RIEGL

Laser Measurement Systems

cutting-edge
Laser Scanning Technology for
mapping & surveying applications

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RIEGL

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Vienna, Austria

International Mobility Days 2023

RIEGL Austria
Headquarters
Horn near Vienna, Austria

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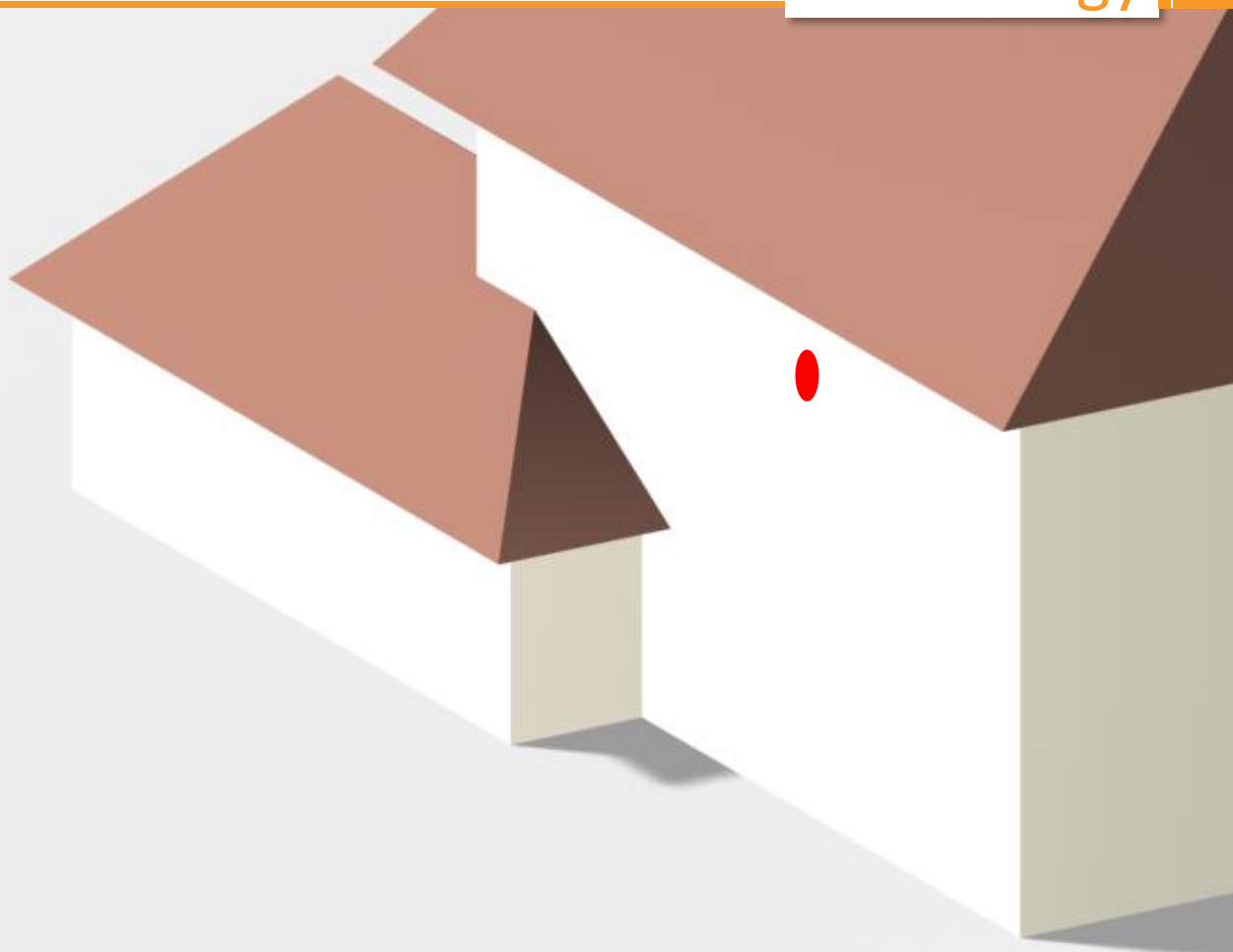
RIEGL®

