INFRABEL

Hyperion

Mobile mapping for ETCS reworks

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Reworks: change existing ETCS installations

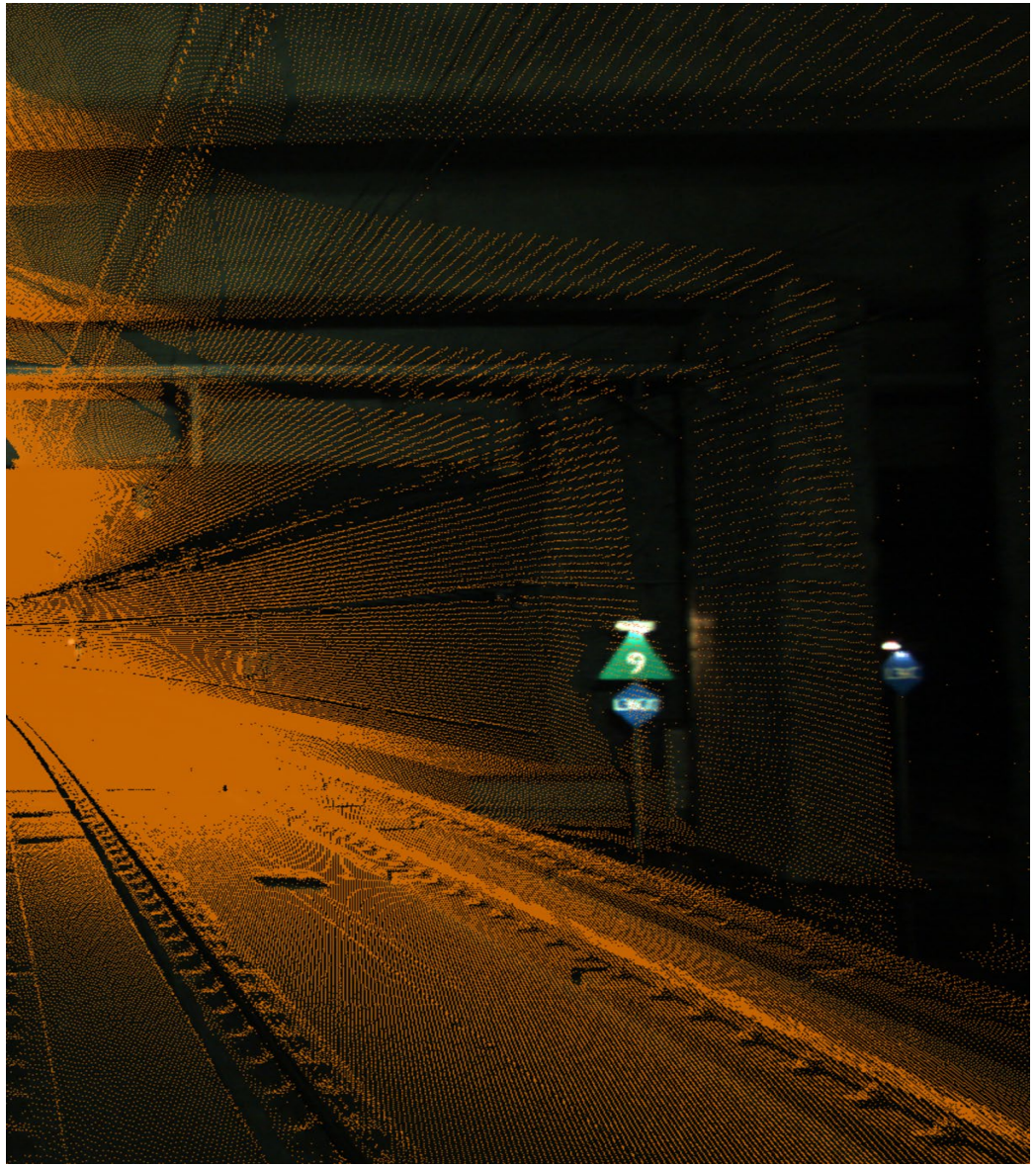
- ETCS Roll-out is not the end, it’s the beginning

- Changes due to:
  - changes to railroad infrastructure
  - capacity demands
  - upgrade to higher ETCS level
  - removal of line side equipment
  - check/rebuild after disaster

Hyperion- Why?

