
MACQ 100 YEARS
anniversary
Macq
100 years

BUSINESS UNIT POLICE

Blacklist

Blacklist : Basic version

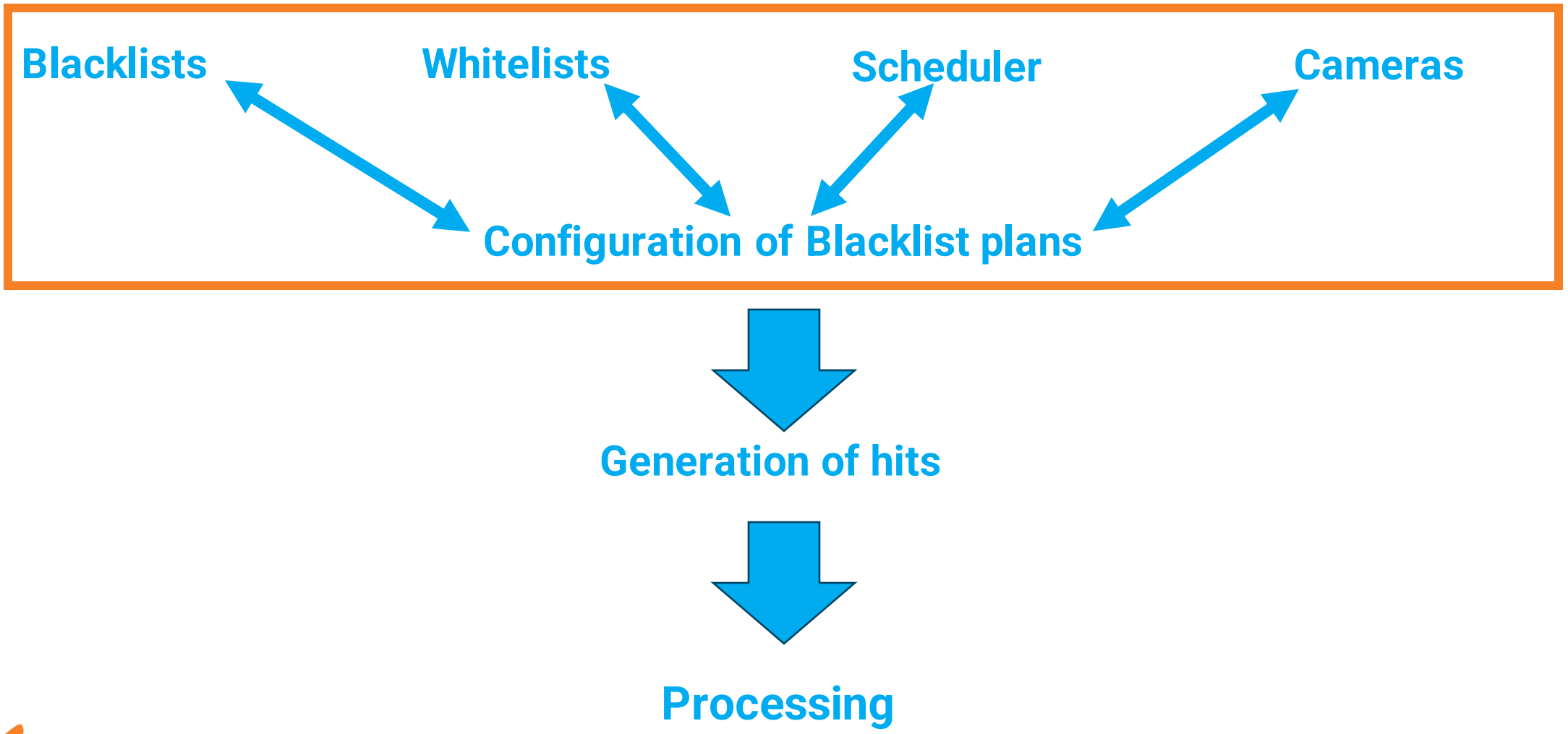
Configuration of a list of plate (manually or automatic by upload)

Generation of hits

Processing

Advanced Blacklist

Advanced version

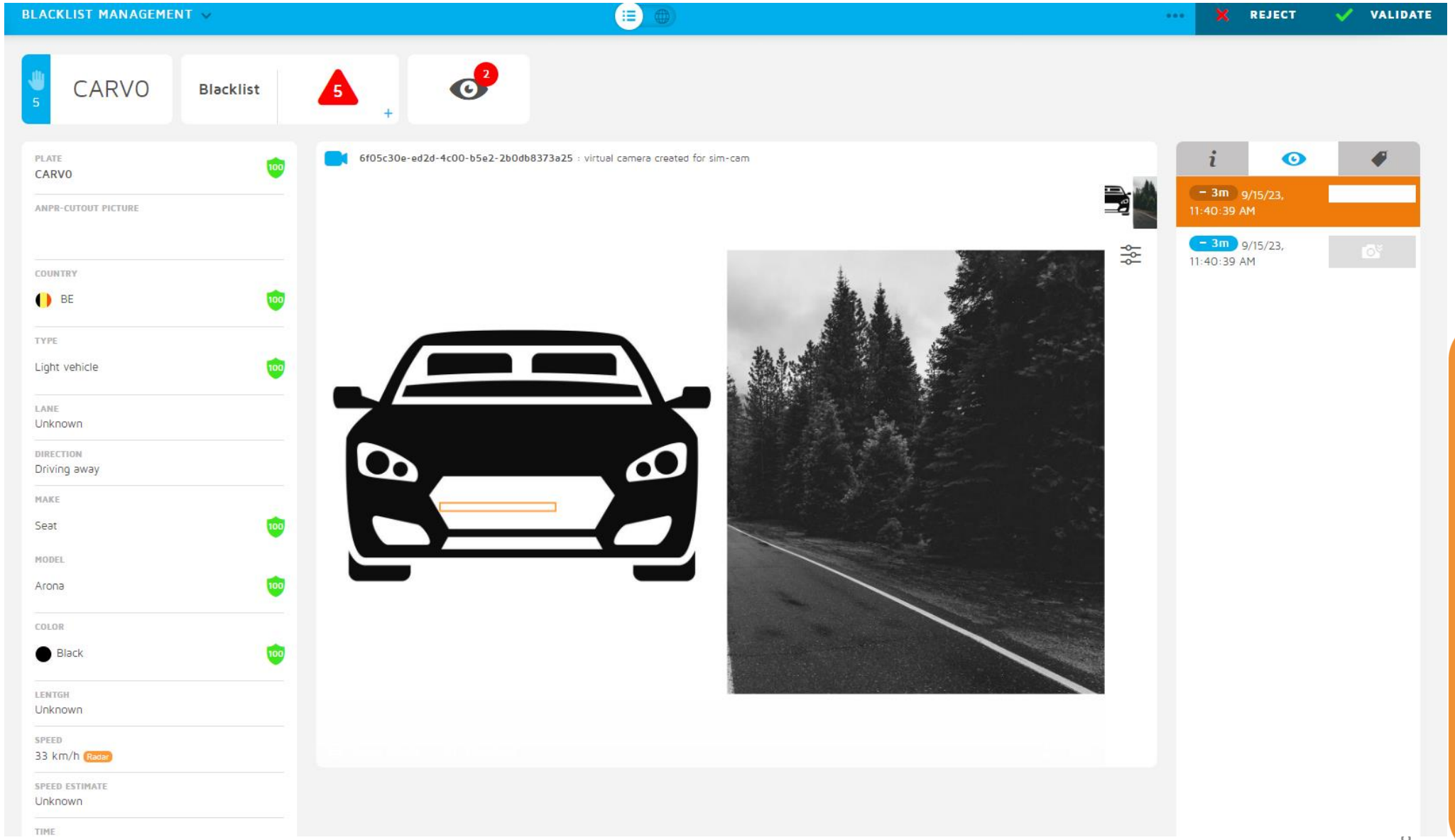


Advanced features

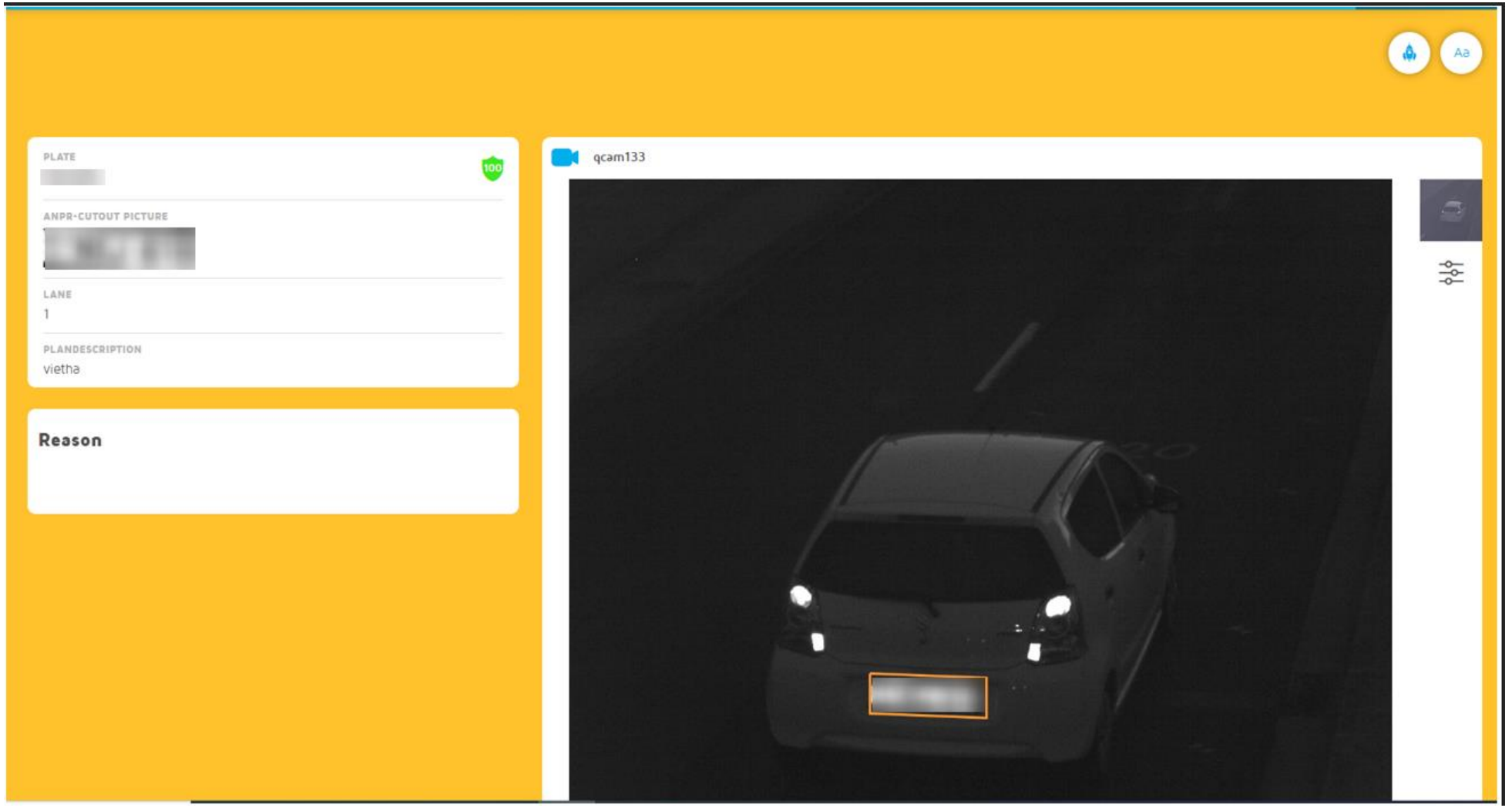
- ❑ *Detection possible* ***without license plate recognition*** *based on Make – Model – Colour – Type :*
  For example look for all « White Van»
- ❑ *Add a whitelist to your plan*
- ❑ *Add a scheduler to your plan*
- ❑ *Choose your cameras*
- ❑ *Priorities Sum-Up*
- ❑ *Configure your HIT-Screen : Police – Colour – Fields to show – …*

Macq

Advanced version



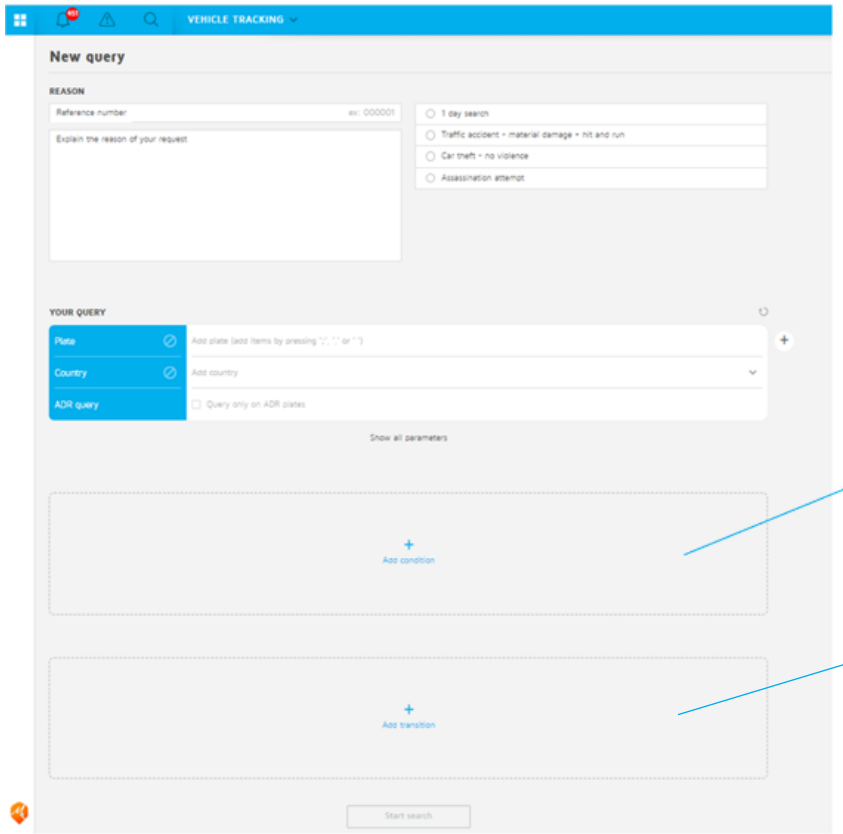
Advanced version

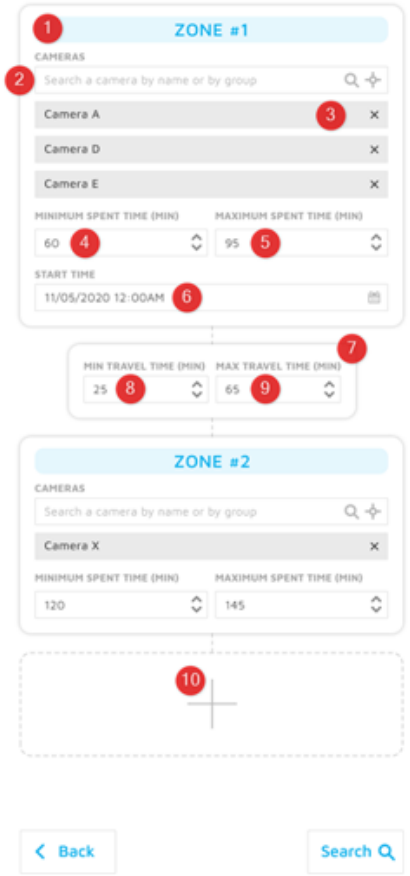


Advanced Search Query

Advanced Search Query: Intro

Advanced Search Query is an extension of the current Search Query module that will provide the user extra main features





Feature 1: Traffic Detection

The Traffic Detection feature detects all the vehicles travelling down a route in one direction and travelling the same route in another direction within a specific time-period.

