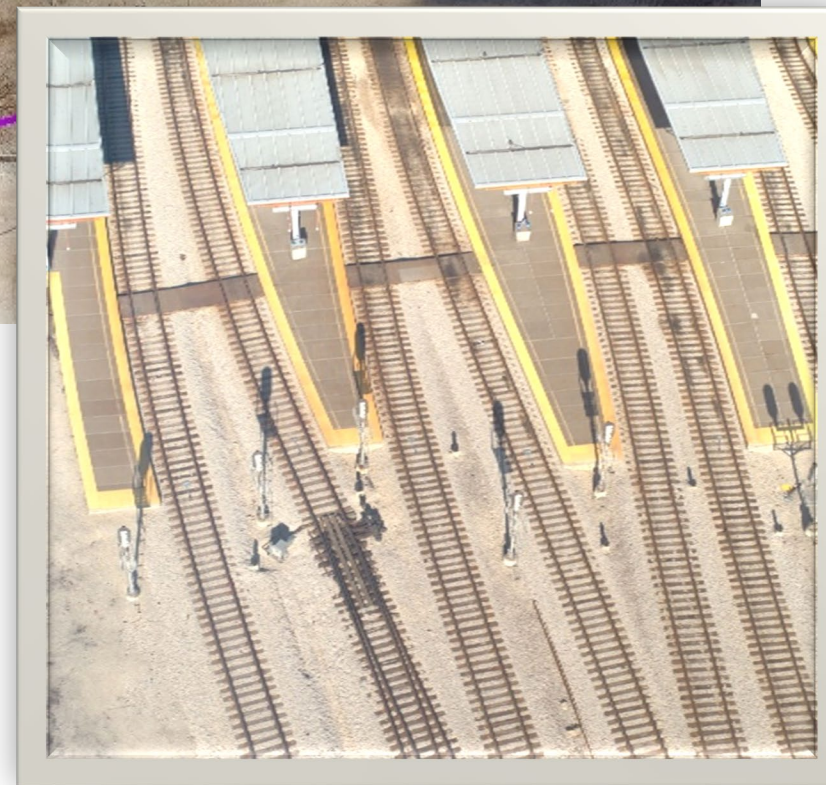
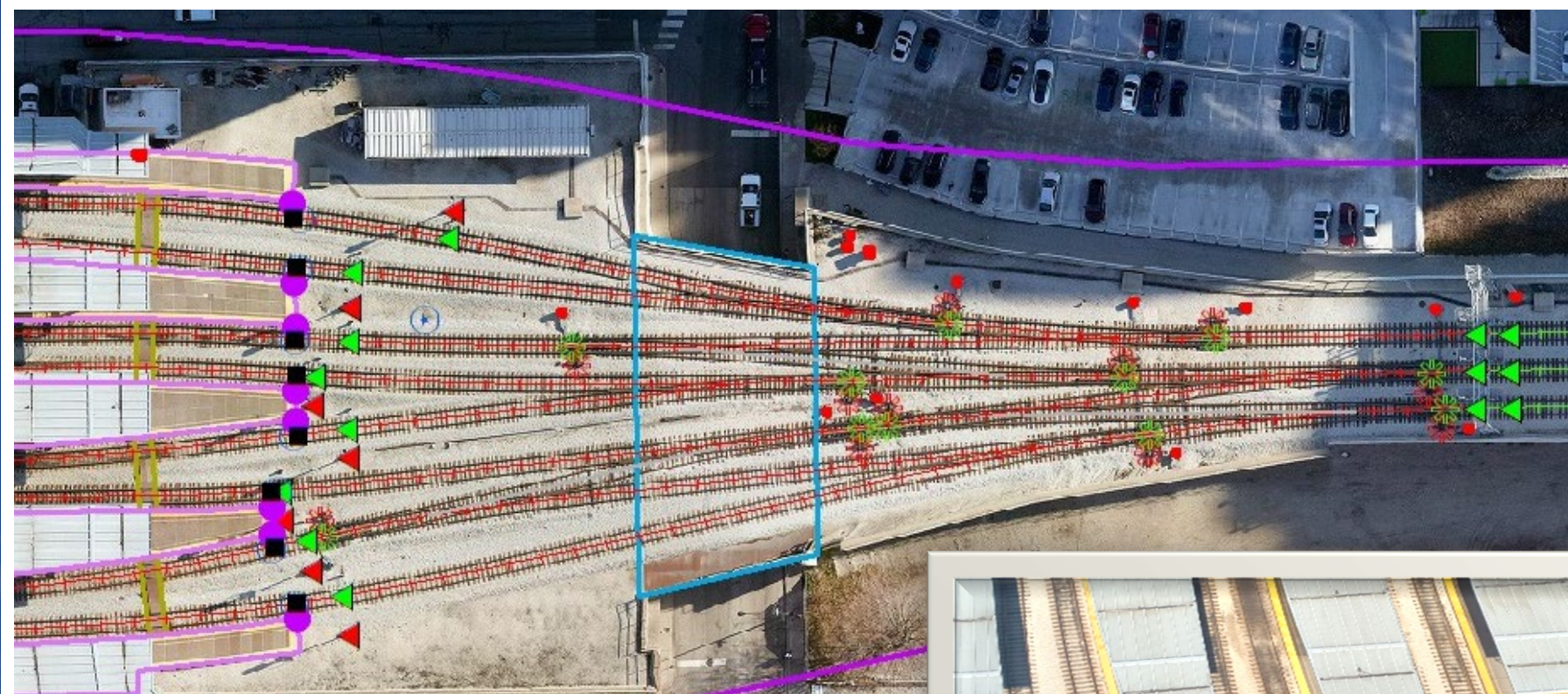






