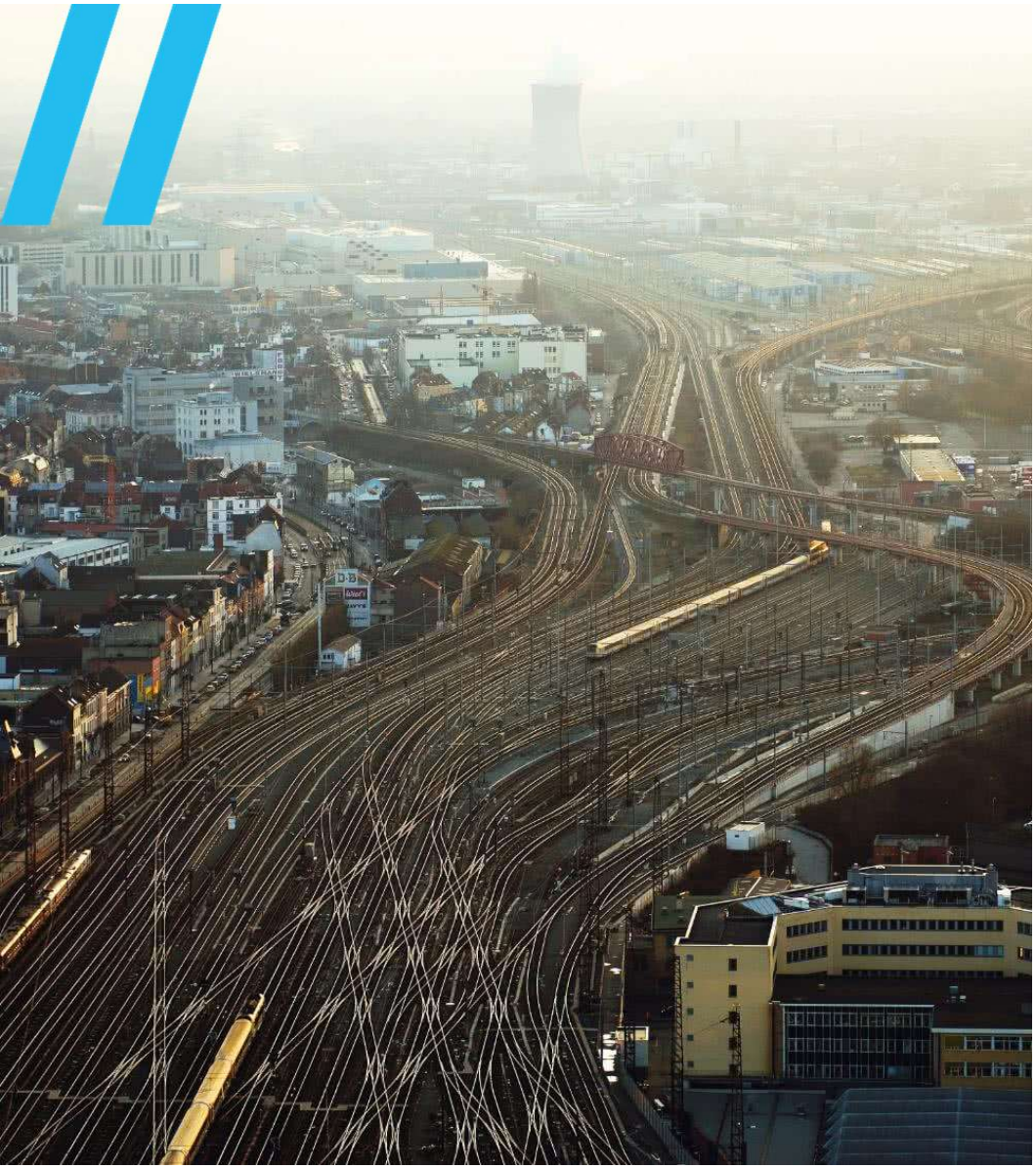


INFRABEL

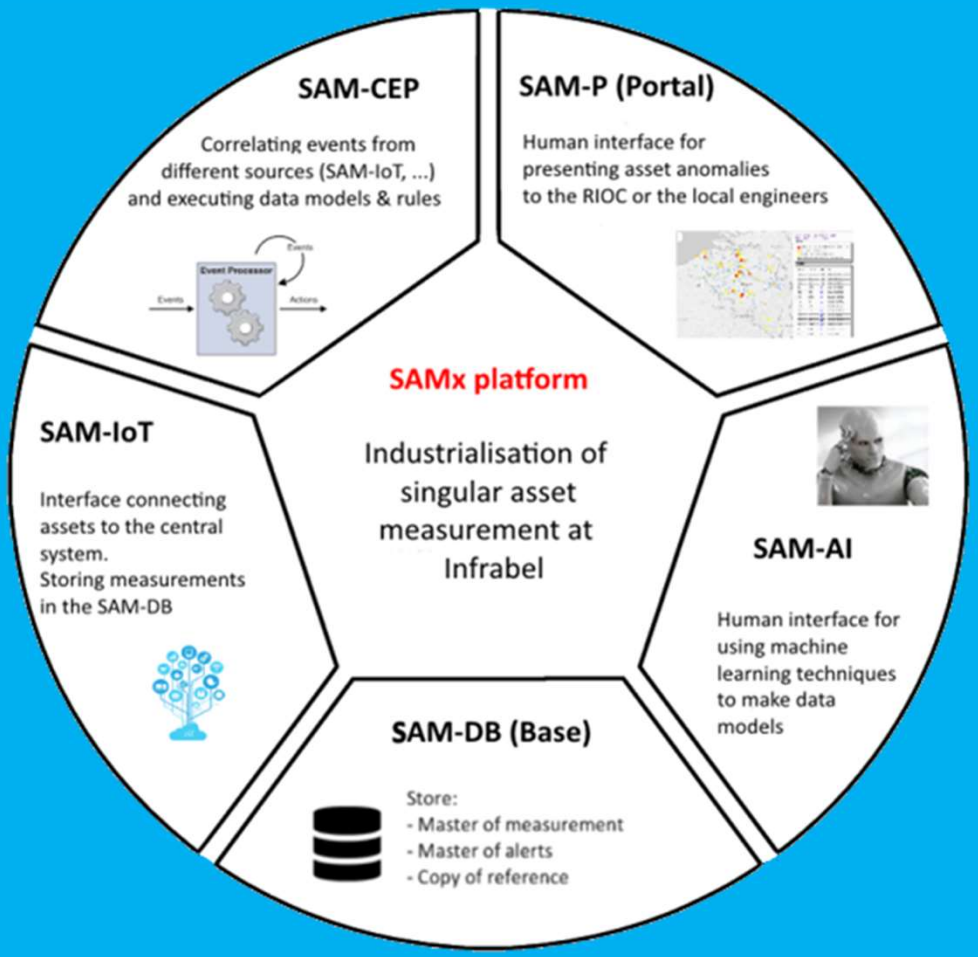
ERA

ERTMS Congress

Signalling Asset Monitoring – SAM Platform

Pieter Verlinden

25/04/2024

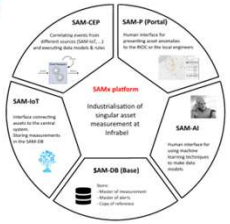


SAM Platform

Signalling Asset Monitoring

J.A.R.V.I.S

(not) Just Another Railway Visual Inspection System

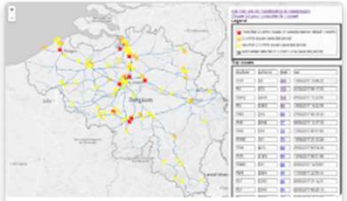


SAM Platform

Signalling Asset Monitoring

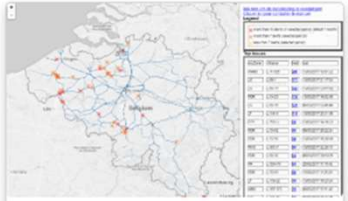
Welcome to the SAM portal

On this site you find some useful portals for the anomalie follow-up of Singular Asset Management