Technology

time of flight



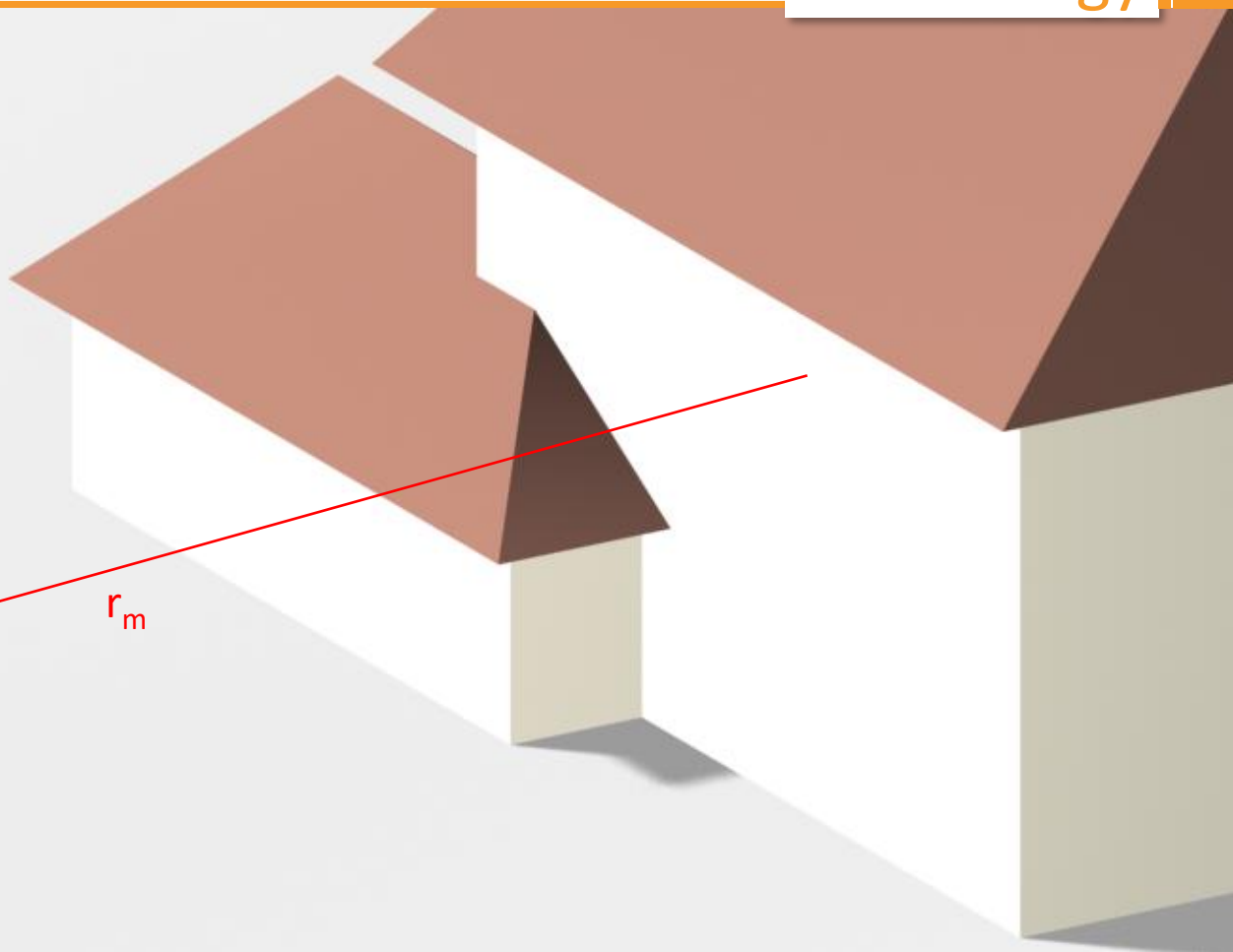
Technology

time of flight

$$r_m = c * \frac{T_n - Tm}{2}$$

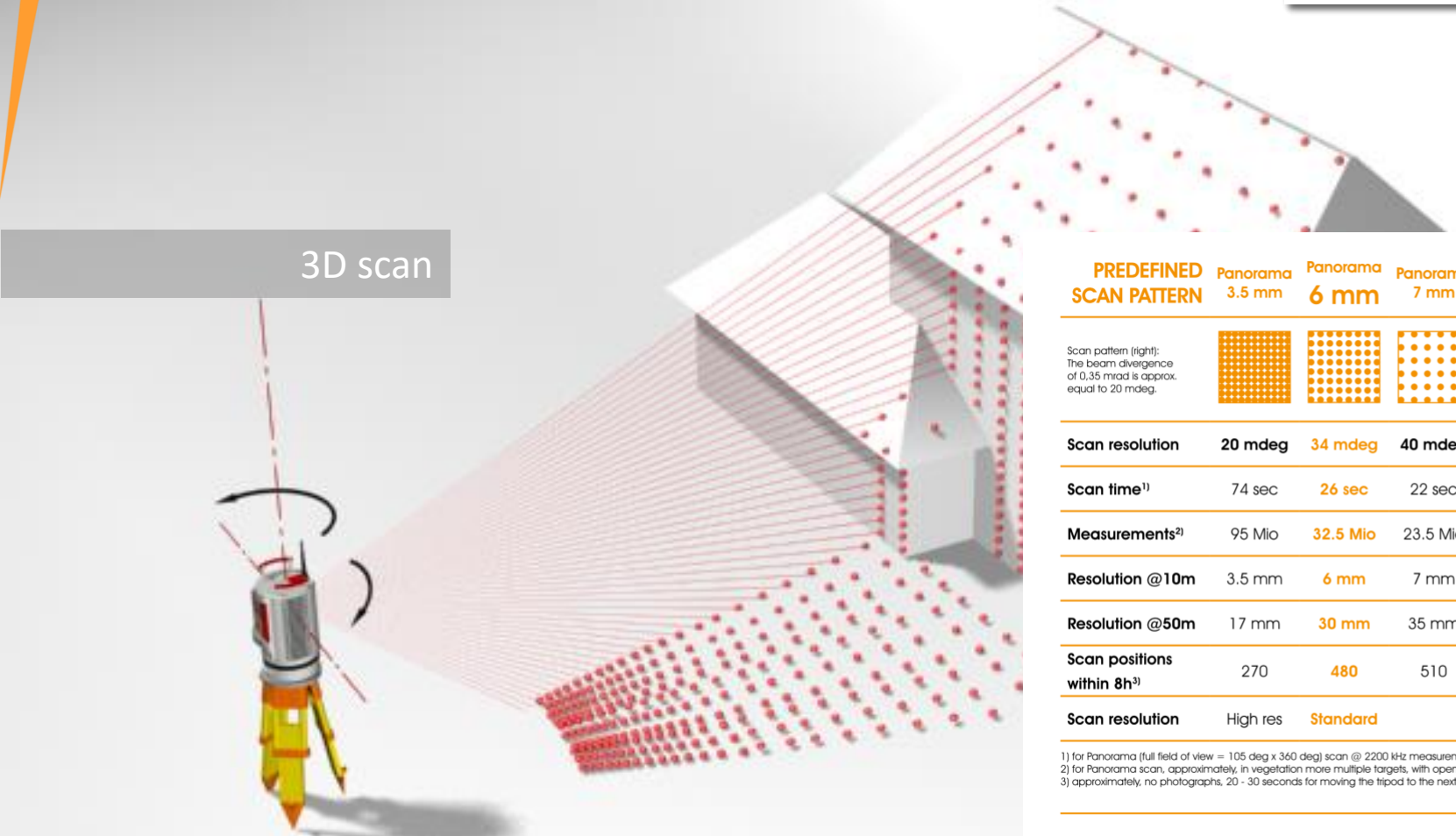
speed of light c_0 = 299 792 458 m/s

r_m



Technology

3D scan



PREDEFINED SCAN PATTERN	Panorama 3.5 mm	Panorama 6 mm	Panorama 7 mm	Panorama 9 mm	Panorama 14 mm
Scan pattern (right): The beam divergence of 0,35 mrad is approx. equal to 20 mdeg.					
Scan resolution	**20 mdeg**	**34 mdeg**	**40 mdeg**	**50 mdeg**	**80 mdeg**
Scan time[1]	74 sec	**26 sec**	22 sec	18 sec	11 sec
Measurements[2]	95 Mio	**32.5 Mio**	23.5 Mio	15 Mio	6 Mio
Resolution @10m	3.5 mm	**6 mm**	7 mm	9 mm	14 mm
Resolution @50m	17 mm	**30 mm**	35 mm	44 mm	70 mm
Scan positions within 8h[3]	270	**480**	510	550	640
Scan resolution	High res	**Standard**			Low res