- Geographical information used for original design still valid?
  - Distances between assets
  - Gradients
  - Absolute positions
- Quickly get new measurement data, in line with SIL4 requirements
- Digital site visits

  (pictures, point cloud, …)
- risk mitigation: avoid delays and costs



Hyperion: what?

Measure infrastructure with cameras, LIDARs and INS on measurement trains

High quality data, high driving speed, everywhere

Automatic post-processing chain

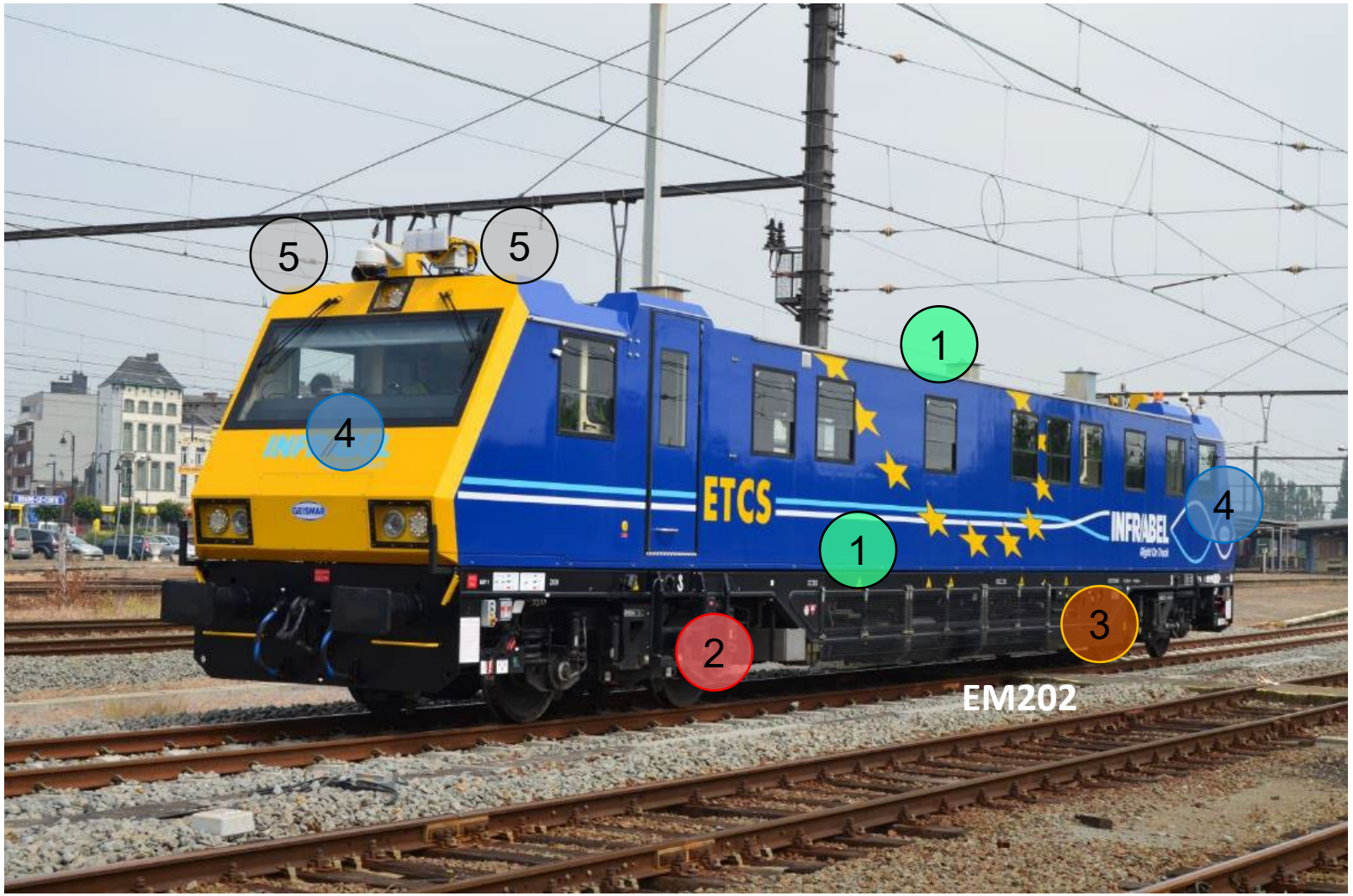
Automatic recognition of elements

Comparison with data of existing project

other clients and use cases

vegetation detection, ballast, catenary, train simulator …

Train based mobile mapping



1 INS -GNSS

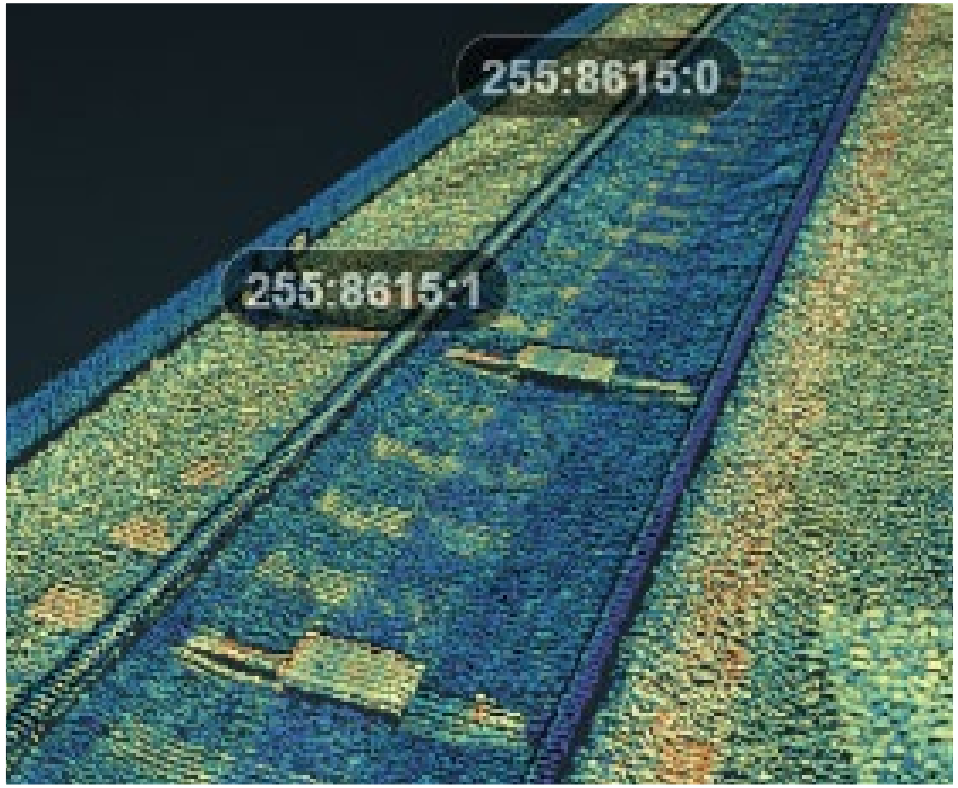
2 odometer

3 2D lidars

4 Stereo cameras

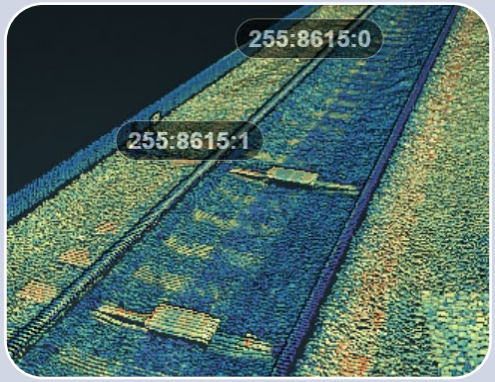
5 3D lidars

2D lidar: profile every 4 cm