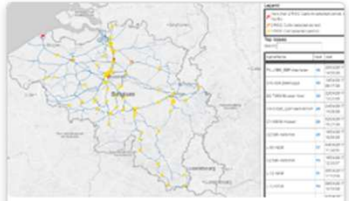
AW Portal

Portal for turnouts(switches) based on EBP, RIAM and PQube data



LX Portal

Portal for level crossings based on EBP, RIAM and RTF data

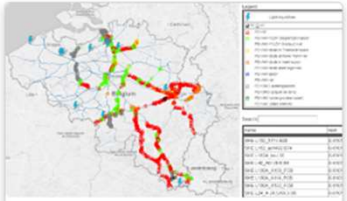


TPTC Portal

Portal for train protection & control (ETCS, TBL1+, LEU, balise, ...)

TVP Portal

Portal for track vacancy proving (ACAT, TC(Jade,...)) monitoring & inventory



Shelter Portal

Portal for signalling shelters (temperature, grounding)

Power Distribution

Power Distribution & Substations. Shelter & weatherstations visualisation

e1002 Viewer

Visualisation of electronic 1002 plans. Zoom on geografical zone to see the plan.

Train Viewer

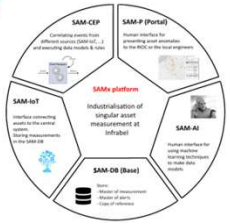
Geografical visualisation of ebp trains.
!!!Some ebp to inventory mappings are faulty.

EBP Inventory

Geografical visualisation of ebp elements.
!!!Some ebp to inventory mappings are faulty.

Lightning strikes

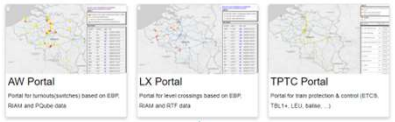
Visualisation of the lightning strike locations in a given period



SAM Platform

Signalling Asset Monitoring

Welcome to the SAM portal



Engineer

Reactive

Technician

INFRABEL

Commercial trains

Measurement Data

Train Control Computer Interlocking

Computer logs

IoT

SAM Platform

Store

Correlate

GIS

Analyse

Predictive

Intervention

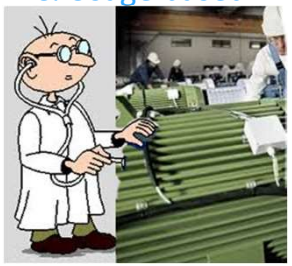
Malfunction

perations Centr

Planner

MASTER DATA

Condition- & Usage based

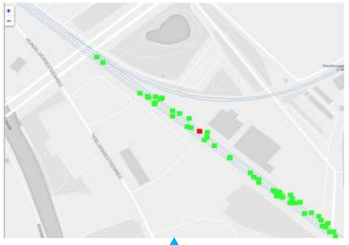


SAP Maintenance

Time-based

OBMT

Online Balise Monitoring Tool



Engineer

Technician

TRU
Data
Baseline 2 or 3

Maintenance cycle

SAM Platform

Parse TRU file

Parse ERTMS file

Data Analysis

Balise Defect

Balise Detection

Intervention

Malfunction

Operations Centre

SIDIS RBC
ETCS L2

GMS

Realtime

IoT: OBMT

Realtime

MASTER DATA

SAP
Maintenance

TRU / JRU

Juridical Recording Unit

During maintenance cylce / Periodical

	Infrabel work train		Alstom Break MS80 – b3
	Siemens Desiro ML MS08 – b2		Alstom MS96 – b3
	Alstom Autorail 41 AR41 – b3		Siemens EuroSprinter HLE18/19

OBMT

Online Balise Monitoring Tool

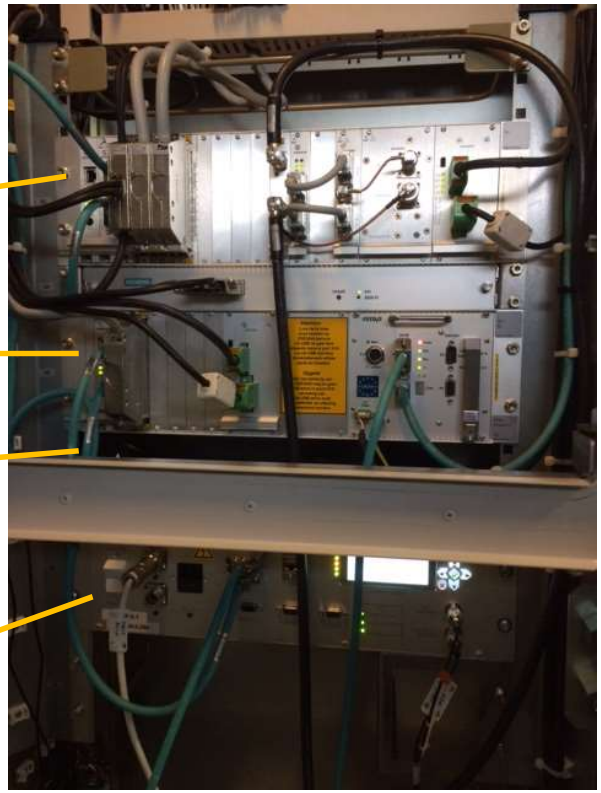
Control cabinet (Siemens Mobility Desiro)

EVC (European Vital Computer)

JRU (Juridical Recording Unit)

MVB bus

OBMT (On-board balise monitoring tool)



OBMT

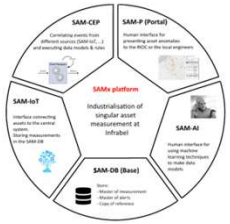
Online Balise Monitoring Tool

GPS antenne

GSM antenne

MVB bus

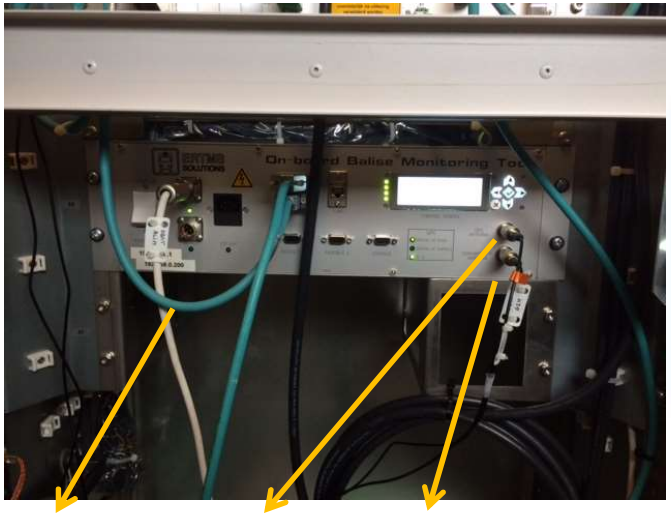
Supplier
ERTMS Solutions



SAM Platform

Signalling Asset Monitoring

IoT on commercial trains. Real time verification of ETCS equipment



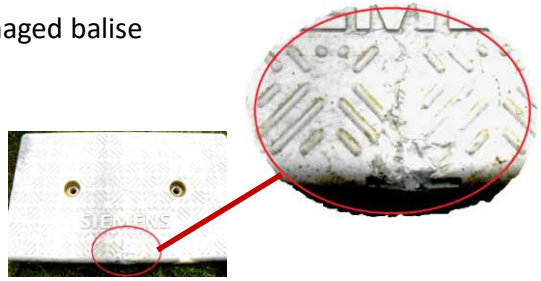
MVB bus

GPS antenna

GSM antenna

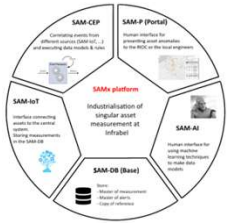
- 5 commercial vehicles
  + offline data other trains
- 30000/33000 balises inspected
- saves 15 FTE / year