- Input:
  - Zones (= 1 or more camera's)
  - Start time
  - Min and max travel time
  - Min and max spent time in each zone
- Output:
  - List of vehicles

Feature 1: Traffic Detection

Scenario: Drug trafficking from France, via Belgium, to the Netherlands

E.g.: **Zone 1 = Border France-Belgium**

Start time = 11 pm

End time = 5 am (next day)

Min spent time = /

Max spent time = /

Min travel time = 1h

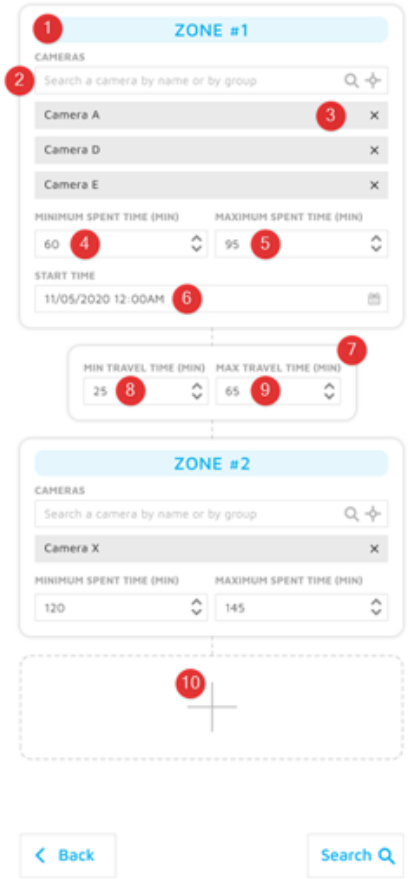
Max travel time = 3h

Zone 2 = Border Belgium-Netherlands

Min spent time = 1h

Max spent time = 5h

Result: list of detected vehicles



Feature 2: Pattern Recognition

The Pattern Recognition feature allows the user to compare different queries and indicate common data.

- Input:
  - 2 or more zones (= 1 or more camera's)
  - 2 or more time windows
- Output:
  - All vehicles that satisfy all the conditions in other words vehicles that are travelling together

Feature 2: Pattern Recognition

- Scenario: Analysis and actively fight wave of burglaries between 2 am and 4 am in a specific zone **(only 1 query)**

  E.g.: Define time window 1: Tuesday 19/09/23 between 2 am and 4 am

  Define time window 2: Tuesday 26/09/23 between 2 am and 4 am

  Define zone 1: Mechelen street 1

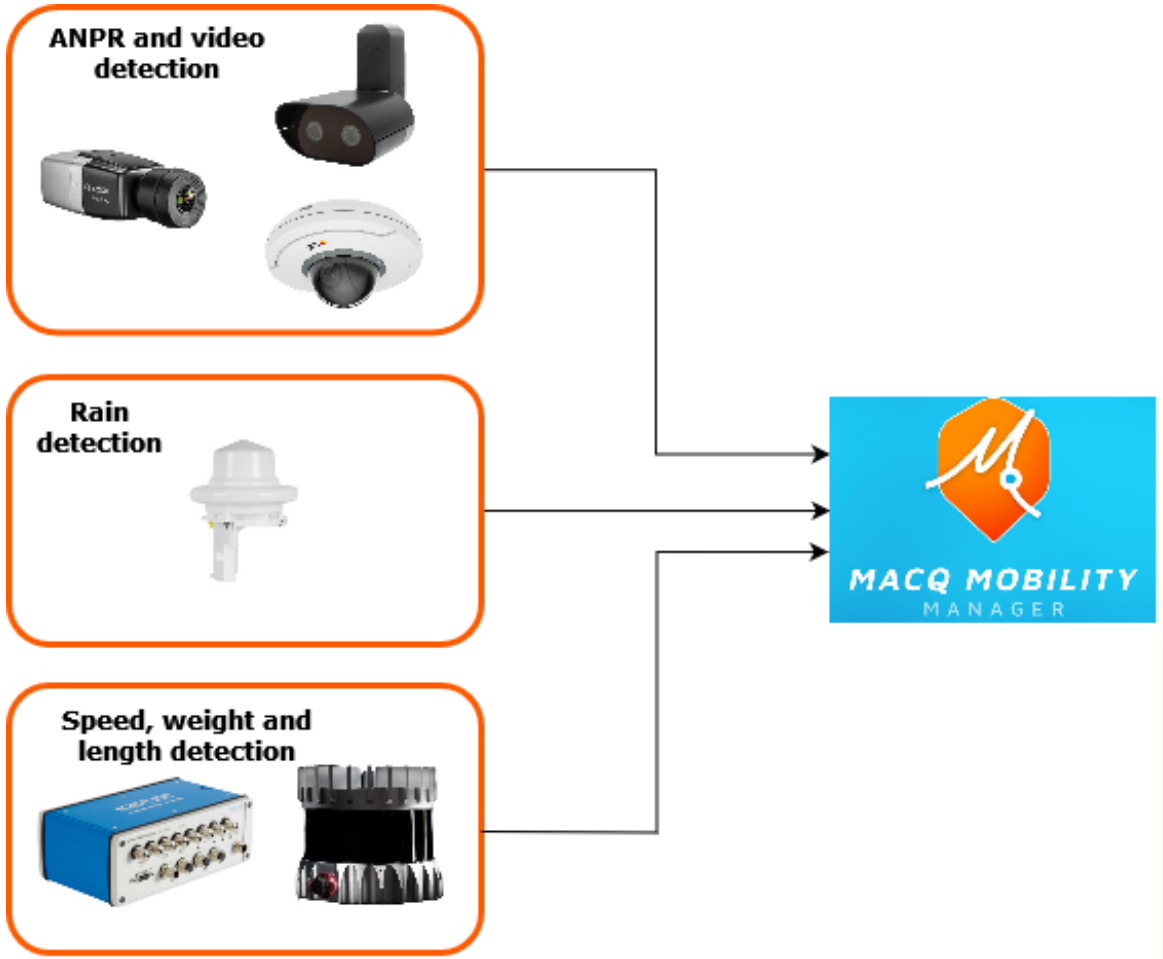
  Define zone 2: Mechelen street 2

  Results: the common numberplates that satisfy all the conditions above

New modules for Police

Technical challenges

- Need to interact with different kind of devices (Cameras, Measurement devices)
- Need to automatically generate infractions
- Need to automatically export evidence case to external servers
- Need to provide picture/video evidence to validate the infraction



TUSSENAFSTAND

VERWERPEN VALIDEREN

Kandidaten

Leven

1AAABBB

1 kandidaat

2 1AAABBB | Tussenafstand | 89.1 km/h | 20-09-2023 15:40:05 | 22.555 m | 1.59 s

Voertuig in overtreding

NUMMERPLAAT
1AAABBB

UITSNEDE NUMMERPLAAT
plate cutout

LAND
RO

VOERTUIGTYPE
Zwaar gewicht

MERK
Mercedes

MODEL

MIV/WIM

ID
Bertem TA

SNELHEID
89.1 km/h

LENGTE
16.4 m

RIJBAAN
1

TIJDSTIP

ANPR

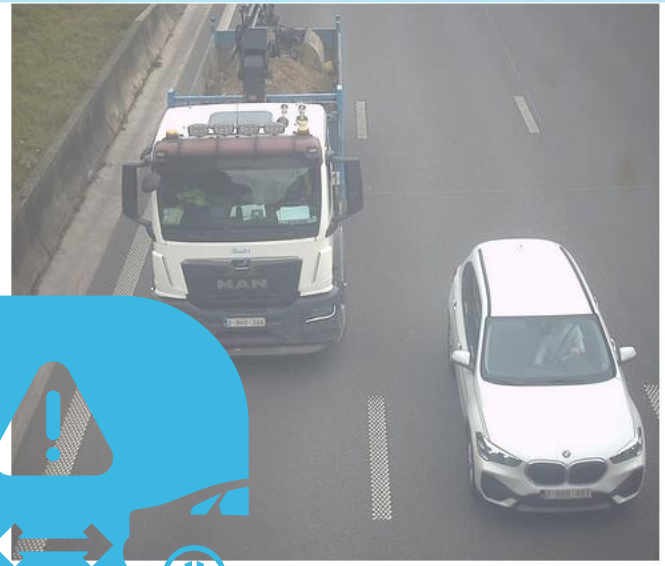
CAM
A3N13-9-M-ANPR

GESCHATTE SNELHEID
57 km/h

RIJBAAN
1

TIJDSTIP
20-09-2023 15:40:06

Voorliggend voertuig



LAND
BE

VOERTUIGTYPE
Zwaar gewicht

MERK
Man

MODEL

MIV/WIM

ID
Bertem TA

SNELHEID
88.2 km/h

LENGTE
10 m

RIJBAAN
1

TIJDSTIP
20-09-2023 15:40:04

ANPR

CAM
A3N13-9-M-ANPR

GESCHATTE SNELHEID
60 km/h

RIJBAAN
1

TIJDSTIP
20-09-2023 15:40:05

Candidates

Plate	Class	Global	Axle	Overdimension	Time
1AAABBB	V12A12	12%	19%	No	14:37:42

1 candidate

1AAABBB

V12A12  49.3 T

05:00

To Intercept

ANPR-CUTOUT PICTURE
null

COUNTRY
NL

LANE
1

MAKE
Scania

MODEL
R-series

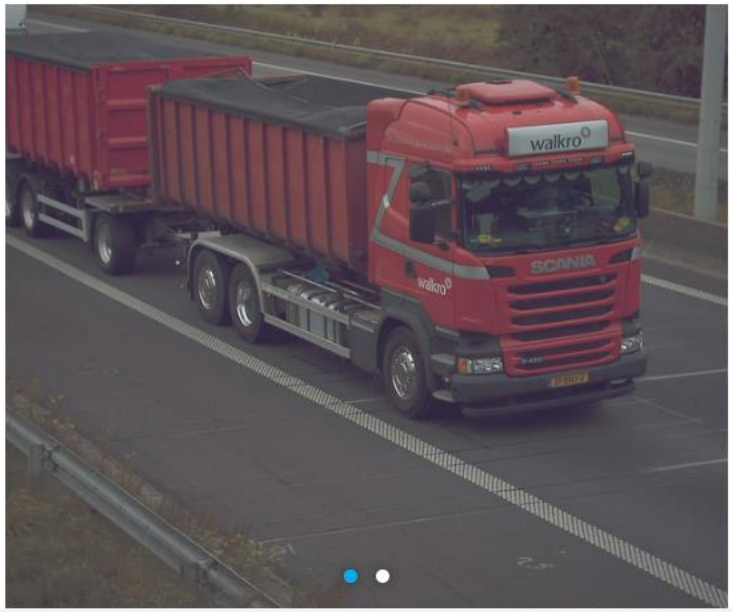
COLOR
Red

LENGTH
18.44

SPEED
72.8 km/h

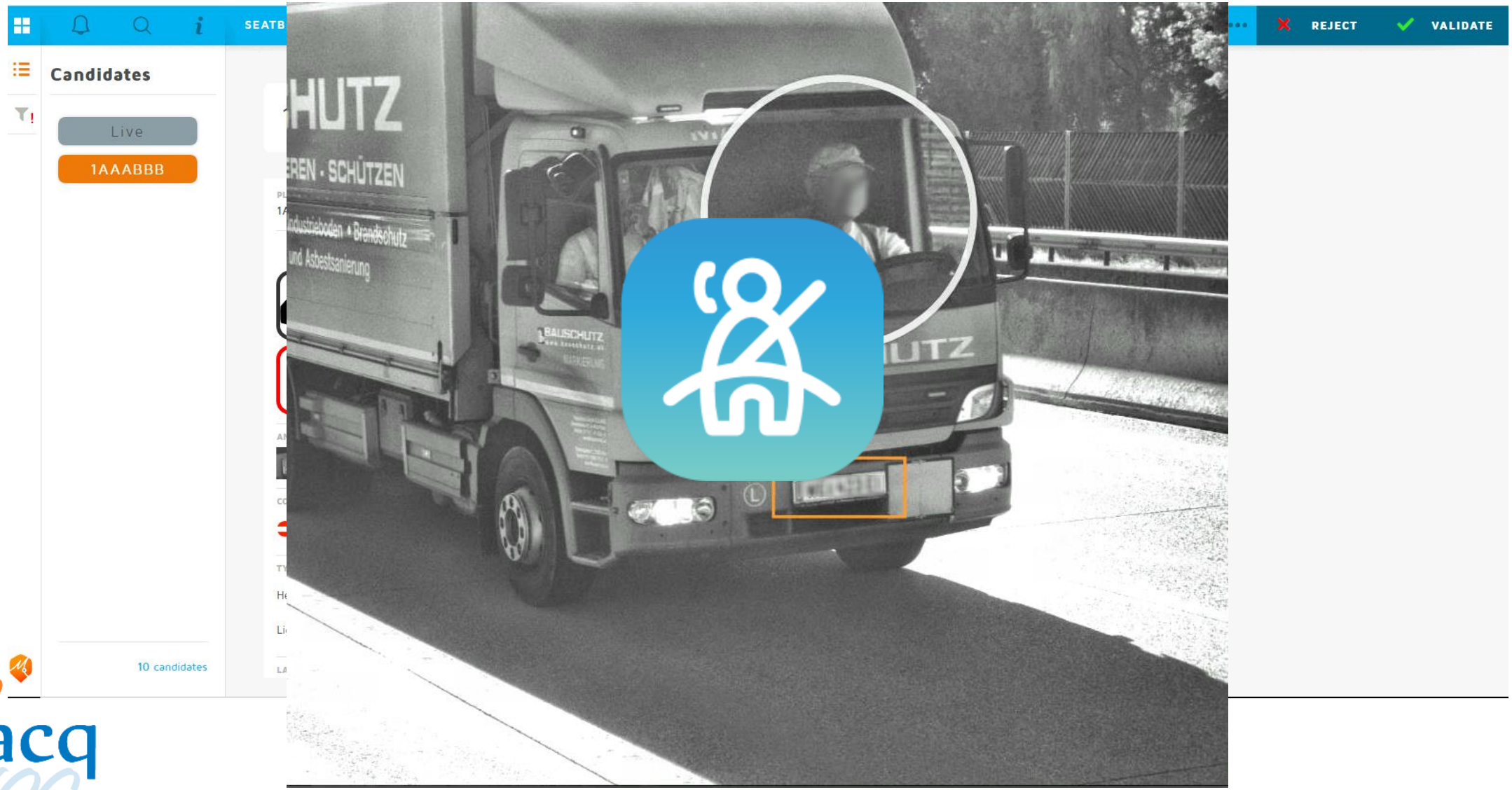
TIME
14:37:42 *927ms*
Wednesday, September 20, 2023

A13P393-R-ANPR-GEEL : A13P39.3.R.ANPR



	WEIGHT MAX	WEIGHT	OVERLOAD	POSITION
Axle 1	7500	8930	19%	0
Axle 2	10000	10700	7%	4.51
Axle 3	10000	7120	0%	1.34
Axle 4	10000	7890	0%	4.24
Axle 5	10000	7410	0%	3.92
Axle 6	10000	7210	0%	1.3

Seatbelt and Phone violation



Overtaking in rainy conditions violation

QCAM-APP

Why QCAM-APP ?