1) for Panorama (full field of view = 105 deg x 360 deg) scan @ 2200 kHz measurement program
2) for Panorama scan, approximately, in vegetation more multiple targets, with open sky less targets
3) approximately, no photographs, 20 - 30 seconds for moving the tripod to the next scan position

Terrestrial Laser Scanning | Public Safety *Application Example*

RIEGL® Mobile Laser Scanning | Road Public Safety *Application Example*

-) Avoid long road closures
-) Quick release of the traffic
-) Accident reconstruction for insurance and legal processing in the court

Robotic Rail Scanning System | RAIL *Application Example*

project planning via app | start automatic mode | results

ÖBB

„Messwagen EM160WZ RailChecker“

Rail Inspection Rail Cars (2x)

Speed: 160 km/h up to 220 km/h

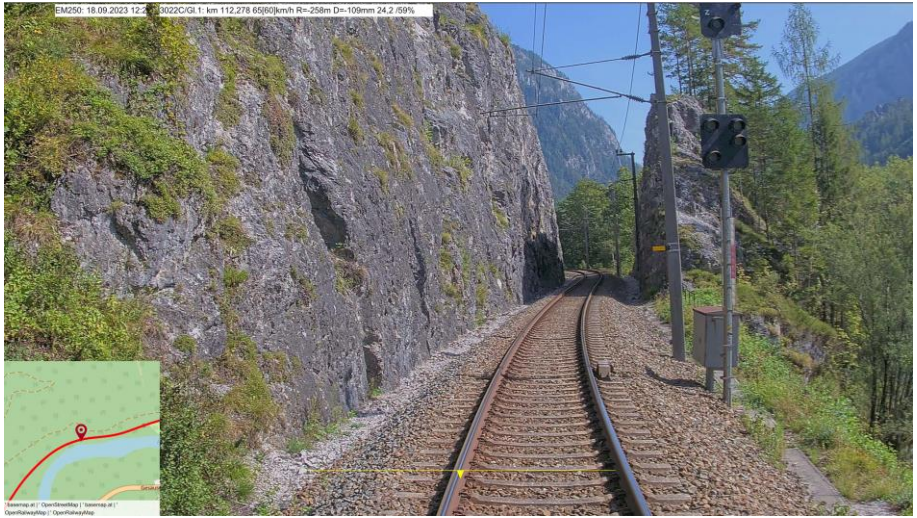
© ÖBB

ÖBB

Austrian Rail Network
approx. 7000 km

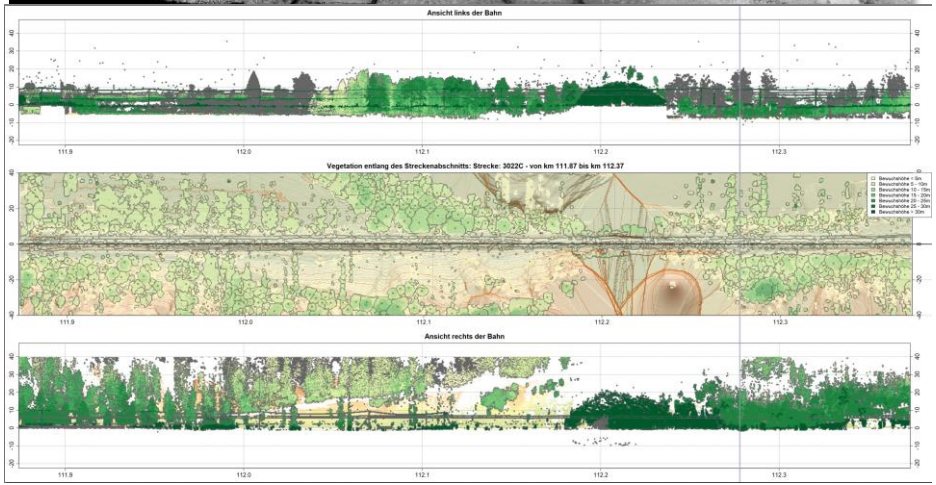
min. 4 inspections per year

Mobile Laser Scanning | RAIL *Application Example*



- Rail infrastructure asset management
- as-built surveying,
- track and infrastructure monitoring,