Damaged balise



Connection problem

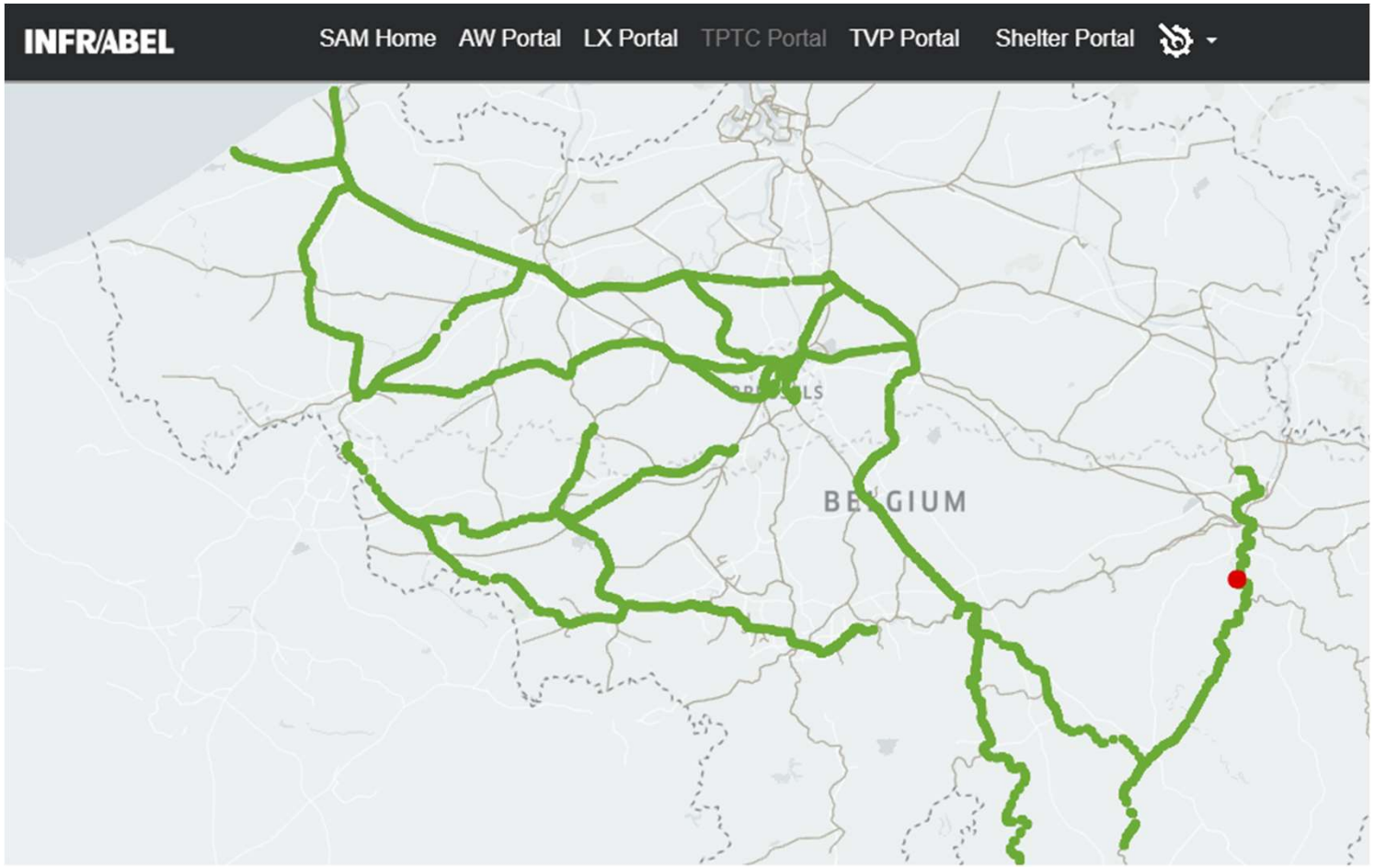
Real-time data to diagnostics system and processing by Operation Center