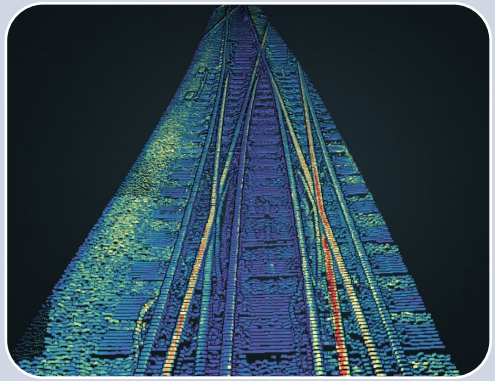
3D lidar- high density point cloud

What is automatically detected / measured?



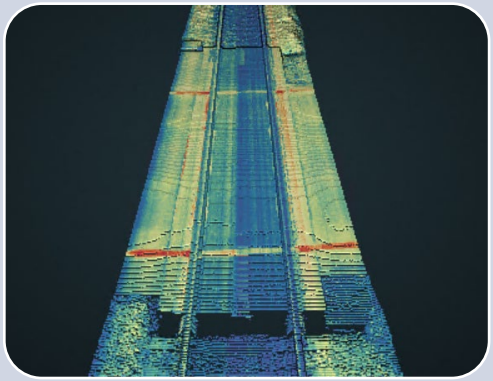
Balises

(with ID if possible)

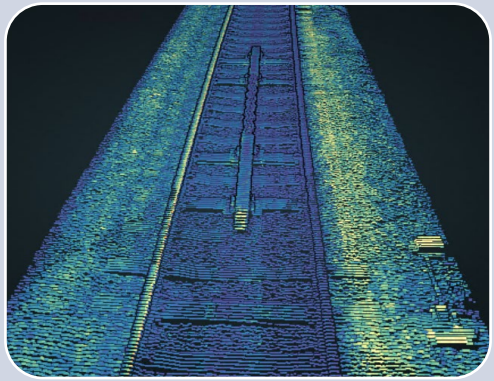


switches

cross-overs

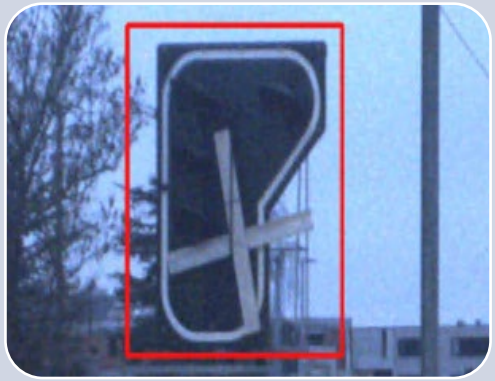


level crossings



croco

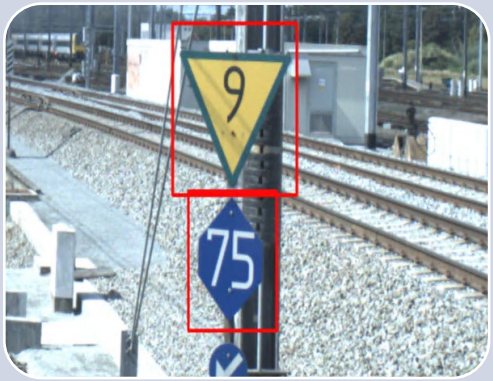
What is automatically detected / measured?



Main signals (incl. name, white cross, phone, …)