Mobile Laser Scanning | RAIL *Application Example*



- Clash detection simulation,
- Clearance and vegetations analysis
- Railway maintenance planning

VMX – RAIL

Triple Scanner Mobile Mapping System
specially designed for Rail Applications

© Eurailscout

EM100VT
© Plasser & Theurer
Track Machines Connected

Mobile Laser Scanning | RAIL *Application Example*

Vigirail ESV | SNCF Rèseau
Foto: RIEGL

Since 2018

SNCF Réseau has integrated **3x RIEGL VMX-RAIL** triple scanner systems

periodic monitoring of **200.000 km** per year

Mobile Laser Scanning | ROAD *Application Example*

Mobile Laser Scanning | ROAD *Application Example*

„Digital Twins“
3D Scan & Image Data for creation of

-) **U**ltra **H**igh **D**efinition Maps

-) Asset Management and BIM – Road Infrastructure

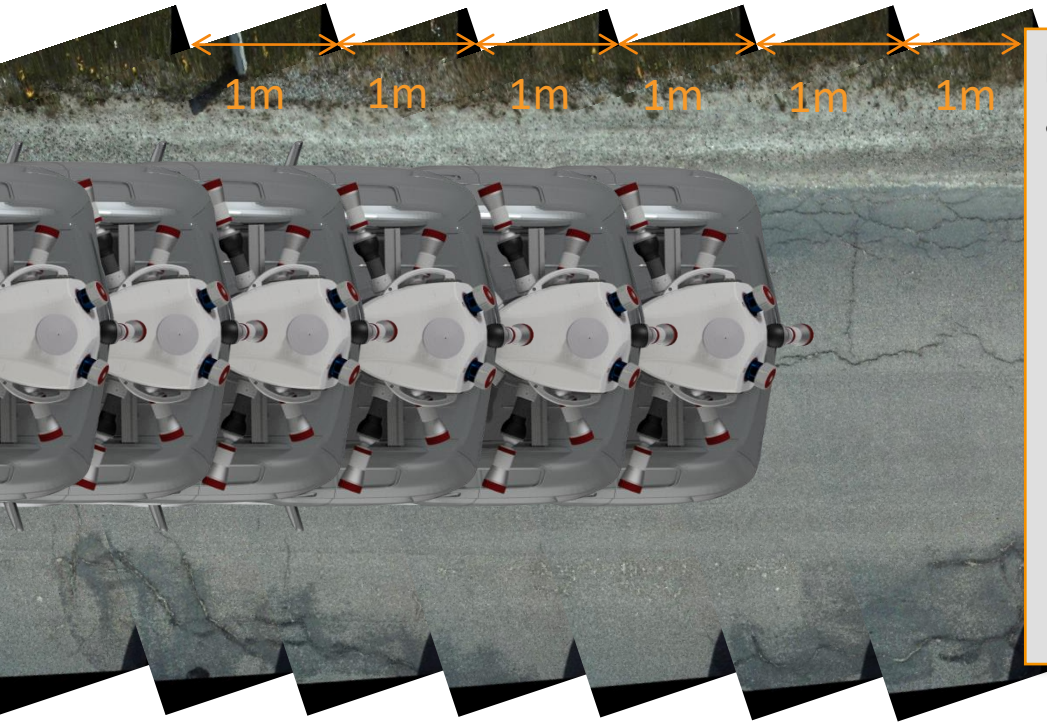
-) Road geometry and topology

-) Road markings and traffic signs inventory

-) Over head constructions

-) Road Surface Measurement

High Speed Pavement Cameras



High Speed | High Resolution Cameras

- high frame rate ensures sufficient overlap

  20 fps per camera @ 5 Mpx

  ~ 1 m distance @ 70 km/h

Road Surface Measurement Pavement Imagery

new

True-Orthophotos

- in this example the source images have been captured with 2 x 5 MP cameras, 1 m distance trigger @ 70 km/h

the ortho-photo is comparable to the bird eye view of the colored point cloud but with much higher resolution and LoD

comparison with same spot in the point cloud

cracks are not visible in the point cloud
but well represented in the ortho-photo