SAM Platform

Signalling Asset Monitoring

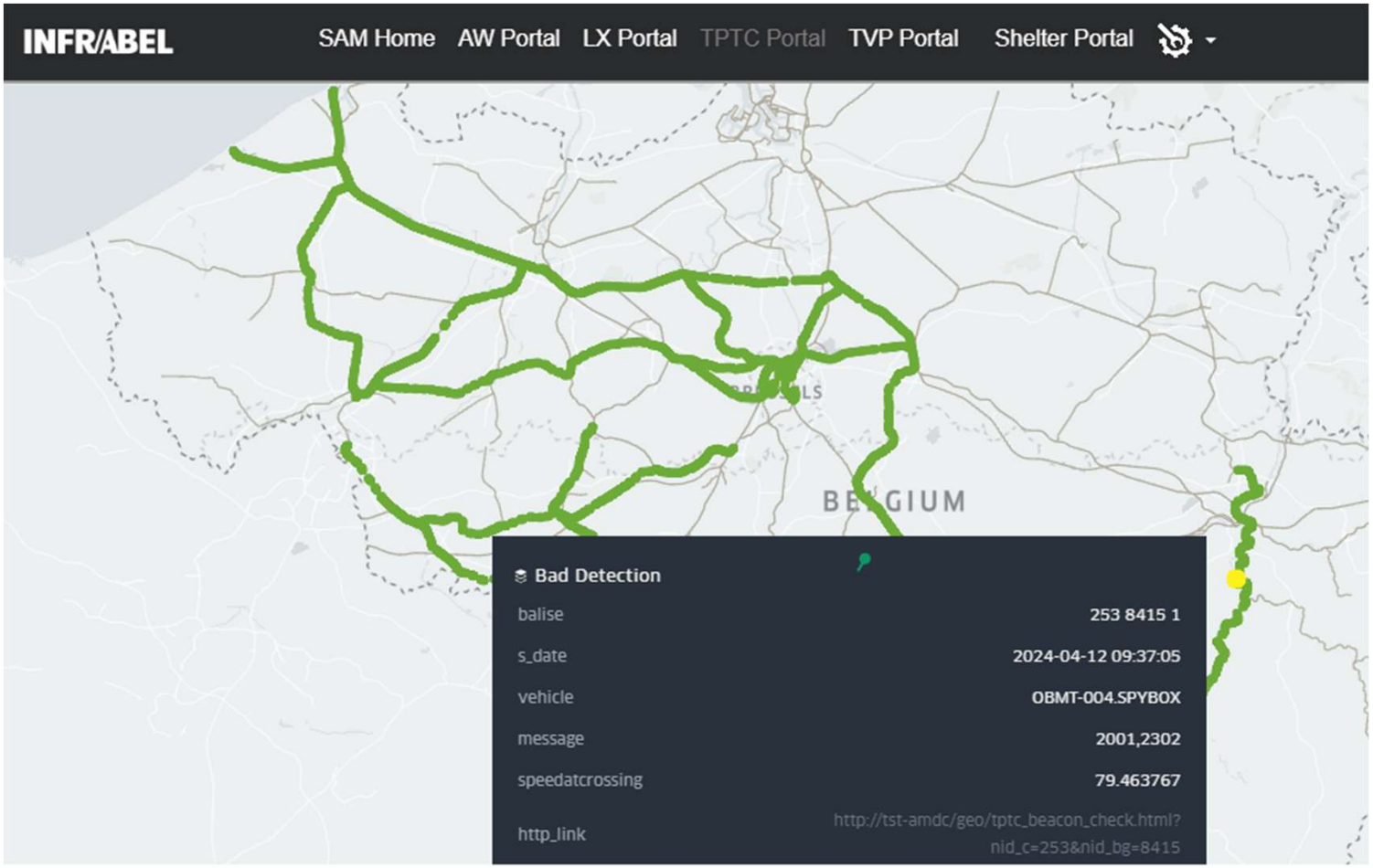
Insight map



SAM Platform

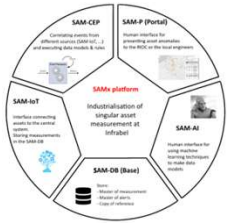
Signalling Asset Monitoring

Insight map: clickable objects



Detected issues

Code	Message	Description
2001	Balise OK	
2101	Balise P254	LEU issue or connection between LEU and Eurobalise interrupted
2301	Balise Missed	Balise in group missing, removed or covered
2302	Balise has M_COUNT = 254	LEU issue or connection between LEU and Eurobalise interrupted
2103	Balise group with balises with differen M_COUNT	Signal state change when euroantenna of train was in between balises of a group



SAM Platform

Signalling Asset Monitoring

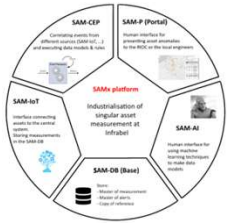
Balise history, all train detections

Click for help on message codes

CSV Excel

Search:

eventdate Brussels	measuredby	n_pig	level_mode	speed	m_mcount	omschrijving	source	message
12/04/2024 09:37:05	OBMT-004.SPYBOX	1		79		2001,2302;50.516292,5.564342	ERTMS	eurobalise connection problem or LEU problem
12/04/2024 09:37:05	OBMT-004.SPYBOX	0		78		2001,2101;50.516292,5.564342	ERTMS	eurobalise connection problem or LEU problem



SAM Platform

Signalling Asset Monitoring

Expert system: problem analysis

Kies een karakteristiek -- select an option --

NL | FR

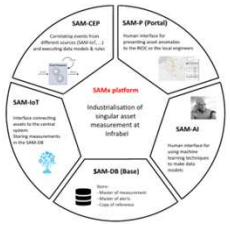
- -- select an option --
- Lijn/zone uitgerust in
- Eurobalise observering
- Trein in modus
- LEU observering
- EBP scherm observering
- RBC observering
- LRMS observering
- GMS observering
- Trein observering
- Verdeeldoos meting (igv LEU S21)
- LDI observering

Bewaren

karakteristiek	waarde
EBP scherm observering	Fout zichtbaar op EBP beeld
Eurobalise observering	pakket 254 aanwezig
LRMS observering	Niet gekend

mogelijke oorzaak
LEU in storing
LEU uitgeschakeld
LEU<=>SB onderbroken

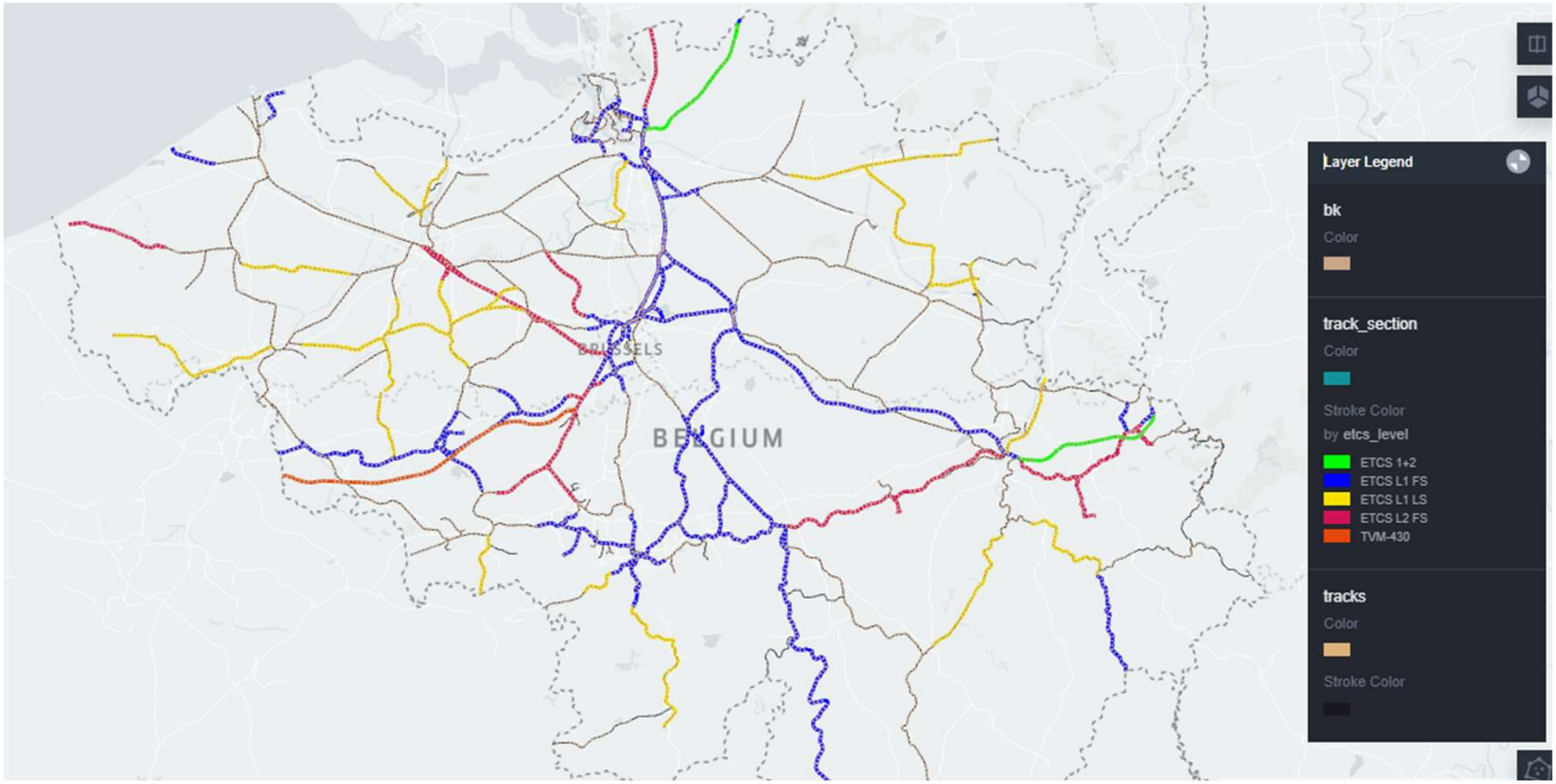
karakteristiek	suggestie	value
Eurobalise observering	Welk telegram werd uitgelezen?	1.5000000000000000
LEU observering	Staat de LEU aan?	1.5000000000000000
Verdeeldoos meting (igv LEU S21)	Is er een meting verdeeldoos (igv LEU S21)?	1.5000000000000000