Other signals

stopping signs



Speed panels

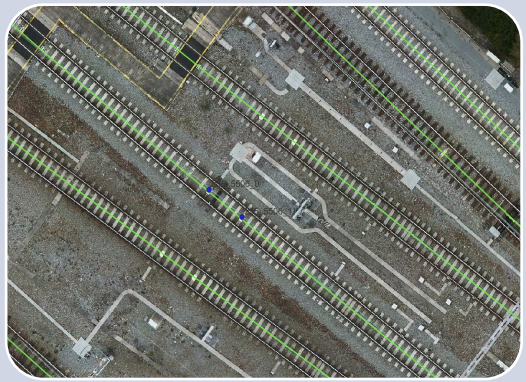
origin signs

line panels

buffer stops

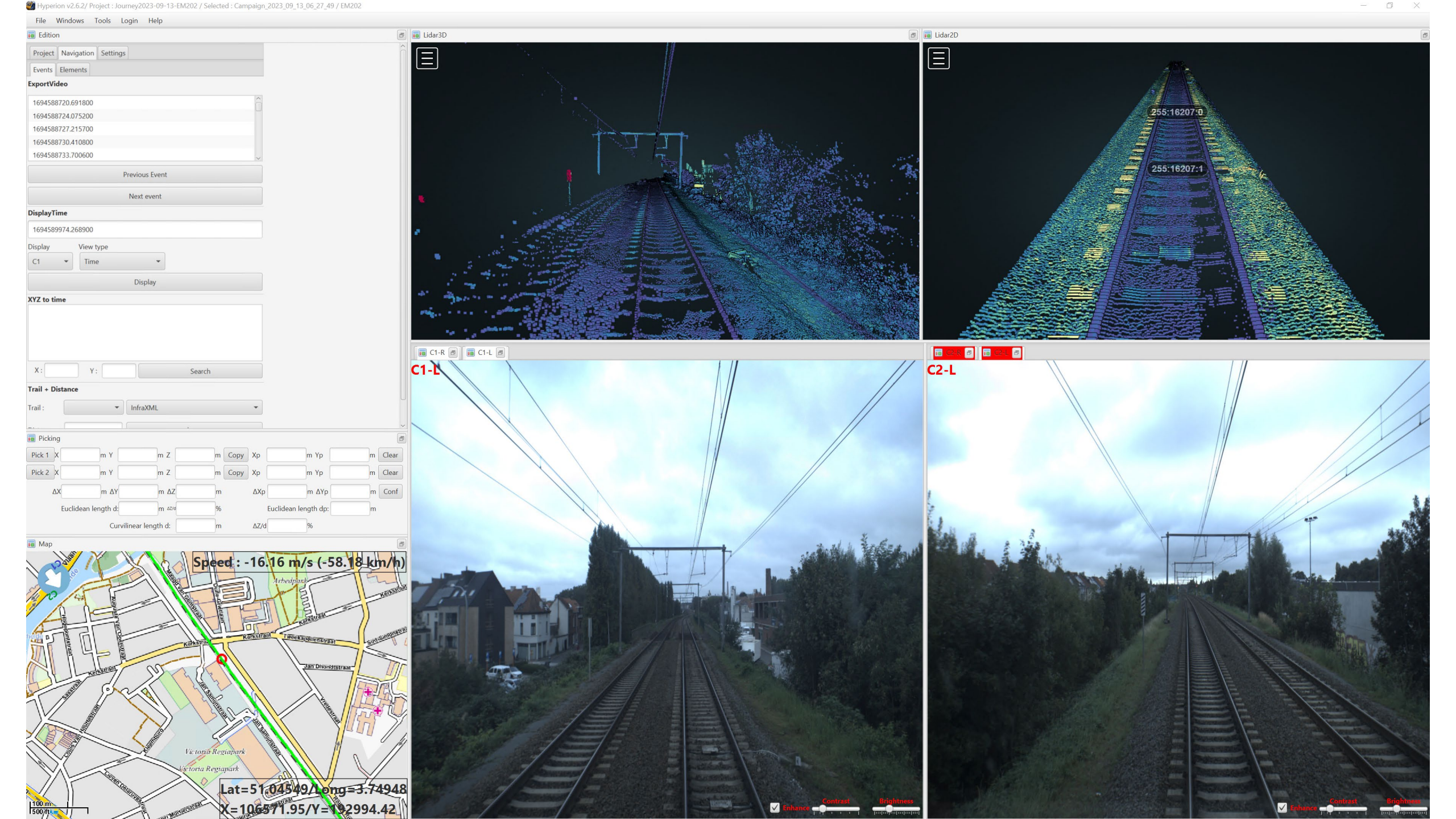
new objects currently being added

What is automatically detected / measured?