RIEGL®

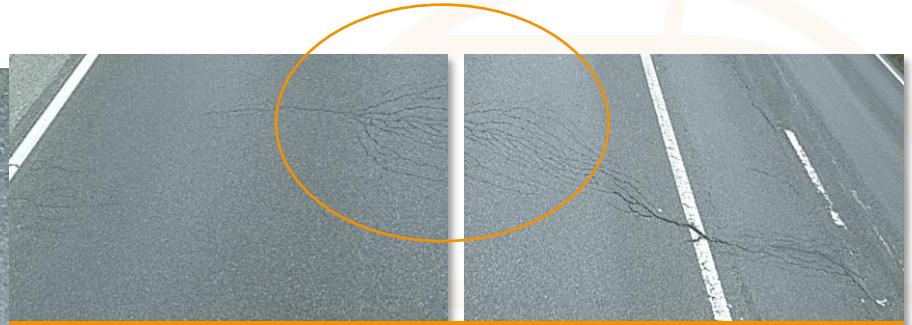
Road Surface Measurement Pavement Imagery

new

True-Orthophotos

- in this example the source images have been captured with 2 x 5 MP cameras, 1 m distance trigger @ 70 km/h

true-ortho-photo with 2 x 2 mm resolution precisely stitched from left and right pavement camera

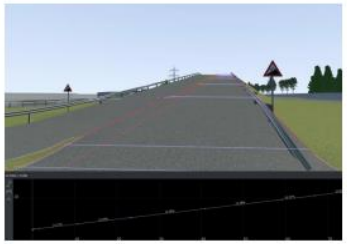


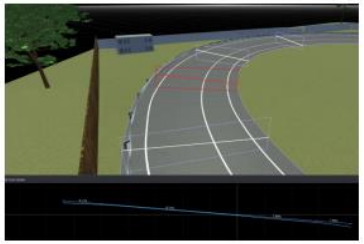
source image left and right pavement camera

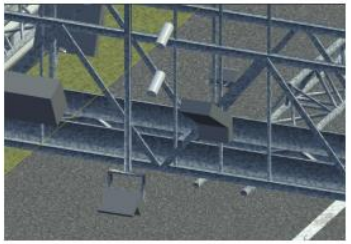
UHD MAPS

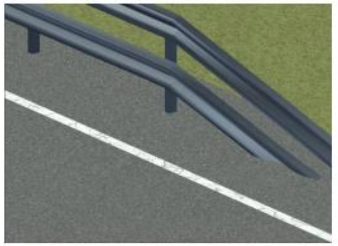
JOANNEUM RESEARCH DIGITAL

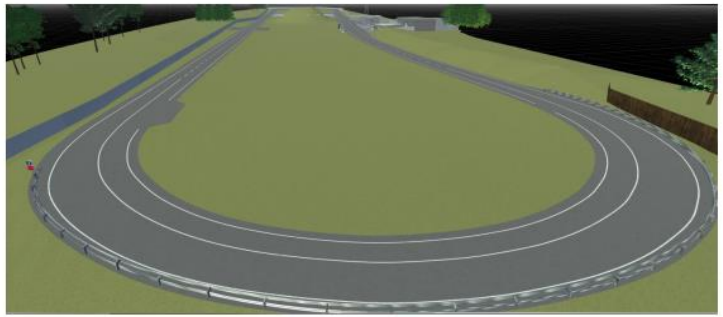
High Detail 3D Reconstruction

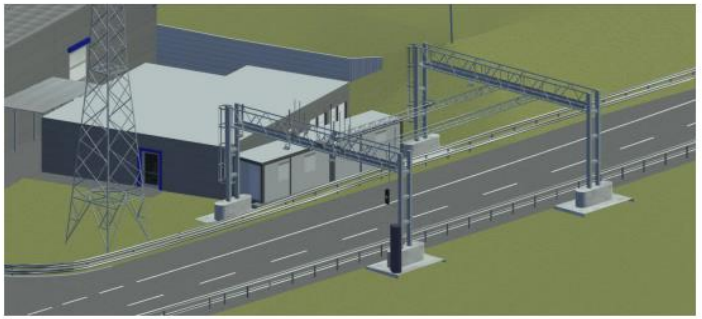












Thank you for your kind attention.

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