# Platform, Ortho and Plan

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Federal Railroad Administration (FRA) and  
Association of American Railroads

PTC technical  
requirements met on  
all required freight and  
passenger lines

Testing  
Deployment  
Compliance  
Interoperability

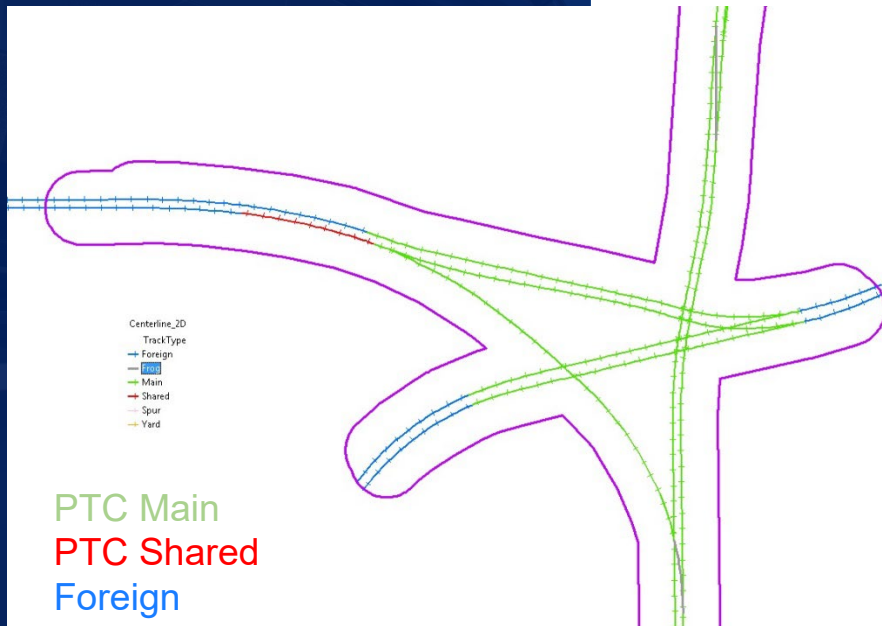
## PTC Status December 2020

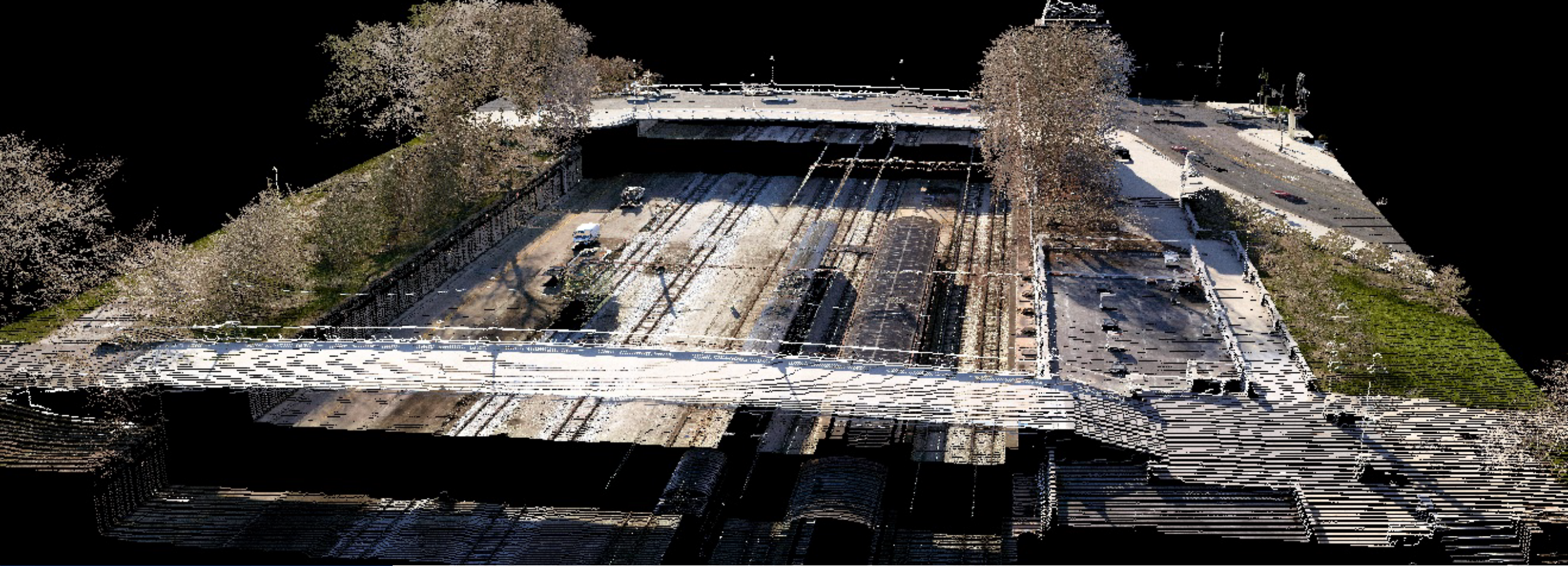
PTC 100% operational  
on 57,536 miles on 41  
railroads

Expected 450,000 field  
assets

Class I freight railroads  
had spent \$10.6 billion  
of their own funds- not  
taxpayers on  
development and  
deployment

Maintenance will cost  
millions of additional  
dollars/year





Thank You – Questions?