Track Axis

gradients


Hyperion v2.6.2/ Project : Journey2023-09-13-EM202 / Selected : Campaign_2023_09_13_06_27_49 / EM202
File
Windows
Tools
Login
Help
Edition
Project
Navigation
Settings
Events
Elements
ExportVideo
1694588720.691800
1694588724.075200
1694588727.215700
1694588730.410800
1694588733.700600
Previous Event
Next event
DisplayTime
1694589974.268900
Display
View type
C1
Time
Display
XYZ to time
X :
Y :
Search
Trail + Distance
Trail :
InfraXML
Picking
Pick 1
Pick 2
Copy
Clear
Conf
Euclidean length d:
Euclidean length dp:
Curvilinear length d:
Map
Speed : -16.16 m/s (-58.18 km/h)
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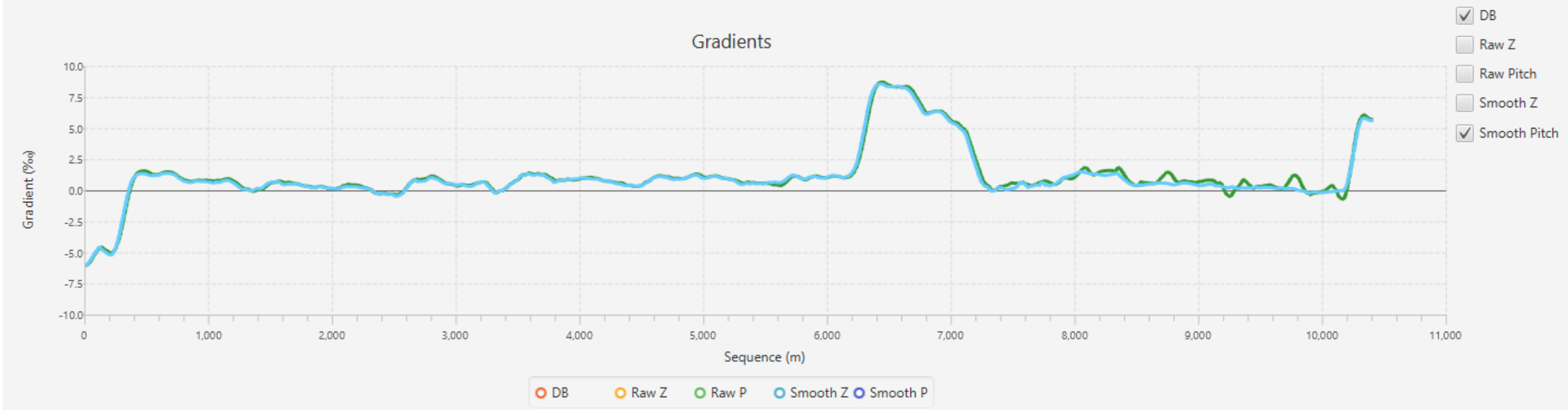
X=106971.95/Y=192994.42
Lidar3D
Lidar2D
255:16207:0
255:16207:1
C1-R
C1-L
C2-R
C2-L
Enhance
Contrast
Brightness