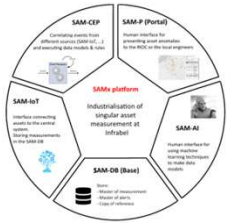


SAM Platform

Signalling Asset Monitoring

Insight map: ETCS

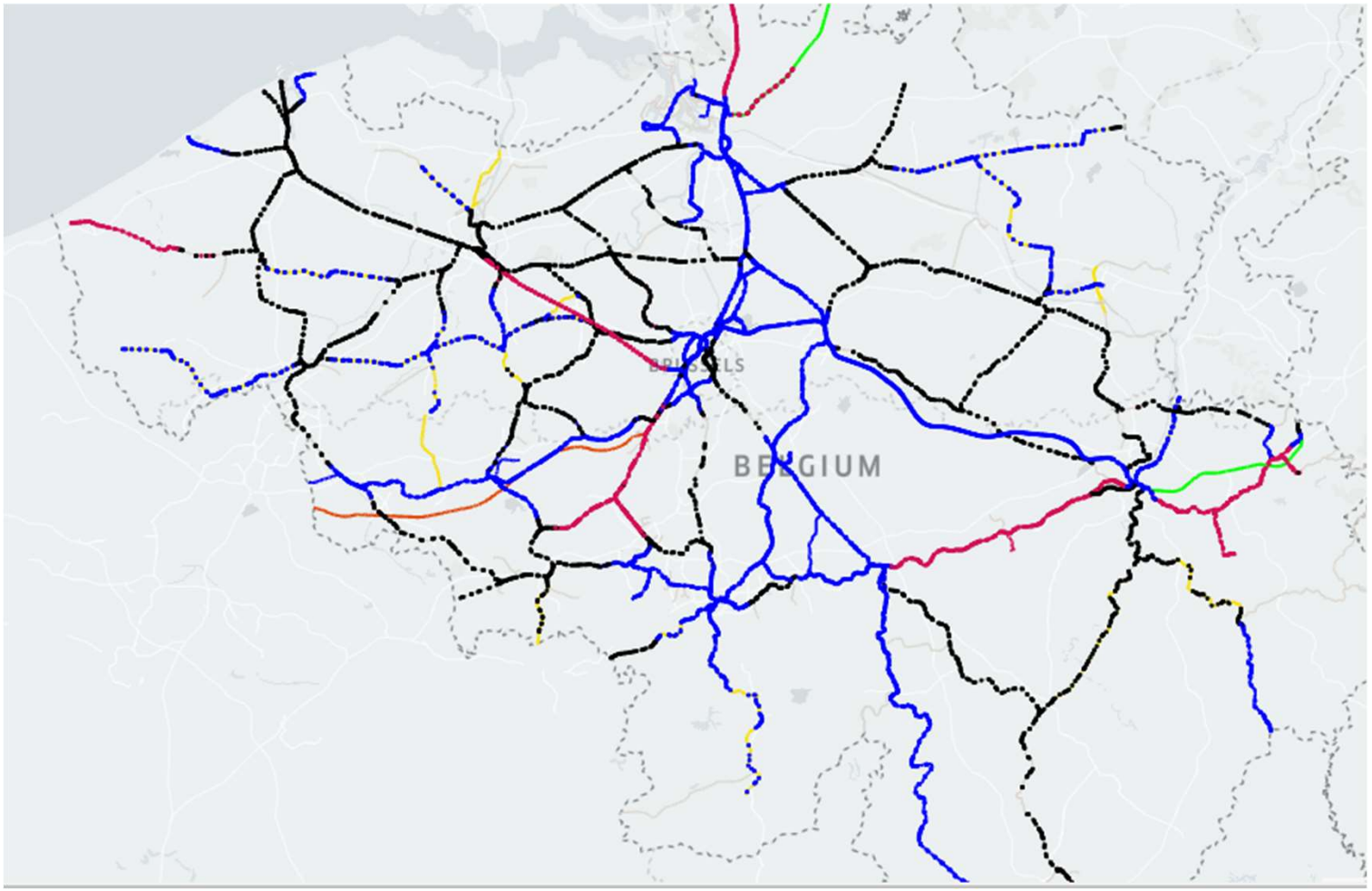


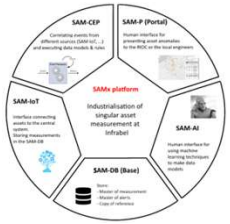


SAM Platform

Signalling Asset Monitoring

Insight map: applied protection per balise

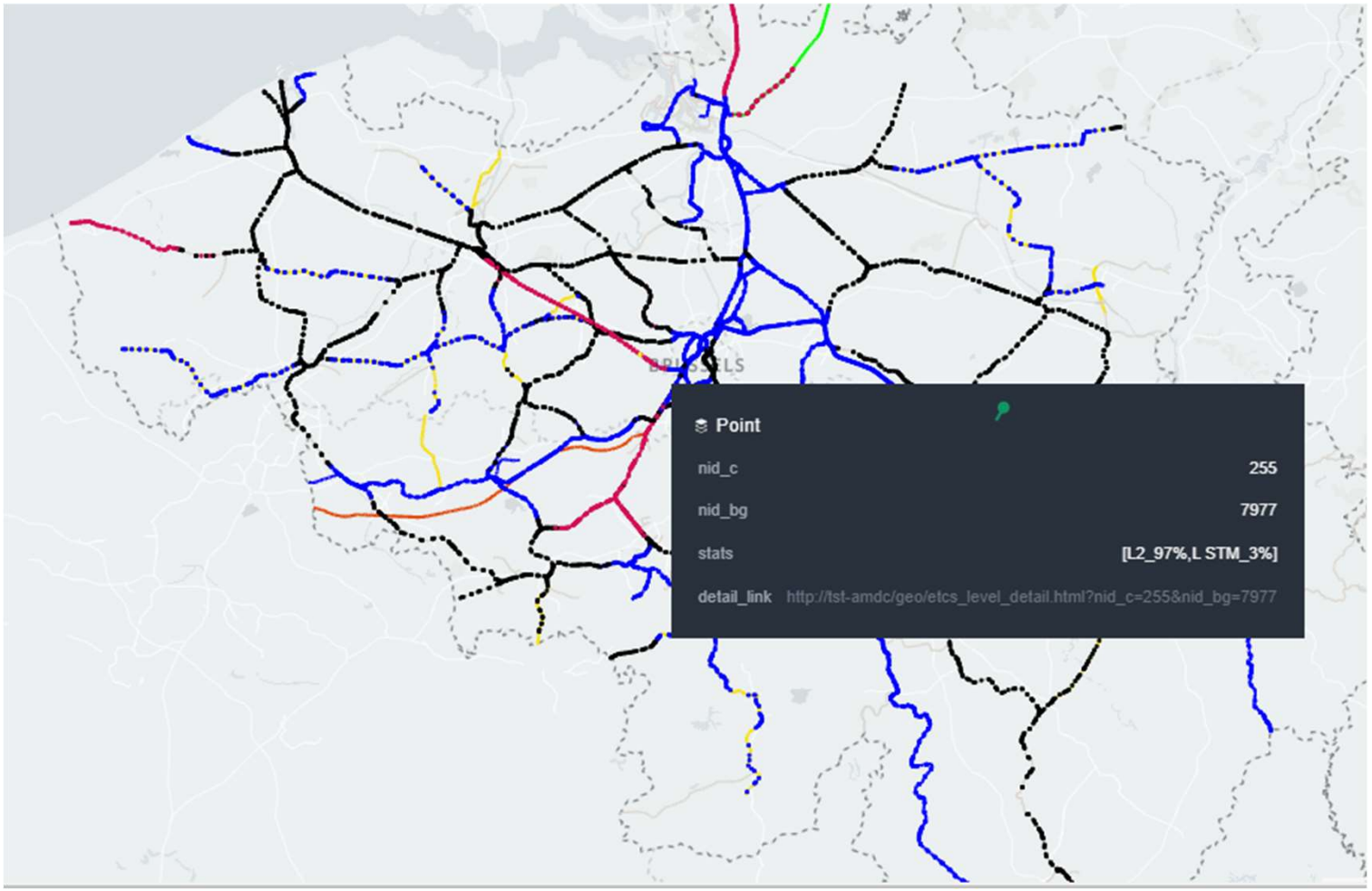


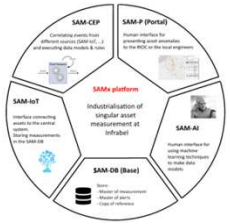


SAM Platform

Signalling Asset Monitoring