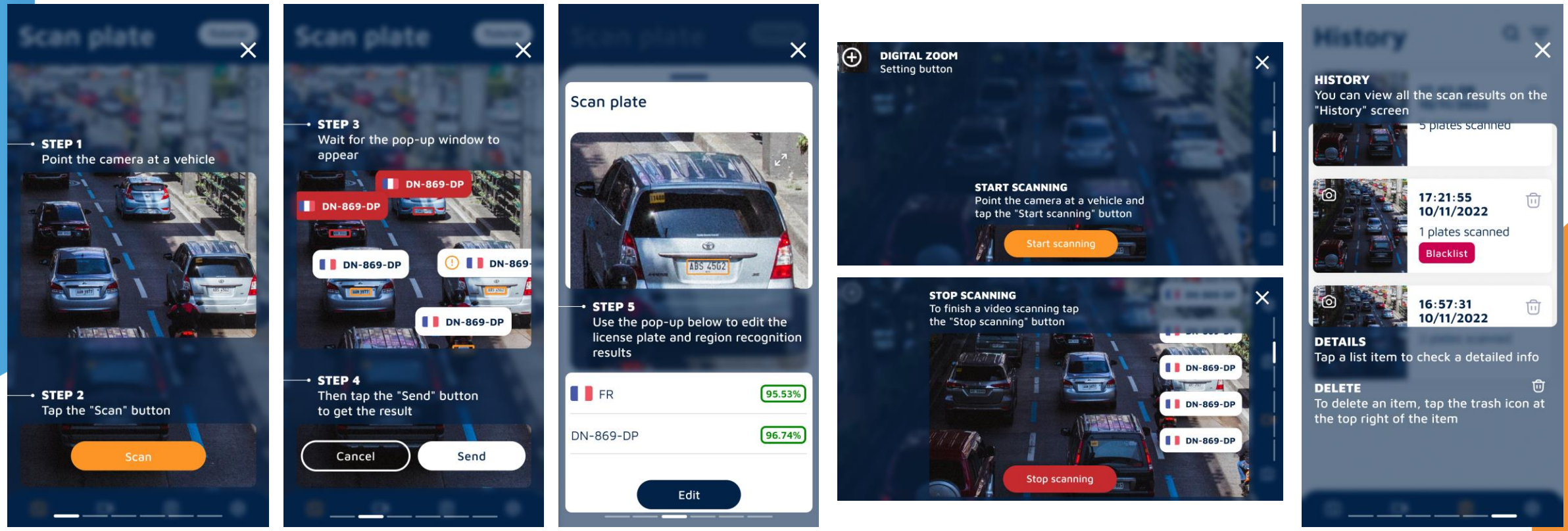
- ***Converts a smartphone into an ANPR camera with two different mode : photo mode and video mode.***
- ***Method:***

  QCAM-APP uses embedded Machine Learning models for detection and recognition and can work with no Internet connection.

Make the world a safer place

Macq Mobility

Tutorial Screen

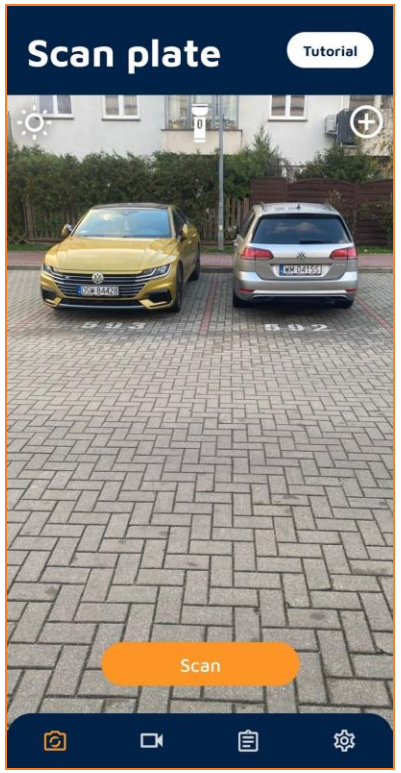


The tutorial describes all the main features of the app.

The **video** tutorial is also available in the app

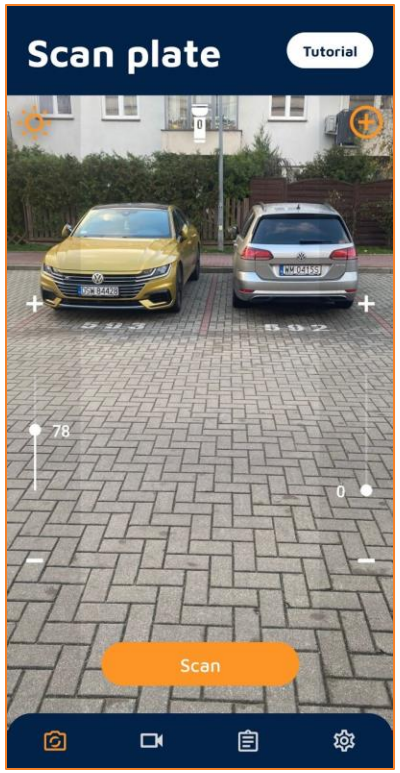
Macq Mobility

License Plate Scanning Process



Step 1 - A

Point the camera on a vehicle



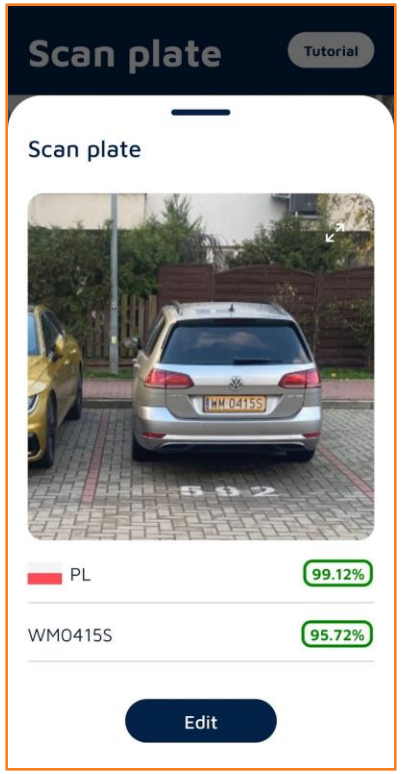
Step 1 - B

Adjust **Zoom** and **Brightness**

(if needed)

Step 2 - A

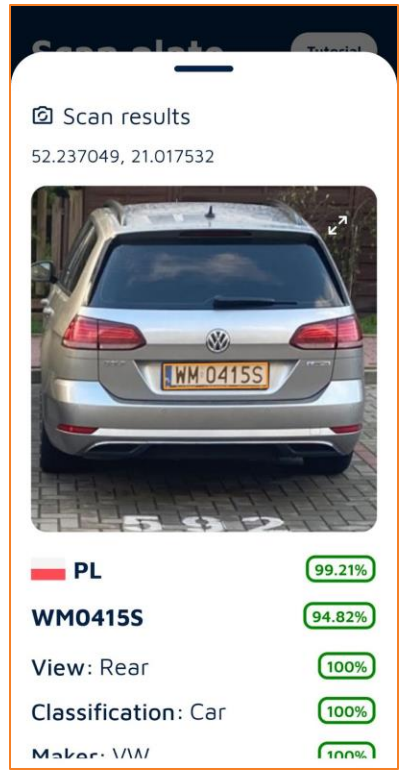
Press the "**Scan**" button and view the results



Step 2 - B

Press on a result item to edit it

(if needed)



Step 3

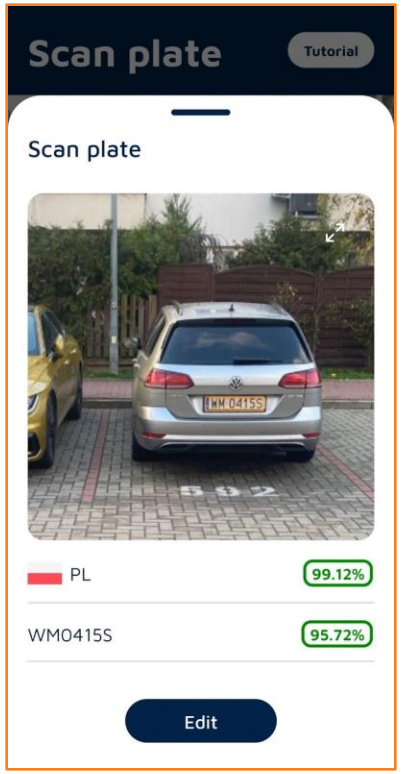
Press the "**Send**" button and view the detailed results

Macq Mobility

Process Modification

Step 1

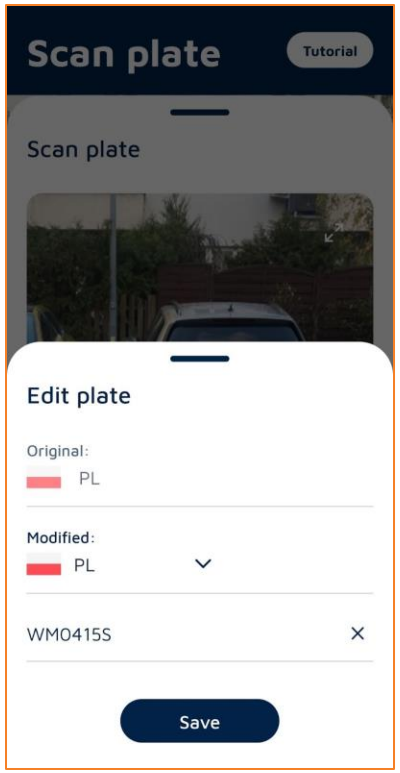
Choose a result item to edit



Step 2

Press the "**Edit**" button

(you can use gestures to zoom the image)



Step 3

Make edits and press the "**Save**" button

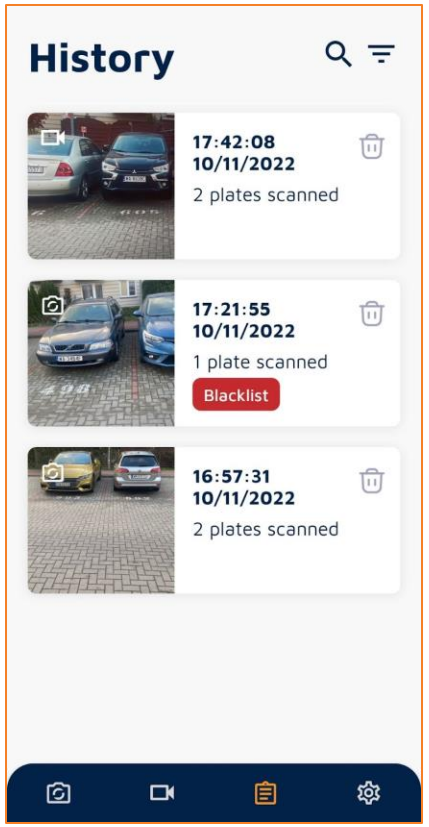
Step 4

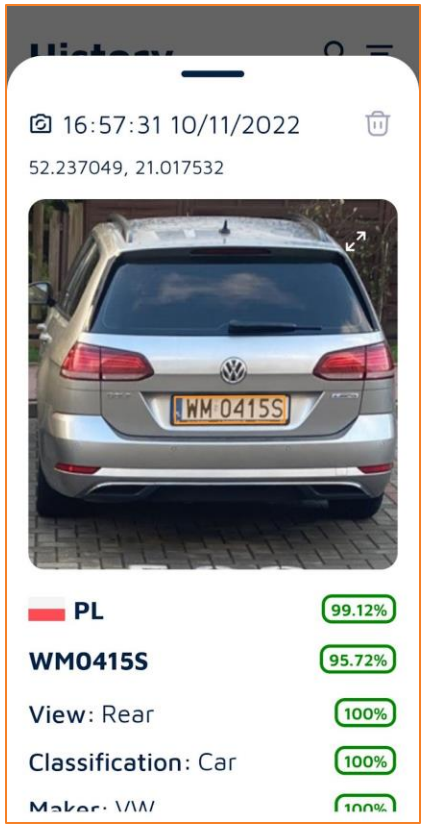
Check the result

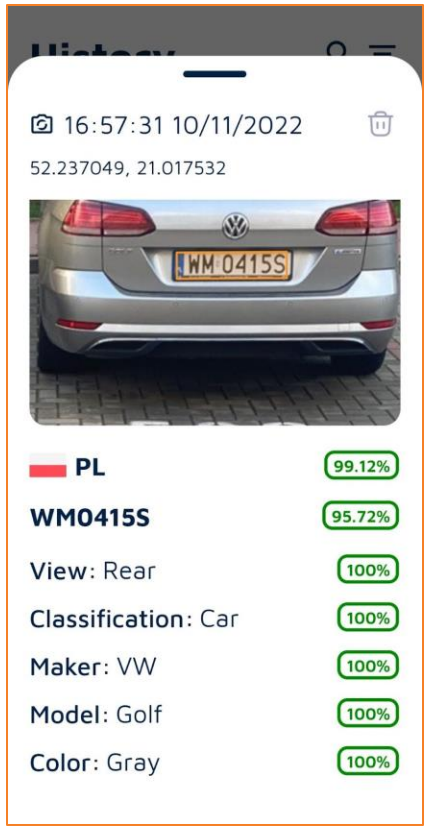
Both original and modified data will be saved in the DB

Macq Mobility

History Screen







After a user presses the "Send" button results are visible on the **History** screen, where the user can **check** or **remove** them.