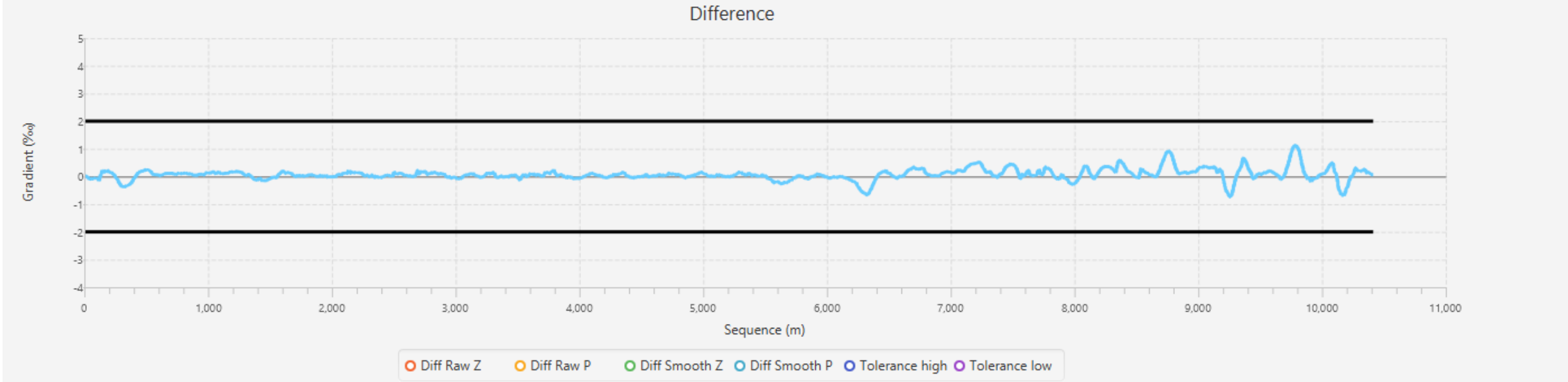
(0) 32C_78BV | Previous | Next

Inventory[INVENTORY Version 1.0]