Insight map: clickable objects





SAM Platform

Signalling Asset Monitoring

Detail of applied protections

INFRABEL SAM Home AW Portal LX Portal TPTC Portal TVP Portal Shelter Portal

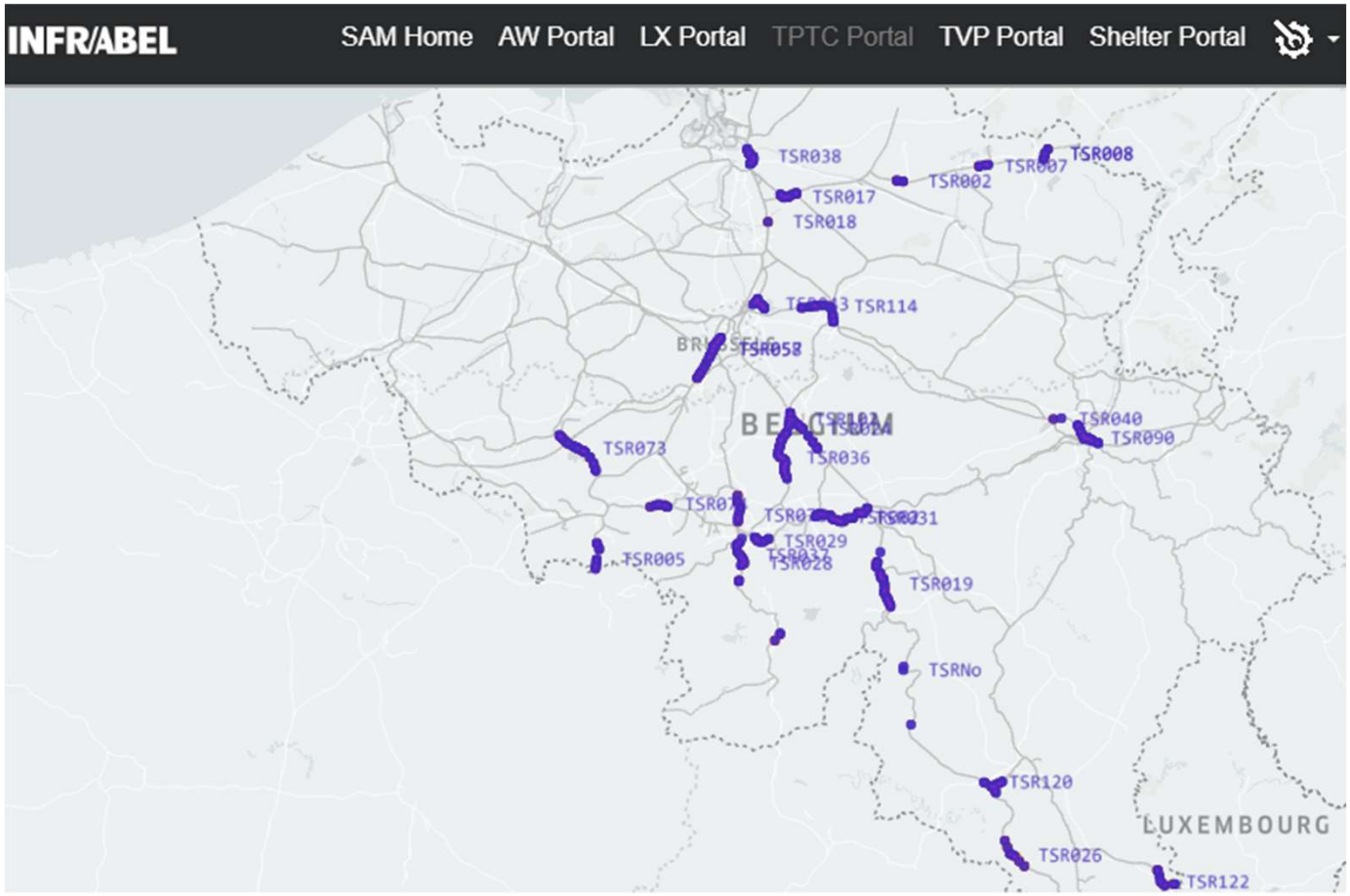
CSV Excel Search

vehicle_type	m_level	pctg	abs_number
Search vehicle_type	Search m_level	Search pctg	Search abs_number
AM08	L STM	100	48
AM80	L2	100	578
HLE18_HLE19	L2	100	1030
MS96	L2	100	86