Filtering and **searching** features are available.

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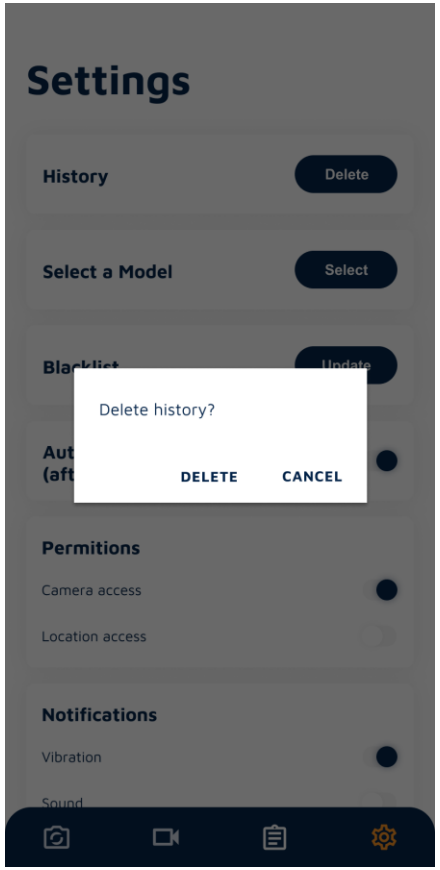
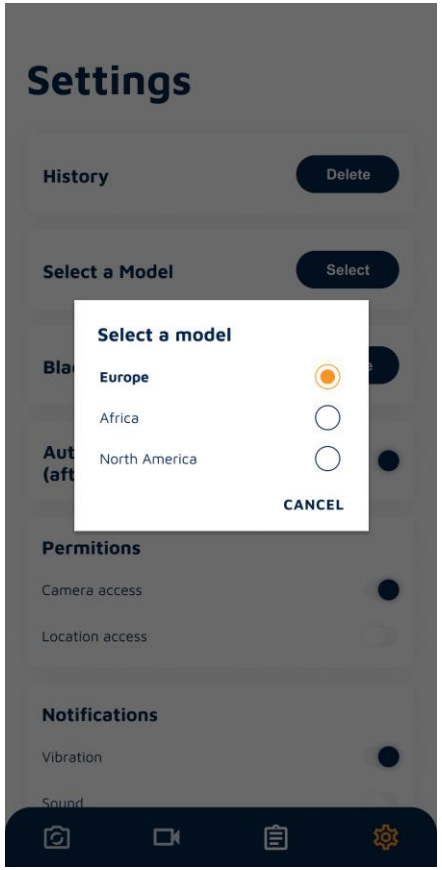
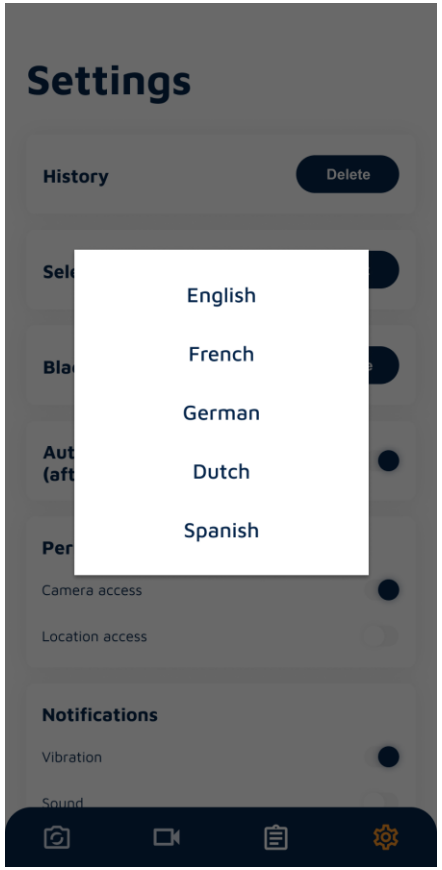
Setting Screen



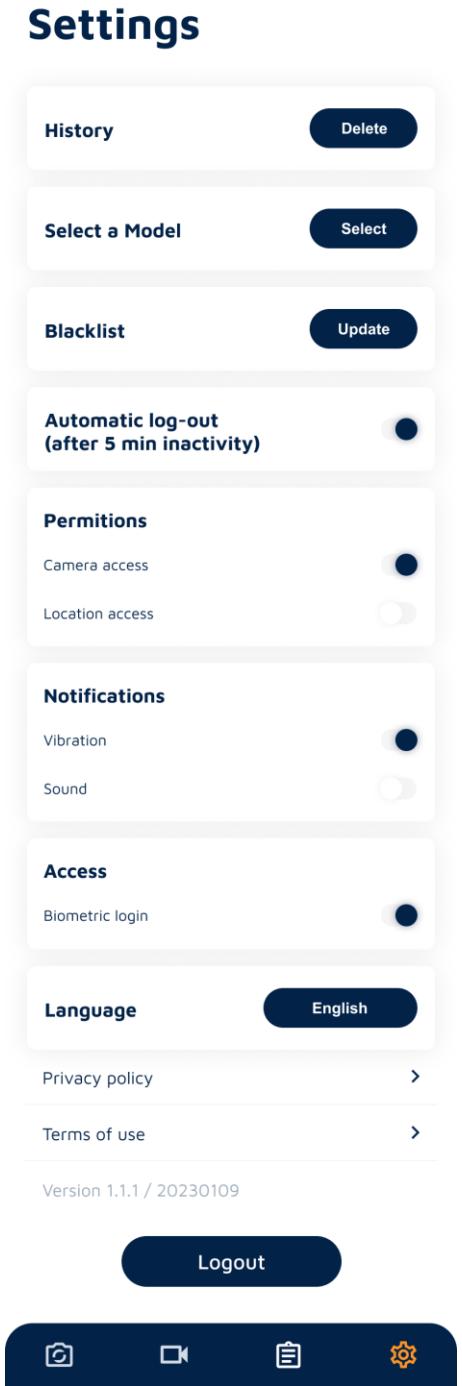
Scans history erasure



Recognition model selection



App language selection



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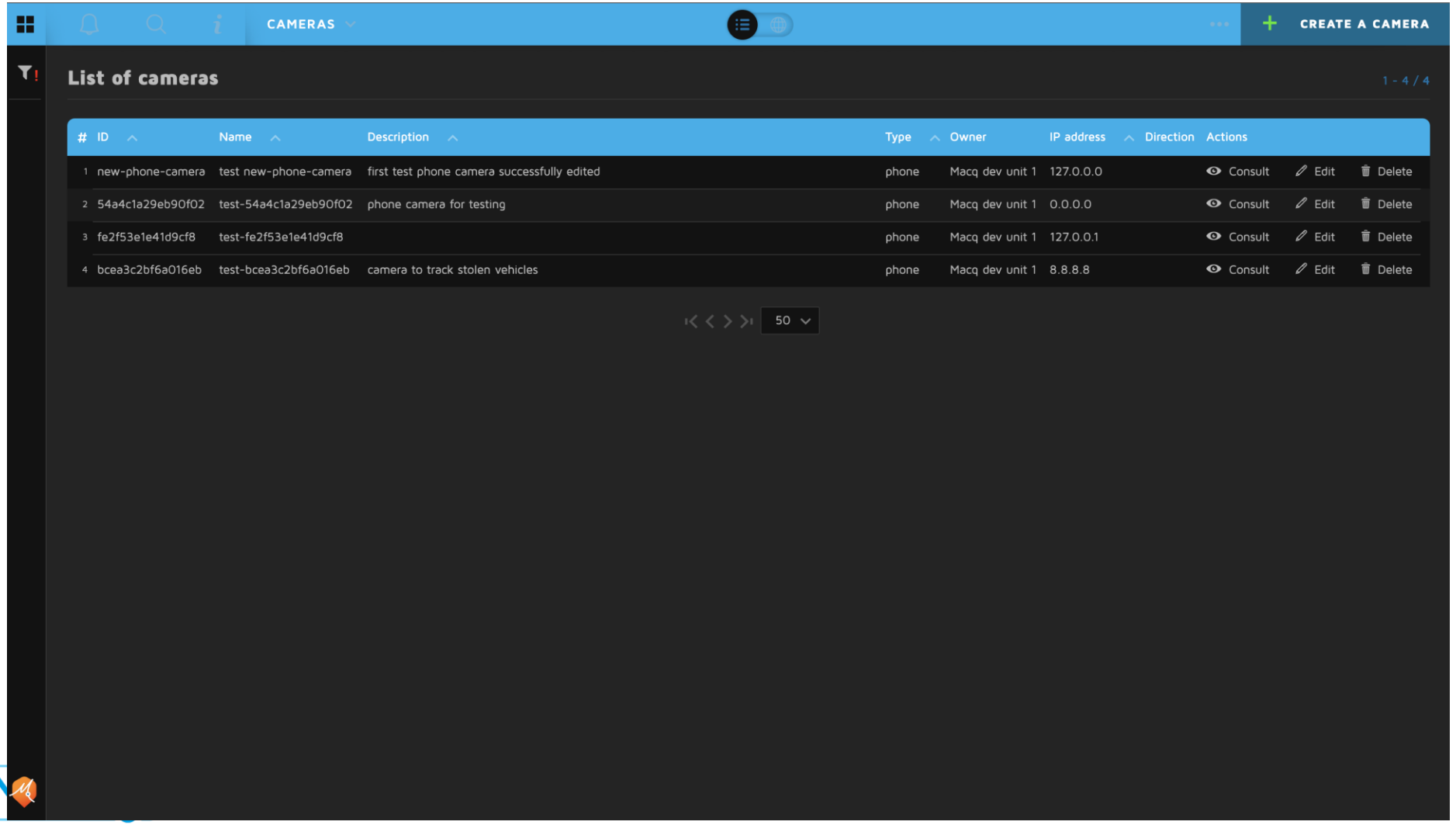
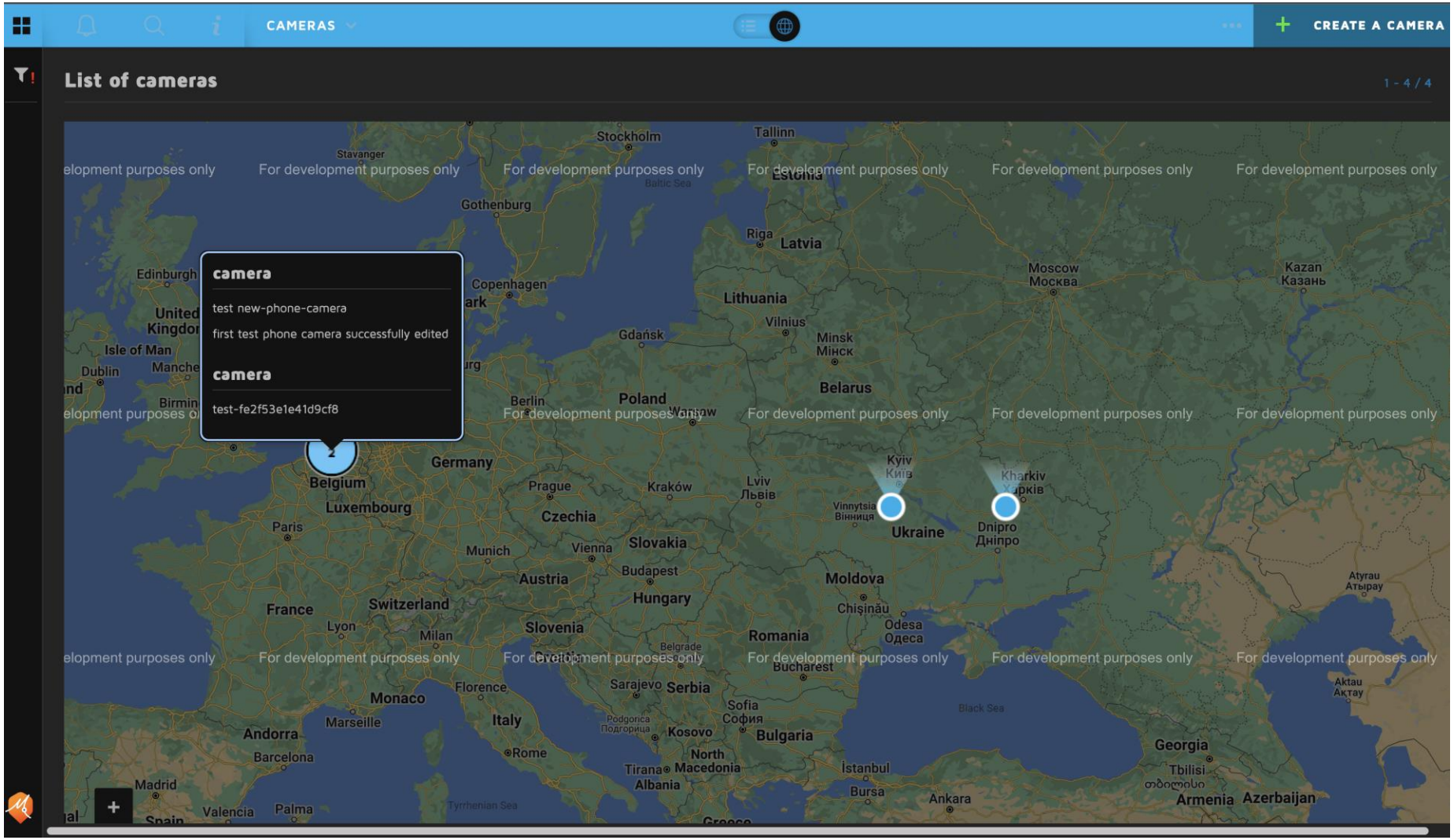
M³ Blacklist web app



Phone localization



Client Environment

The QCAM application (app) is an Android app, IOS app.