Trail : (0) 32C_78BV

Zoom | Reset



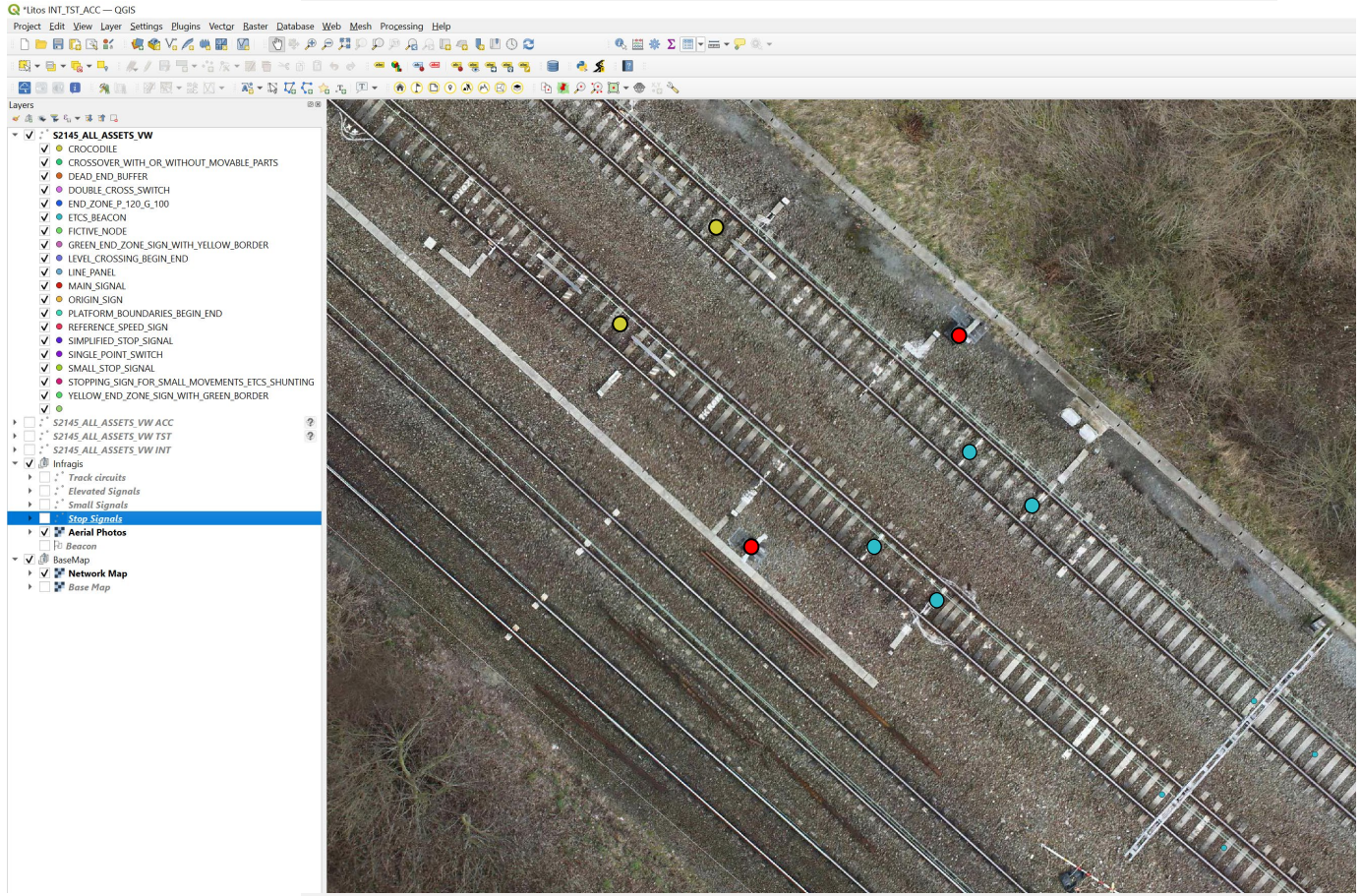


Reporting

Trail	Type	MeasuredPosition	DBPosition	DeltaPosition	MeasuredAttributes	DBAttributes	Status	Comment
32C_78BV	SWITCH	0	0	0	TYPE = SINGLE_POINT_SWITCH	NAME = 32C, TYPE = SWITCH, ID = P014a_false_census_102_01_2	Ok	
32C_78BV	LINE_PANEL	190.5805183	190.319829	0.260689377	REGIME = VNS, BLUE_DISK = NO, ASSOCIATED_ITEM = NO, ORIENTATION = NO, TRACK_SIDE = LEFT, DRIVER_CAB = CAB_C_1, LINE_NUMBER = 75, TYPE = LINE_PANEL, TEMPORARY = NO	LINE_NUMBER = Line panel (KP39100()-sp/), TYPE = LINE_PANEL, ID = P014a_false_census_102_01_41	AttributesMismatch	ok, census provides K
32C_78BV	ETCS_BEACON	209.6953973			TYPE = ETCS_BEACON, COMMENT = balise with cover		FailedMapping	balise with cover
32C_78BV	ETCS_BEACON	212.7649945			TYPE = ETCS_BEACON, COMMENT = balise with cover		FailedMapping	balise with cover
32C_78BV	REFERENCE_SPEED_SIGN		246.4229492		COMMENT = true error: moved between 2015 and 2019- no longer present at that point	SPEED = 16, TYPE = REFERENCE_SPEED_SIGN, ID = P014a_false_census_102_01_54	NotMeasured	true error: moved be
32C_78BV	CROCODILE	367.4097507			TYPE = CROCODILE		NotUsed	
32C_78BV	CROCODILE	371.7971018			TYPE = CROCODILE		NotUsed	

Database production

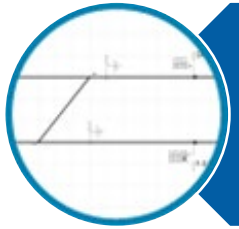
- Access for all ETCS projects
- Up-to-date measurements
- Viewable with standard GIS software
- Gain of productivity
- Reduction of delivery time



Verification – important remarks

- best case : old data conform to current situation
- acceptable case : only small differences, no impact on ongoing redesign
- worst case: anomalies impacting design

Examples from real projects



imprecisions on schematic drawing

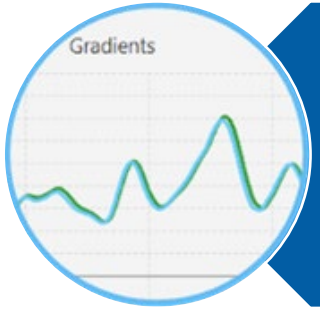
wrong switch position in infrastructure database

Speed panel and signal moved 150m

wrong signal name on site

Examples from real projects

Discussion on definition of a switch



Anomaly for gradients at border of projects

Some attributes wrong

Questions?

Thank you for your attention

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