TSR

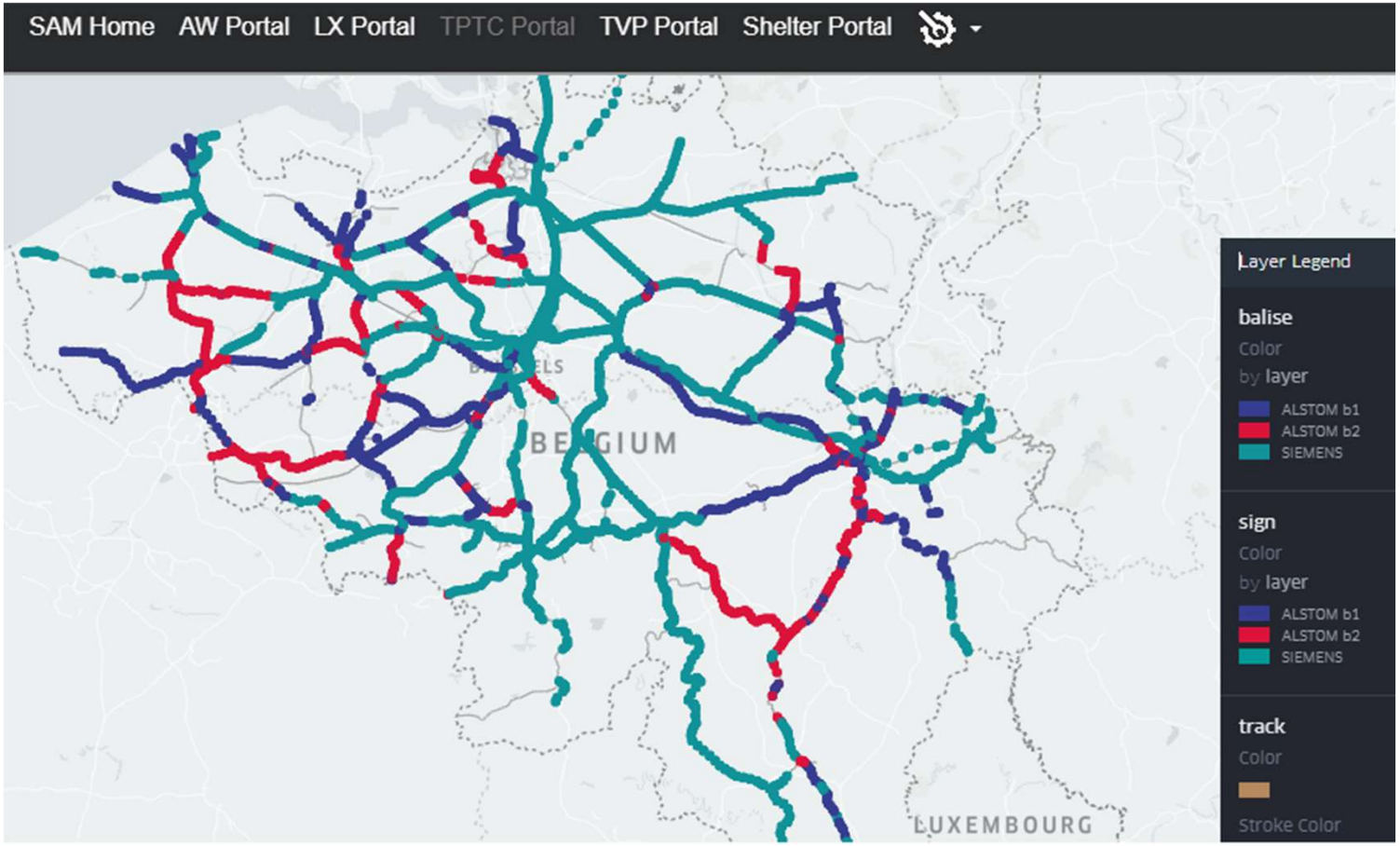
Temporary Speed Restrictions

Insight map: Applied speed restrictions



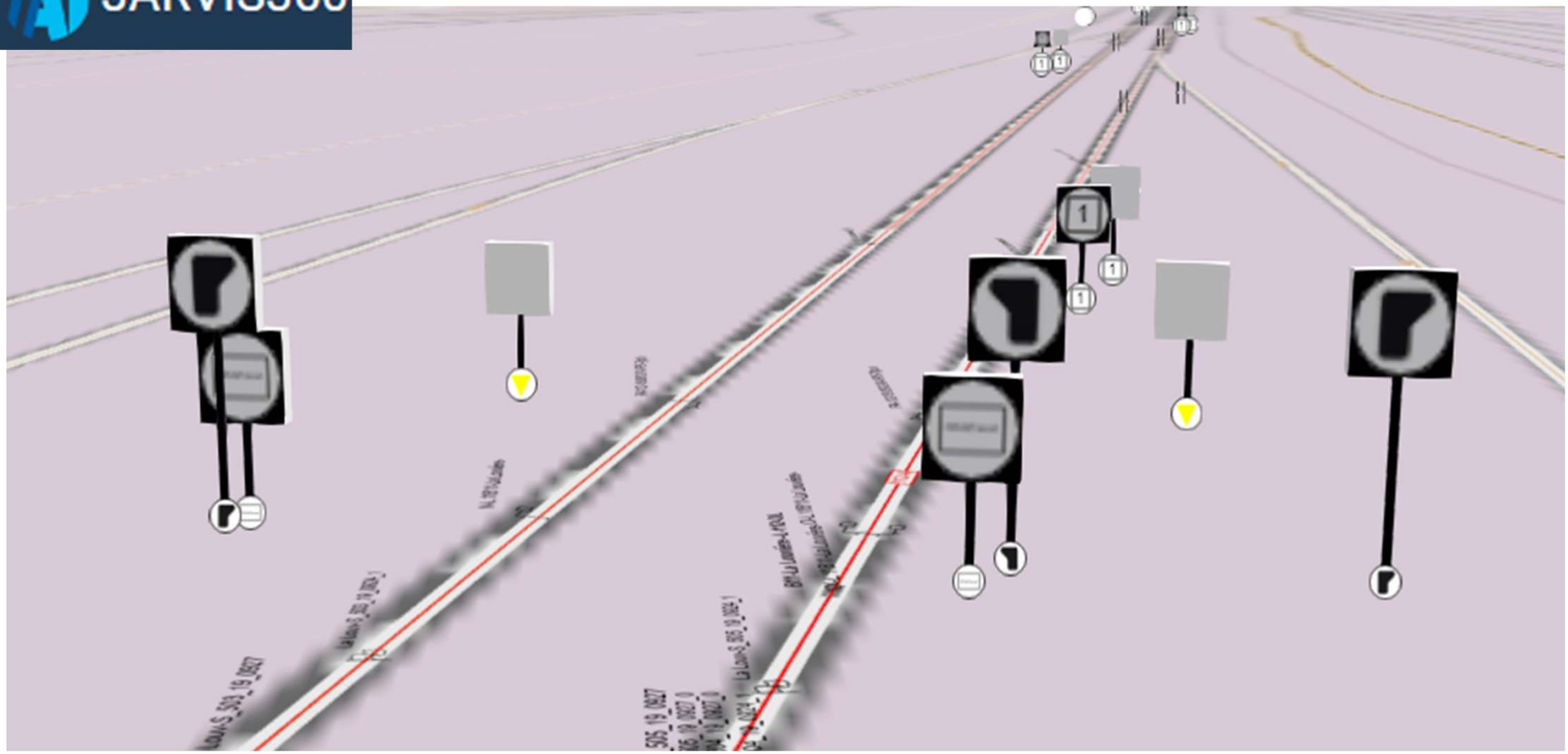
Suppliers

Insight map: Technologies

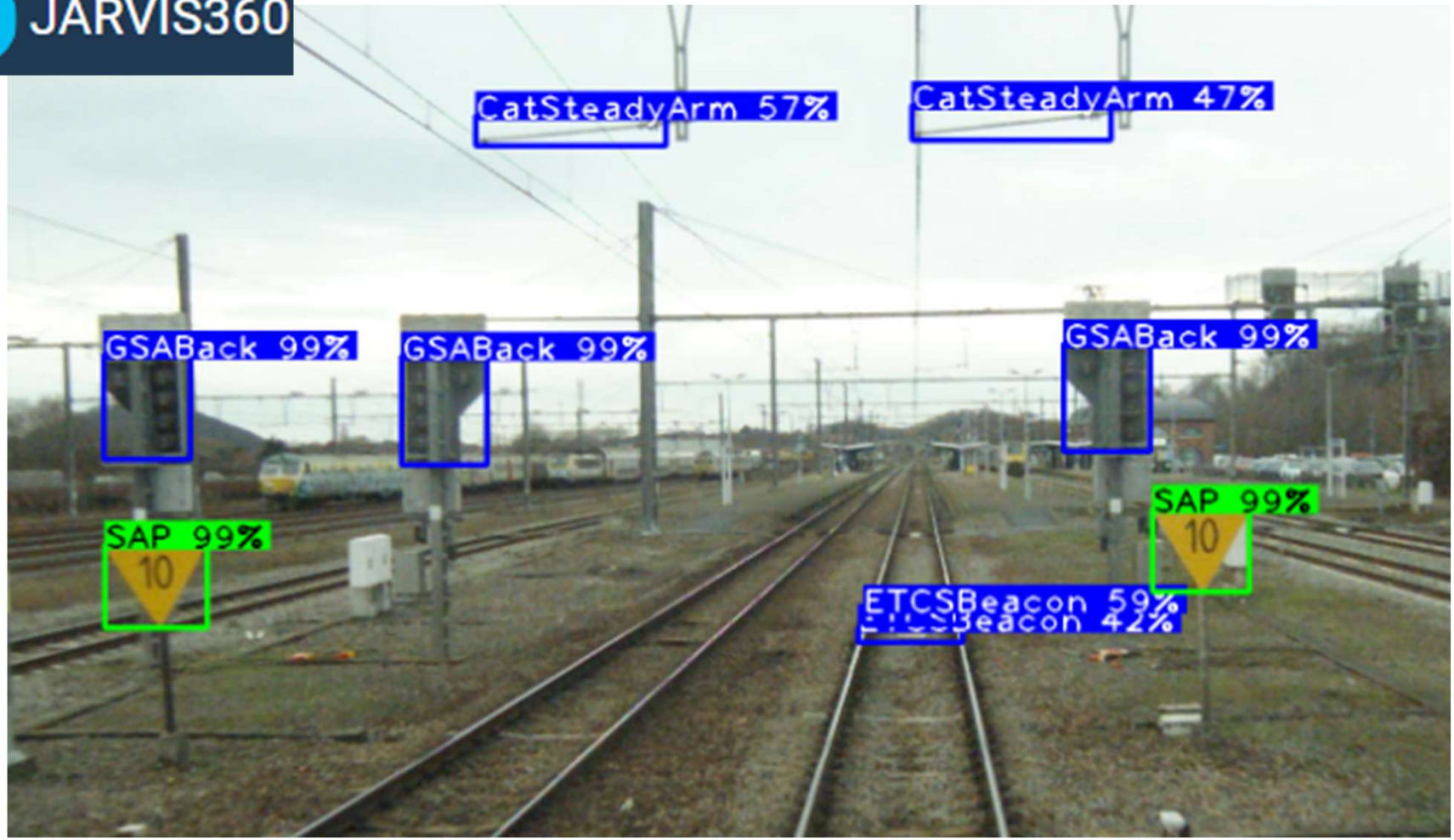


JARVIS360
GSALightTop 99%
GSA 99%