The QCAM app supports the following Android versions:

- Minimal version supported : Android 8
- Compile version: Android 13

The QCAM app supports the following IOS versions:

- Minimal version supported: IOS 13
- Compile version: IOS 16

Macq Mobility

Security Aspect

- Registering the smartphone in M³
- Create the link between Phone and M³ with 4G
- GDPR (automatic delete informations after 24 hours)

- Security targets and cryptographic audit have been done with Synaktiv certified ANSSI.

Macq Mobility

A new way to investigate

Yacq

A new way to investigate

Introduction

THE INTUITION

Mario Venturi, founder of KeyCrime and former Italian state Police office, intuits that by focusing on the ***identification of criminal series*** through data analysis, it would have been possible to understand the logic and dynamics useful for ***effective planning actions to prevent and combat crime***.

100 crimes are not done by 100 criminals, but a few criminals commit 100 crimes.

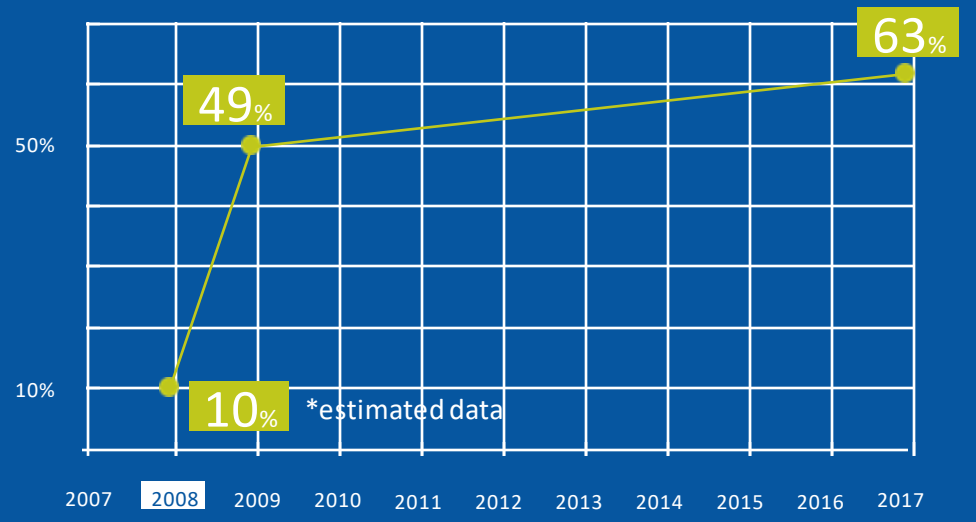
TO THE TOOL

From intuition arises the need to structure acquisition models to ***improve the collection of crime data*** and create an IT tool capable of ***storing and analyzing*** them through an algorithm, capable of identifying the same hand within crimes that occured in different time and places, to ***identify and isolate criminal series and predict when and where next crime will be committed.***

TEST 1

In 2008 the Police began using the software to analyze shop robberies in the metropolitan area of Milan, immediately obtaining **important results.**

Progress of cases resolved with the introduction of the software



28% reduction in business robberies In the first year

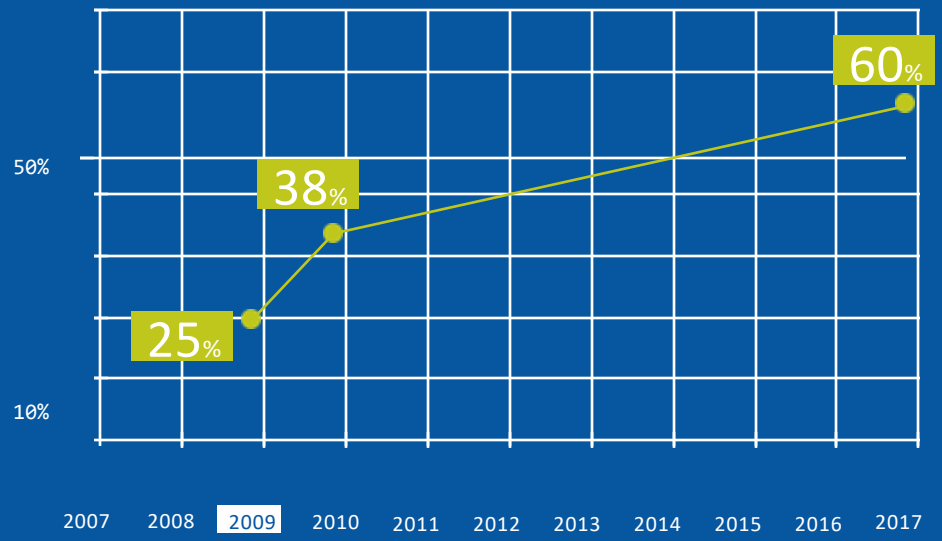
58% Reduction in business robberies when fully operational

THE TEST

TEST 2

The successful use of the first test prompted the heads of the Police Headquarters, in 2009, to **extend** its use for robberies perpetrated against credit institutions **in the entire province of Milan.**

Progress of cases resolved with the introduction of the software



25% reduction in business robberies In the first year

89% Reduction in business robberies when fully operational

Institutional FEEDBACK

POLICE

Increased prevention and repression of crimes

UNIONS

Increased Security levels of Police Operators

PROSECUTION

Increased the effectiveness of prosecution

GOVERNMENT

Increased efficiency of Citizen services

Macq 100 years

SCIENTIFIC *VALIDATION*

G. Mastrobuoni, Professor at the University of Turin, Vice Dean of the Carlo Alberto College of Turin and Professor at the Università dell'Essex (UK), in March 2020 obtained the ***Peer Review*** of the paper ***"Crime is terribly revealing: information technology and police productivity"*** and the publication in the economics journal ***«The Review of Economic Studies»*** of the University of Oxford (UK).

* referring only to the economic damage for robberies that did not take place

Results

Reduction of robbery sequences from 18 to 6.6 per series

Reduction of 1000 judicial instances per year in the province of Milan

Saving for the population of Milan of eur 2.5mln a year

FEEDBACKS

MEDIA

HBO

"KeyCrime is unique:
it focuses on **individuals behavior analisys** rather than aggregate data to guide investigations."

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RTL TELEVISION · Herald · HBO · Bloomberg

sky · Rai 1 · VICE · Courrier international

RTS Radio Télévision Suisse · arte · SOY 502 · The Charlotte Observer

BBC · WIRED · Infobase · Semana

Europe 1 · ANSA · Chicago Tribune · CORRIERE DELLA SERA

BUSINESS UNIT MOBILTY & CITY

Understanding urban traffic & mobility

Macq

Introducing TORRES

Consortium:

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VUB ETRO ELECTRONICS & INFORMATICS

ULB MLG MACHINE LEARNING GROUP

funded by innoviris .brussels

Need for **authorities** and **cities** to better understand and **quantify** the **impact of their policies** on traffic and mobility, which directly relate to **citizen's quality of life** and **safety**.

Using **AI** and **machine learning** to allow authorities and cities to make **smarter data-driven** decisions.

In line with the **long-term strategy** of Macq in smart mobility at national and international level.

Multimodal traffic data processing

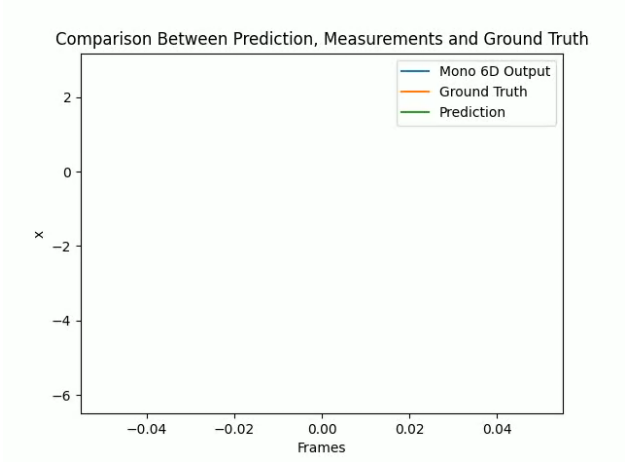
- Smart camera
- Counting loops
- Traffic incidents
- Floating car data
- Weather
- On Board Unit (OBU)
- Road works
- ⋮

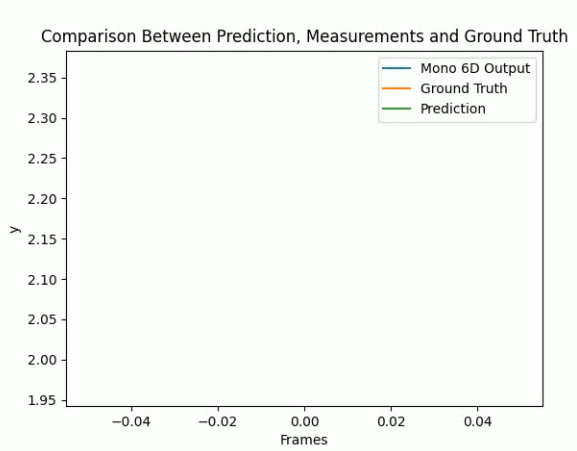
Data-driven toolbox
(machine learning)

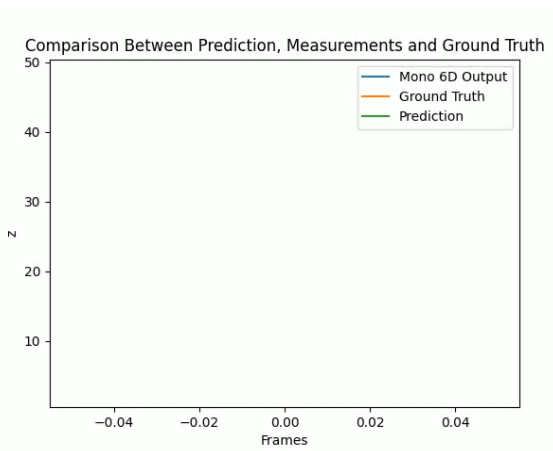
- Data cleaning
- Data fusion
- Data imputation
- Traffic simulation
- Traffic forecasting
- Traffic interpolation

Understanding traffic

At small scale...







Understanding traffic

… to the level of a city

Use cases

Working with public authorities and mobility experts

1. Forecasting

2. Analysis of road works and traffic disturbances

3. Preventive road maintenance

4. Intelligent equipment deployment

Expert user group:

BRUSSELS MOBILITY
BRUSSELS REGIONAL PUBLIC SERVICE

Gemeente Amsterdam

CODC

ULPGC

ULB

MaaS Lab

UCL

VUB

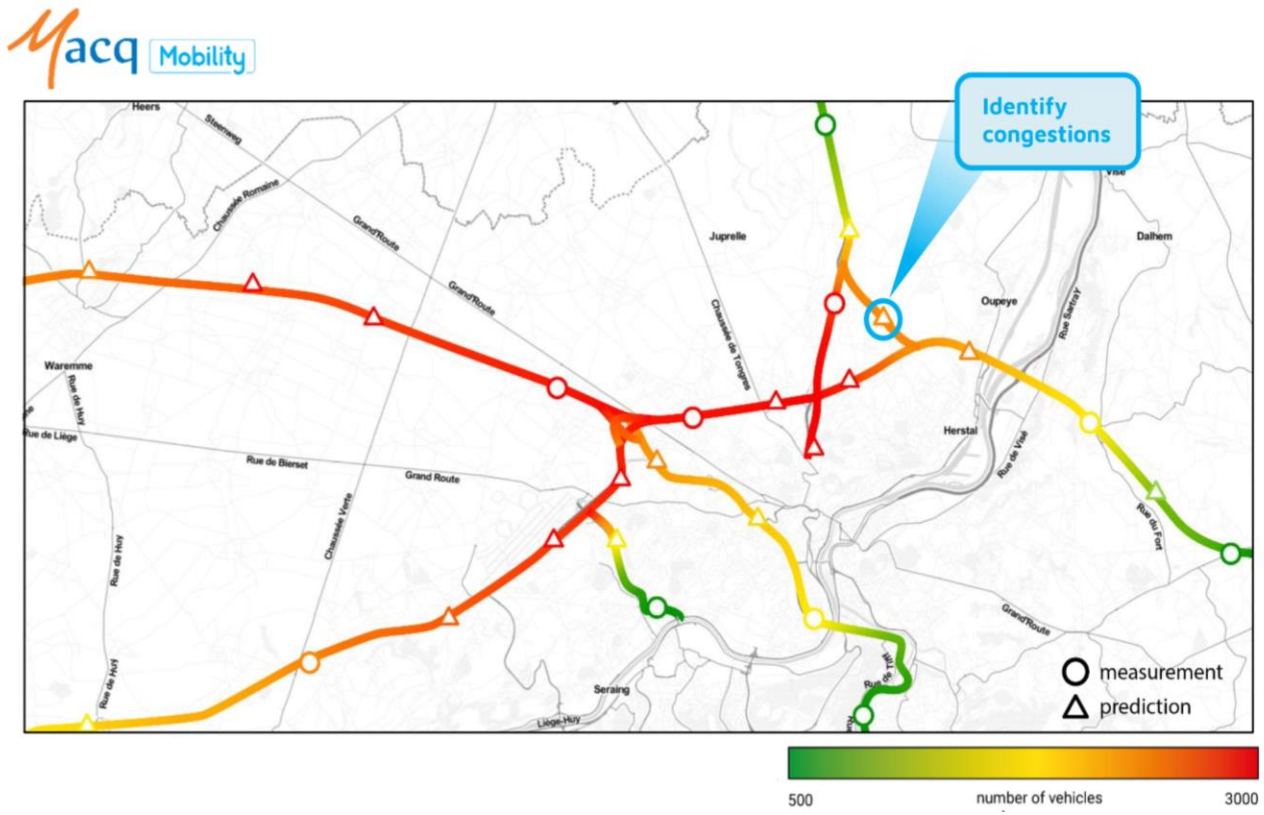
mobi

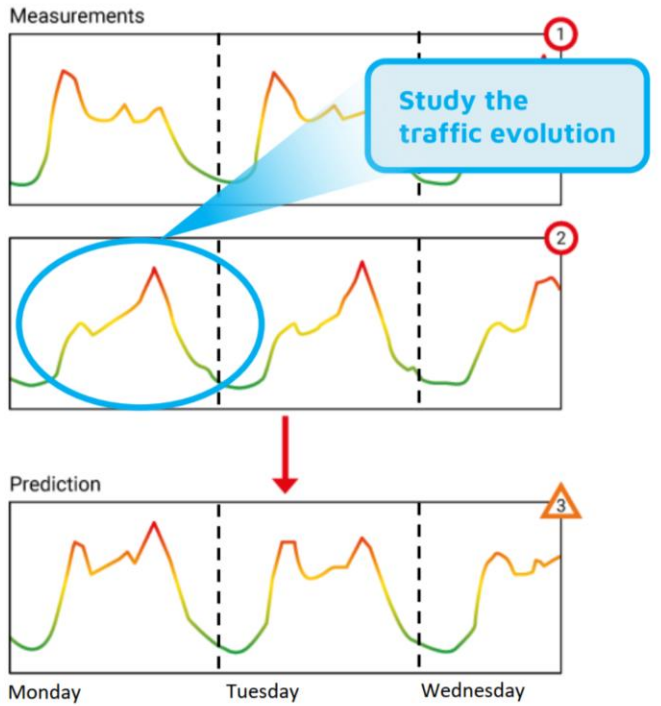
Macq 100 years

Traffic management at a large scale

Macq 100 years

Problem identification





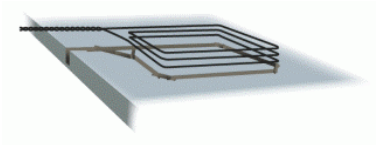
Gathering valuable data

Road network sensors :

- CCTV cameras, Counting loops, Smart cameras, …

\+ Precise measurements
\+ Rich information

\- Localized data point
\- Subject to malfunctions
\- High cost (Installation & maintenance)


Floating car data :

- OBUs, TomTom, Coyote, …

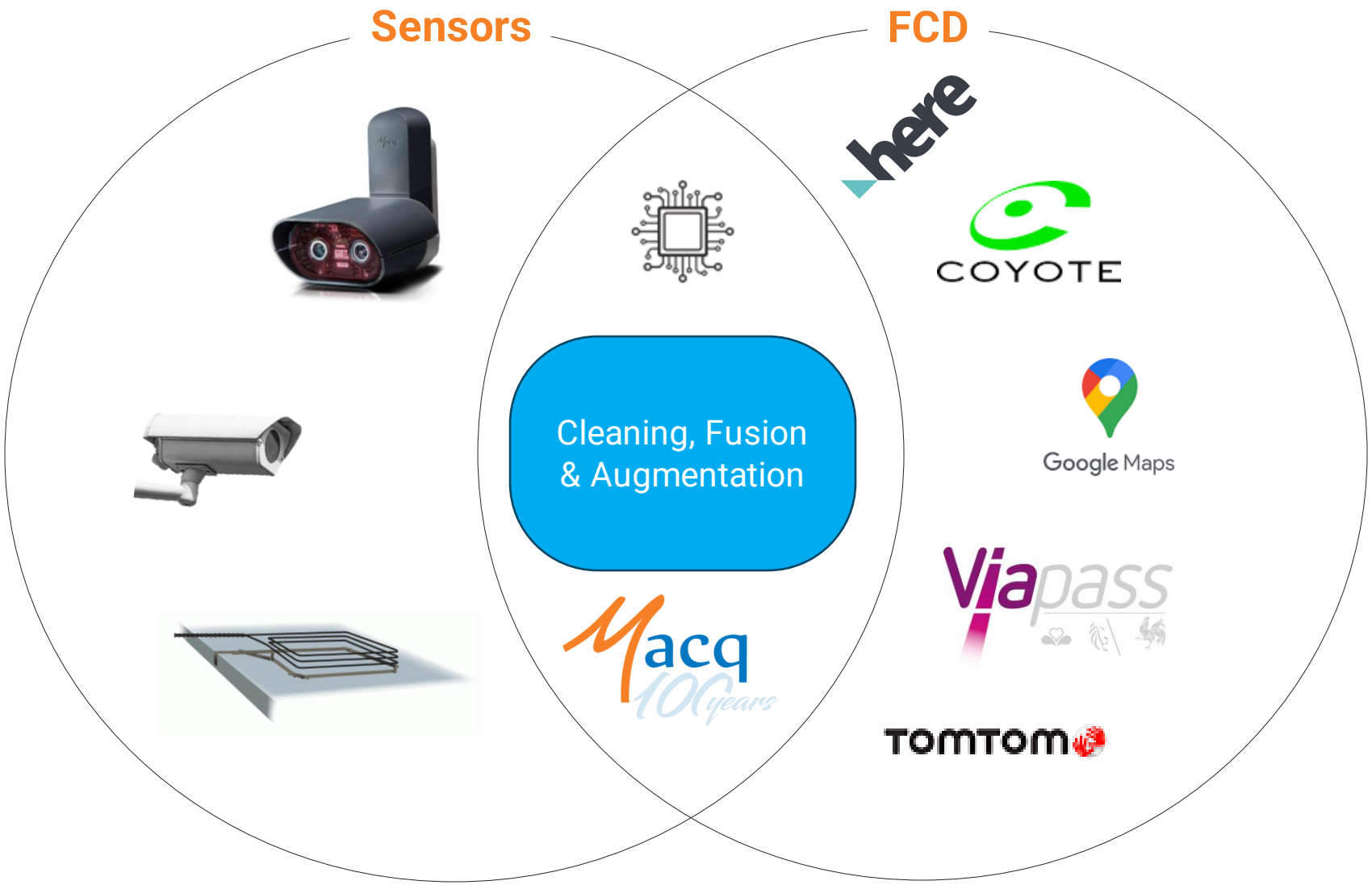
\+ Large data source
\+ Large geographic coverage

\- Partial market coverage
\- Uncertain data quality

here COYOTE Google Maps TOMTOM Viapass

Macq 100 years

Creating the data layer



Macq 100 years

Multimodal traffic data processing

- Smart camera
- Counting loops
- Traffic incidents
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- Weather
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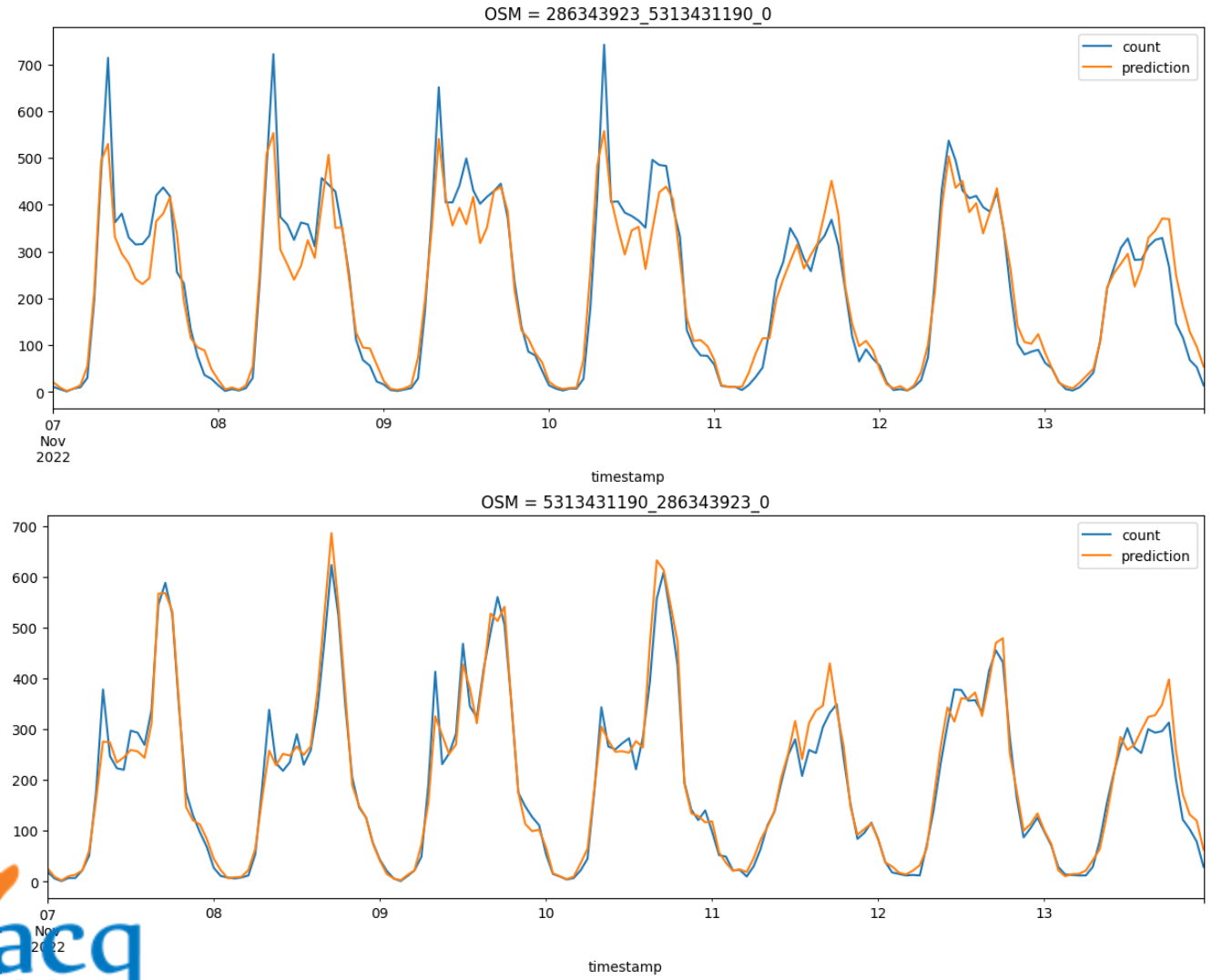
- Road works
- ⋮

Data-driven toolbox
(machine learning)

- Data cleaning
- Data fusion
- Data imputation
- Traffic forecasting
- Data Anonymization
- Traffic interpolation