CatSteadyArm 54%
CatSteadyArm 41%
GSA 99
HmPanel 63%
GSAPanel 99%
GSALightSmall 94%
TPhone 99%
T

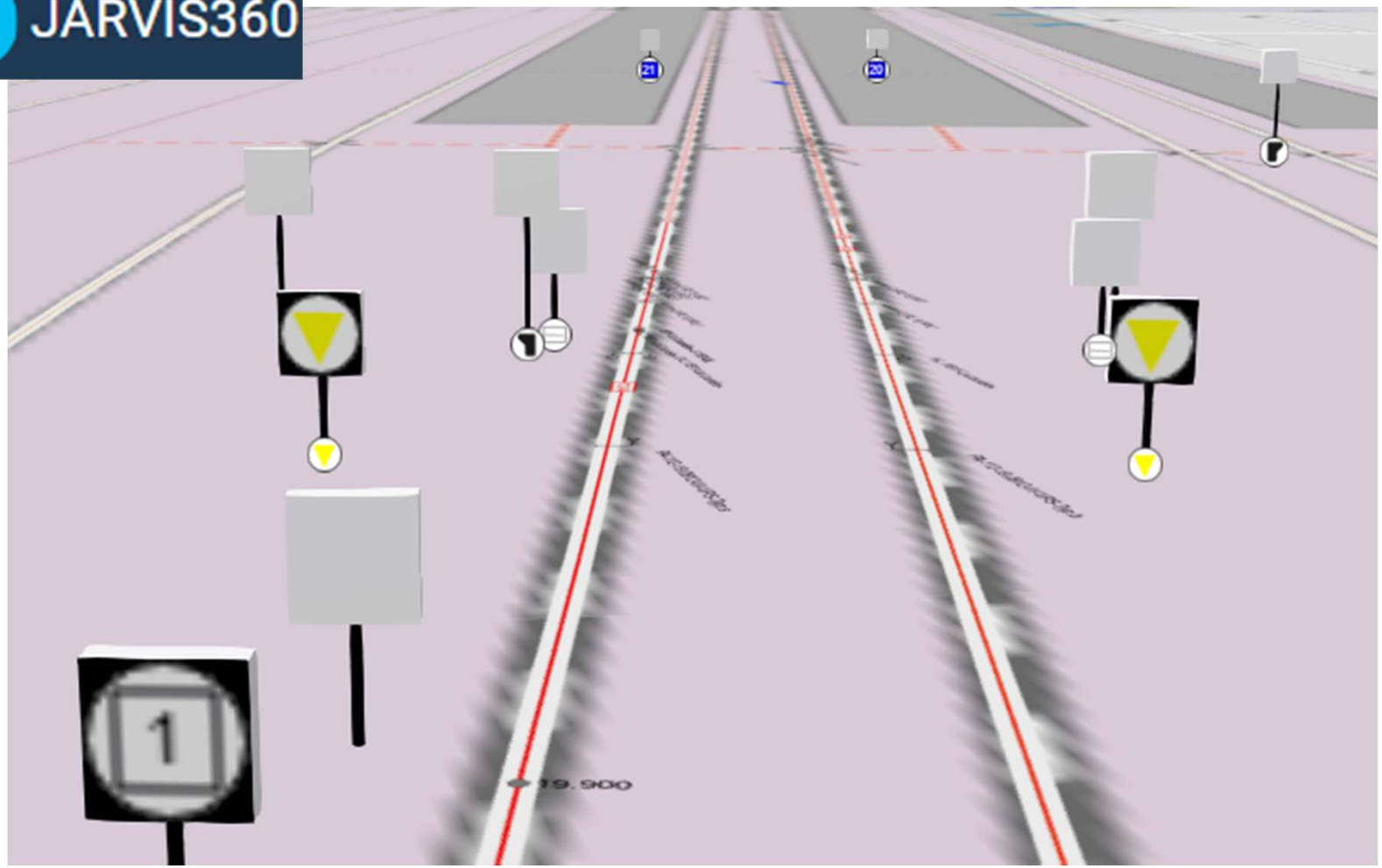
JARVIS360



JARVIS360


CatSteadyArm 57%
CatSteadyArm 47%
GSABack 99%
GSABack 99%
GSABack 99%
SAP 99%
10
SAP 99%
10
ETCSBeacon 59%

JARVIS360



Q&A