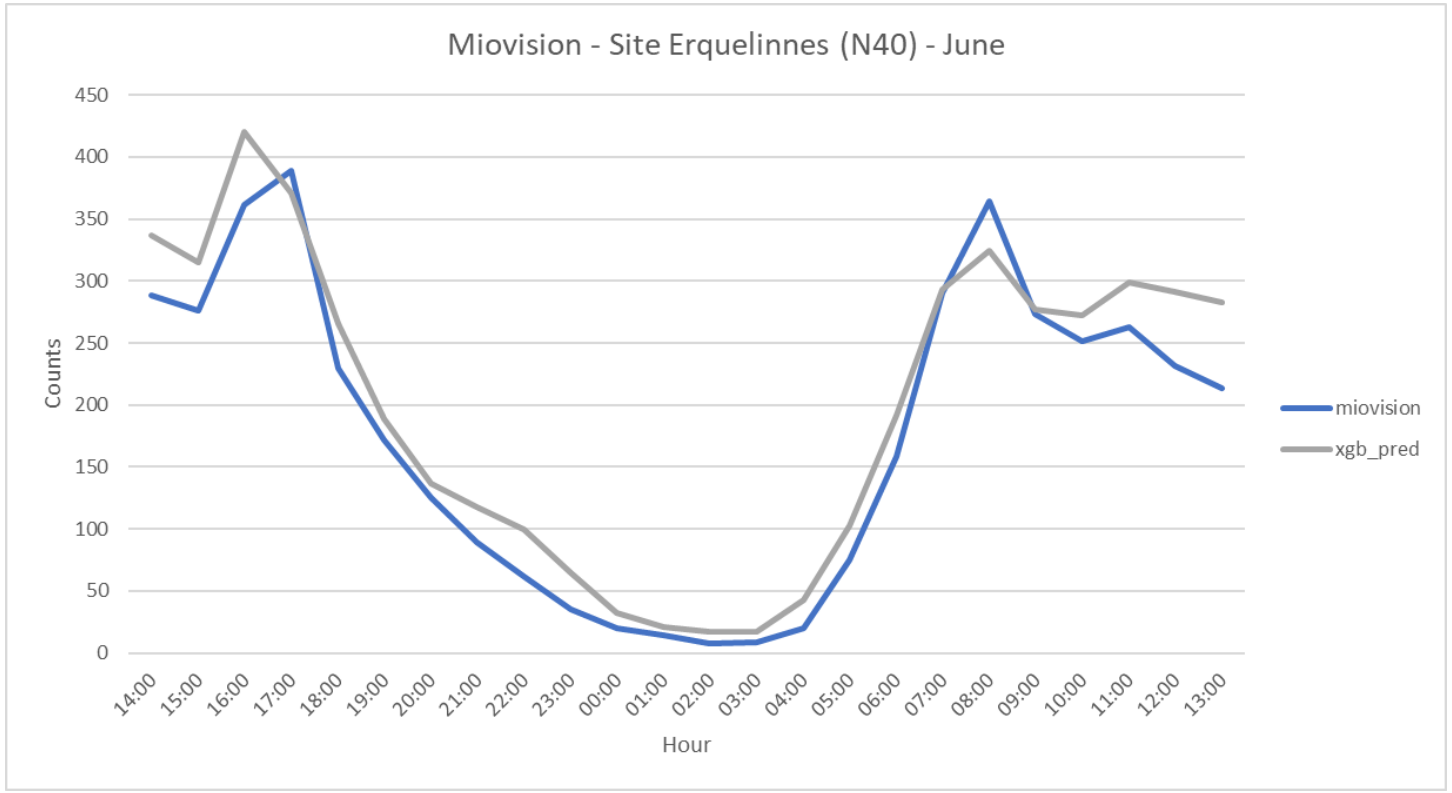
Macq 100 years

Evaluating the results



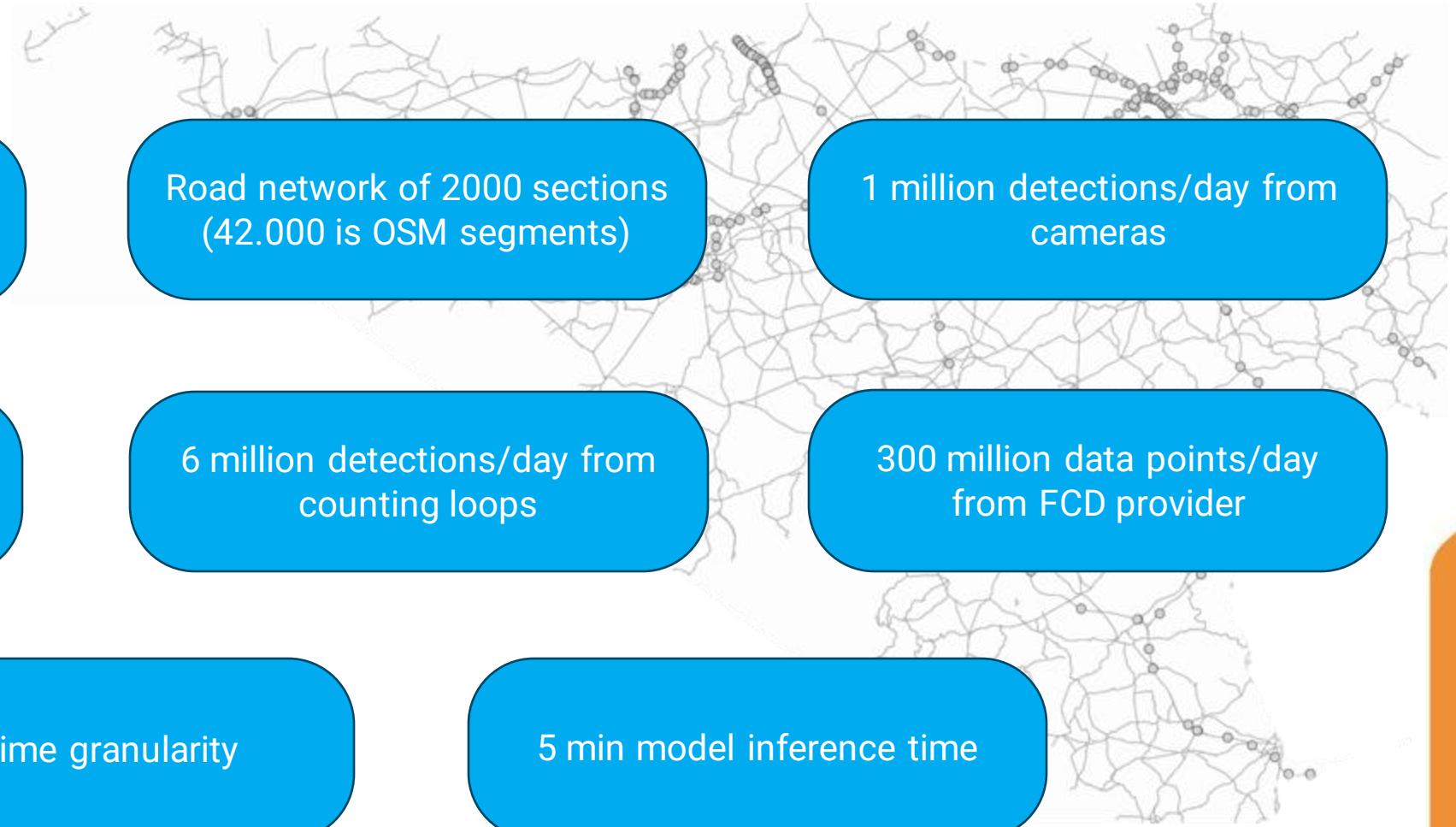
Chaussée de Huy (N243)

Evaluating the results



Erquelinnes (N40)

Reference - Trademex



4 years worth of expertise

Road network of 2000 sections (42.000 is OSM segments)

1 million detections/day from cameras

200 million data points/day from OBU

6 million detections/day from counting loops

300 million data points/day from FCD provider

5 min time granularity

5 min model inference time

Macq 100 years

Wallonie service public SPW

SOFICO

EQUANS

NRB DARING TO COMMIT

Smart Mobility introduced in your city

Macq 100 years

Smart Mobility at City level

Macq Solutions

M³ Applications

- Low Emission Zone
- Restricted Traffic Zone
- Smart Parking
- …

Integrate field equipments

- ANPR cameras
- Air Quality Sensors
- Parking sensors
- Variable Message Signs
- …

Traffic analysis

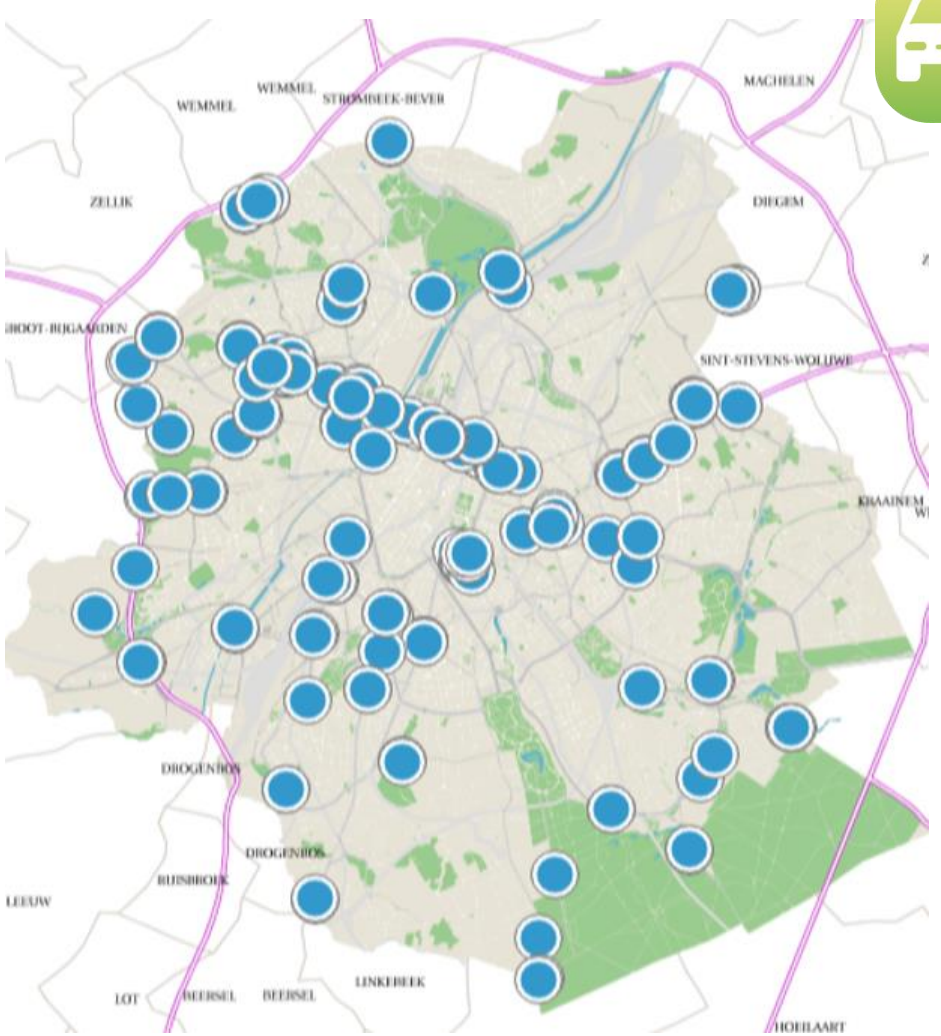
- Monitor real time traffic
- Get statistics
- …

M³ Applications

Low Emission Zone

Improve air quality and public health

- Identify higher polluting vehicles not allowed to enter the City
- Deployment of ANPR Cameras in strategic locations of the City
- M³ handling high number of vehicle recognitions



M³ Applications

Restricted traffic zone

Improve safety, avoid transit traffic

- Example : implementation for a pedestrian zone
- Open to general traffic only at certain times
- Variable message sign indicating the right of access to the area
- Management of detected violations via M³

Integration of various data sources

Collecting data

ANPR camera

Air quality sensor

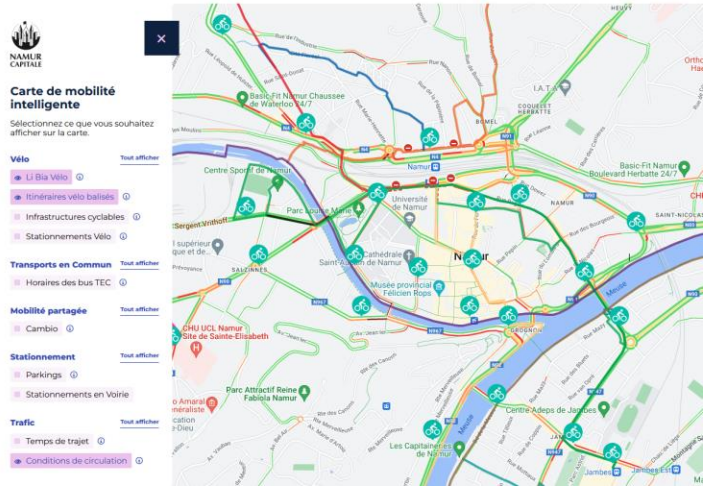
Parking sensor

Opendata

Processing

Providing information

Variable Message Sign (VMS)



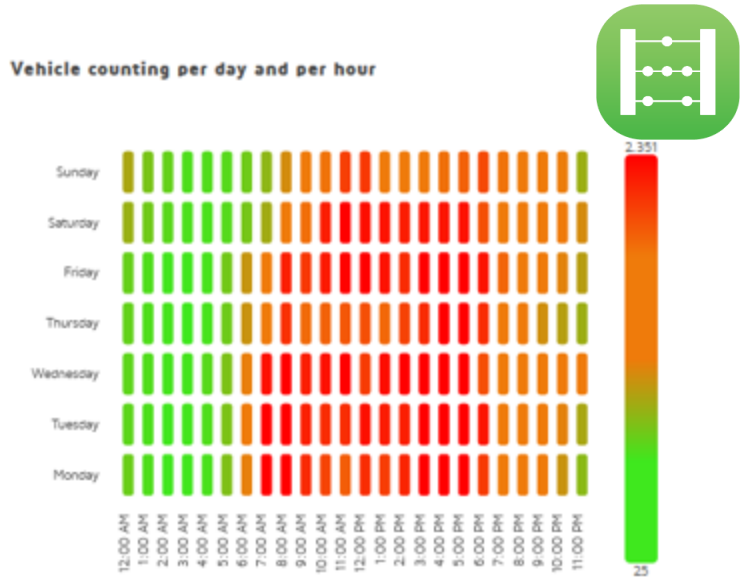
Website

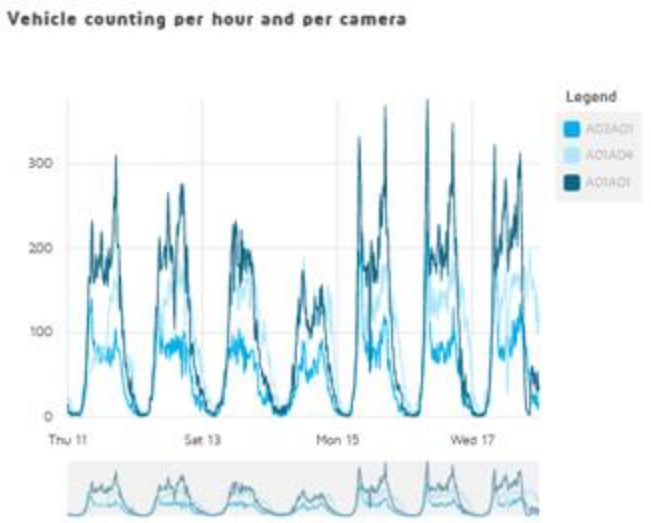
Macq 100 years

Traffic analysis

Vehicle counting and *Travel time*

- For a defined area and time frame
- Identify patterns in the traffic
  - Number of vehicles per type
  - Number of foreigners
  - …
- Realtime monitoring
- Historical analysis

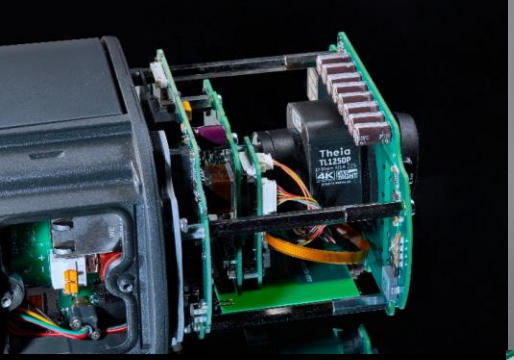
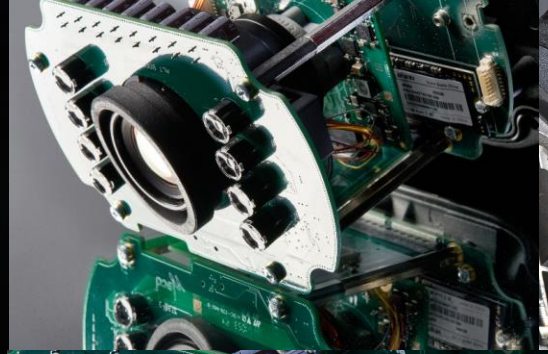


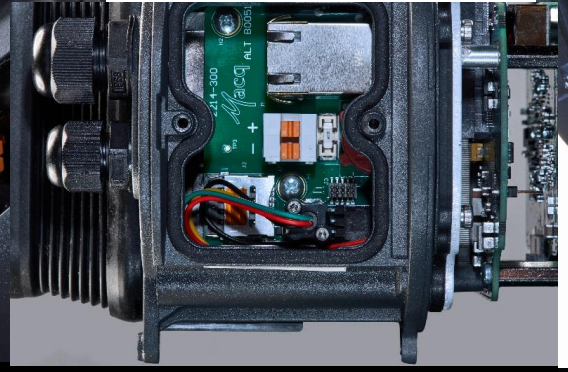


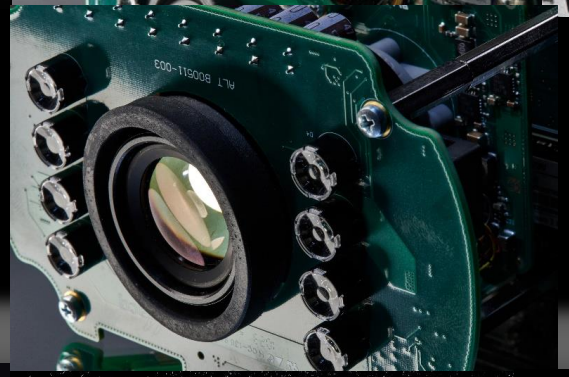

Product Unit
CAMERA

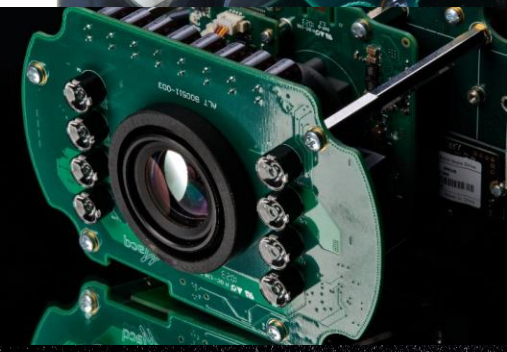
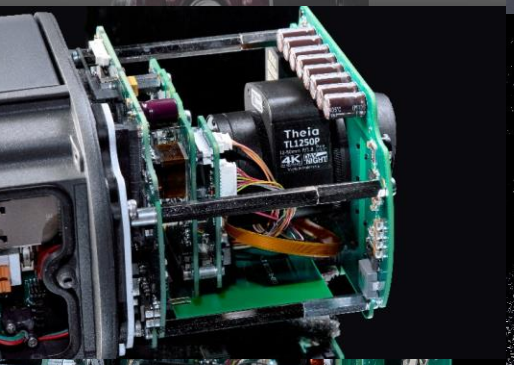
MAQCAM

QCAM3

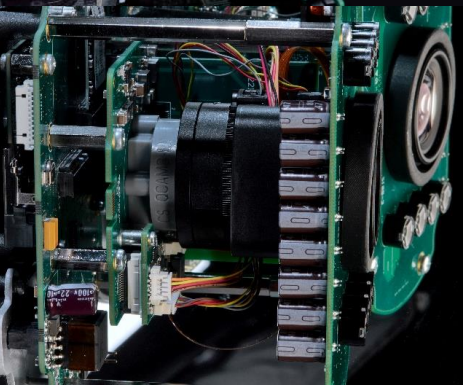







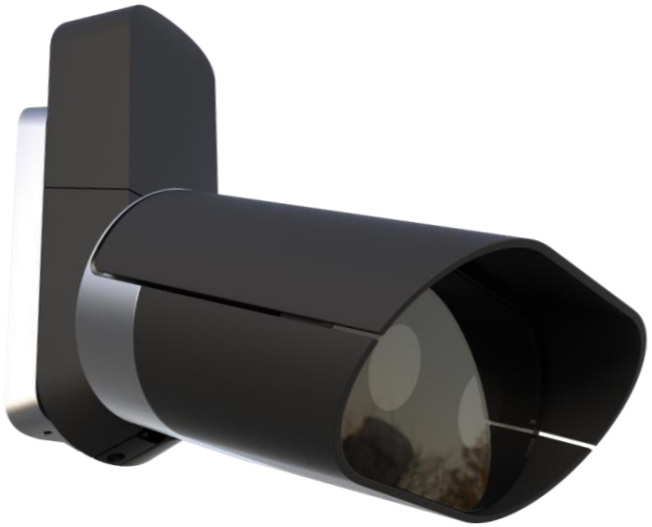


QCAM3 – The Green One

- 1x **5MP** sensor (B&W OR color)
- **Motorized lens** (Focus & Iris)
- **Optical zoom** (12 - 50 mm) for color sensor
- Fixed focal length (16 / 25 mm) for B&W sensor
- **PoE / PoE+** or 12V DC
- **Low power** consumption & **compact** housing
- Connectivity: Ethernet, WiFi, **4G / 5G**
- **1-2 lanes**
- Embedded Features
  - ANPR + country code
  - Classification
  - Make & Model, Vehicle characteristics, color
  - Instant Speed
  - Embedded whitelist

QCAM5

QCAM5

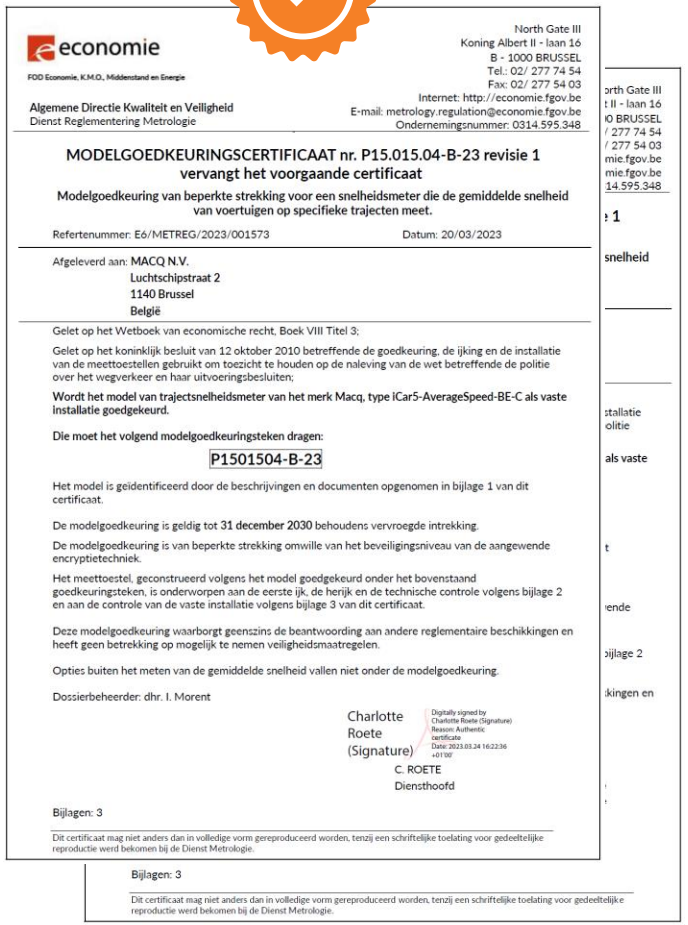


- **2x** 5MP sensors (B&W and color)
- **Fixed lens** (Focus & Iris)
- **Fixed focal length** (8 / 16 / 25 mm)
- **24V DC**
- Connectivity: Ethernet, WiFi, **4G**
- **2-3 lanes**
- Embedded Features
  - ANPR + country code + classification + **ADR**
  - Make & Model, Vehicle characteristics, color
  - Instant Speed
  - Embedded whitelist
  - **Seatbelt & Hand-held mobile phone detection**
  - **Object detection**

Homologated for Average Speed

	Class A	Class C
Speed *(max.)*	**150 km/h**	**250 km/h**
Section length *(min.)*	**200 m**	**500 m**

250 km/h



economie

FOD Economie, K.M.O., Middenstand en Energie

North Gate III
Koning Albert II - laan 16
B - 1000 BRUSSEL
Tel.: 02/ 277 74 54
Fax: 02/ 277 54 03
Internet: http://economie.fgov.be
E-mail: metrology.regulation@economie.fgov.be
Ondernemingsnummer: 0314.595.348

Algemene Directie Kwaliteit en Veiligheid
Dienst Reglementering Metrologie

MODELGOEDKEURINGSCERTIFICAAT nr. P15.015.04-B-23 revisie 1
vervangt het voorgaande certificaat

Modelgoedkeuring van beperkte strekking voor een snelheidsmeter die de gemiddelde snelheid van voertuigen op specifieke trajecten meet.

Referentienummer: E6/METREG/2023/001573 Datum: 20/03/2023

Afgeleverd aan: **MACQ N.V.**
Luchtschipstraat 2
1140 Brussel
België

Gelet op het Wetboek van economische recht, Boek VIII Titel 3;

Gelet op het koninklijk besluit van 12 oktober 2010 betreffende de goedkeuring, de ijking en de installatie van de meettoestellen gebruikt om toezicht te houden op de naleving van de wet betreffende de politie over het wegverkeer en haar uitvoeringsbesluiten;

Wordt het model van trajectsnelheidsmeter van het merk Macq, type iCar5-AverageSpeed-BE-C als vaste installatie goedgekeurd.

Die moet het volgend modelgoedkeuringsteken dragen:

P1501504-B-23

Het model is geïdentificeerd door de beschrijvingen en documenten opgenomen in bijlage 1 van dit certificaat.

De modelgoedkeuring is geldig tot **31 december 2030** behoudens vervroegde intrekking.

De modelgoedkeuring is van beperkte strekking omwille van het beveiligingsniveau van de aangewende encryptietechniek.

Het meettoestel, geconstrueerd volgens het model goedgekeurd onder het bovenstaand goedkeuringsteken, is onderworpen aan de eerste ijk, de herijk en de technische controle volgens bijlage 2 en aan de controle van de vaste installatie volgens bijlage 3 van dit certificaat.

Deze modelgoedkeuring waarborgt geenszins de beantwoording aan andere reglementaire beschikkingen en heeft geen betrekking op mogelijk te nemen veiligheidsmaatregelen.

Opties buiten het meten van de gemiddelde snelheid vallen niet onder de modelgoedkeuring.

Dossierbeheerder: dhr. I. Morent

Charlotte Roete (Signature)
Digitally signed by Charlotte Roete (Signature)
Reason: Authentic certificate
Date: 2023.03.24 16:22:36 +01'00'

C. ROETE
Diensthoofd

Bijlagen: 3

Dit certificaat mag niet anders dan in volledige vorm gereproduceerd worden, tenzij een schriftelijke toelating voor gedeeltelijke reproductie werd bekomen bij de Dienst Metrologie.

Macq 100 years

Concept QCAM


Macq

Concept QCAM

Available in 2024

- **2x 12MP** sensors (B&W and color)
- Based on **Nvidia Jetson Orin NX AI-Platform**
- **Motorized lens** (Focus & Iris)
- **Optical zoom** (4 – 10 mm or 12 – 50 mm)
- **PoE++ or 24V DC**
- Connectivity: Ethernet, WiFi, **4G / 5G**
- **3-4 lanes**

Features

Data acquisition thanks to QCAM cameras

Performance

ANPR

Vehicle detection rate

>99%

License plate reading rate

>99%

Classification

>99%

Make & Model *

>98%

Color *

>95%

* Only during daytime; at night only with appropriate lighting

Vehicle characteristics *

- Ambulance
- Vehicle carrying livestock
- Caravan
- Fire brigade
- Law enforcement (police, customs, …)
- Pickup
- Vehicle with push bumper
- Vehicle with rear mounting
- Vehicle carrying tree trunks






Macq 100 years

* Only during daytime; at night only with appropriate lighting

Why is the QCAM series the good choice?

High Performance

- Top-notch product **specifications**
- **High quality** product components
- **Automatic** and **dynamic adjustment to lighting conditions** (backlight, shadows, etc.)

European Product

- 100% developed in **Belgium**
- Manufactured in **France**

Easy Commissioning

- „**All-in-one**“ off the shelf product
- **Low** weight
- **Compact** design
- **Remote** Motorization & Configurability

Increased Return-on-investment

- **Multi-purpose** hardware
- The QCAM can be used for multiple mobility or enforcement purposes **simultaneously**

Macq 100 years

BUSINESS UNIT XAAS

The new, more sustainable business model (XaaS)

TaaS

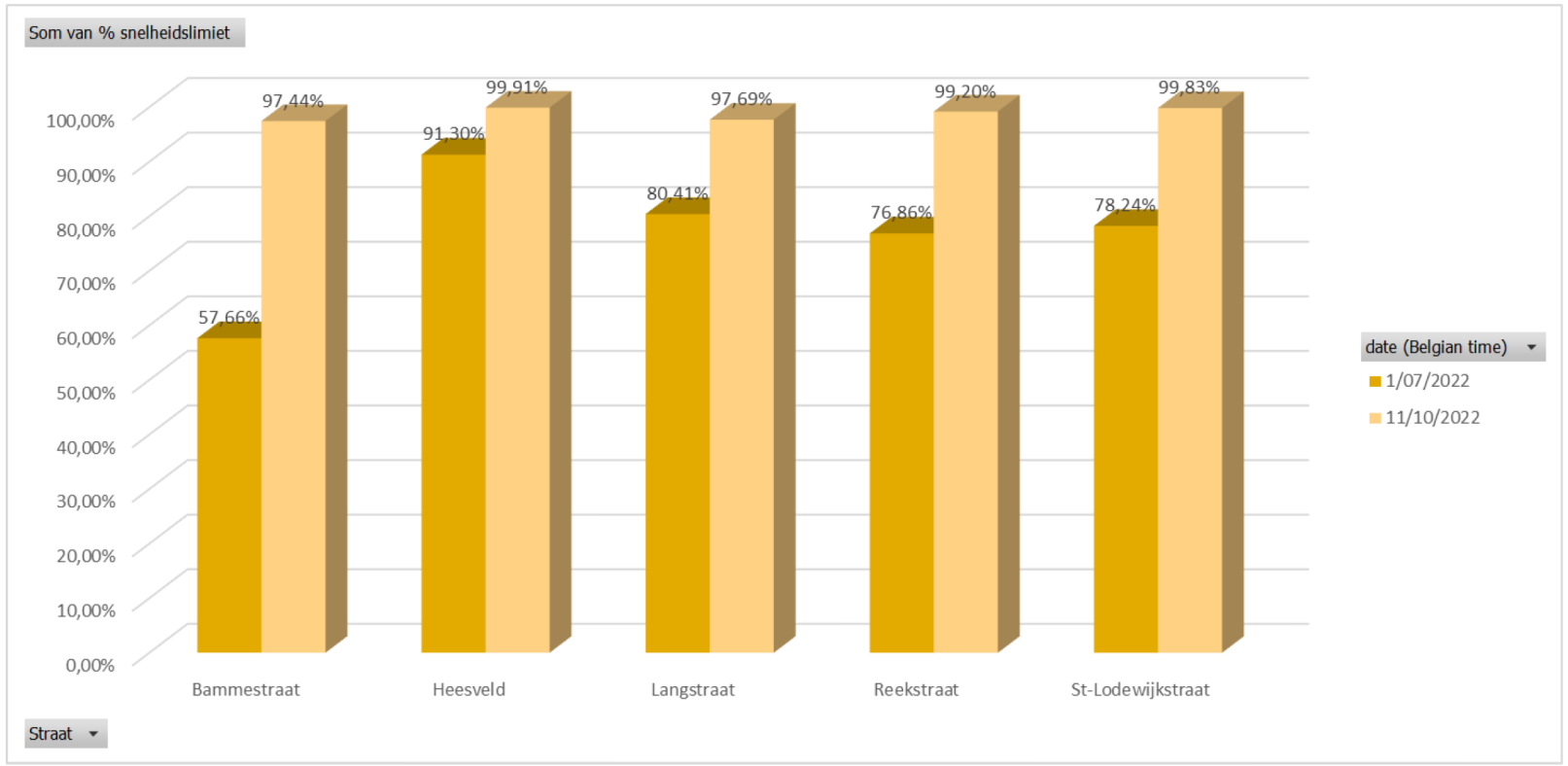
Since 2021 GAS – sanction for speed limit 30 & 50

+25 Communes

+130 Section Controls

The new, more sustainable business model (XaaS)

Impacting on speeding behaviour



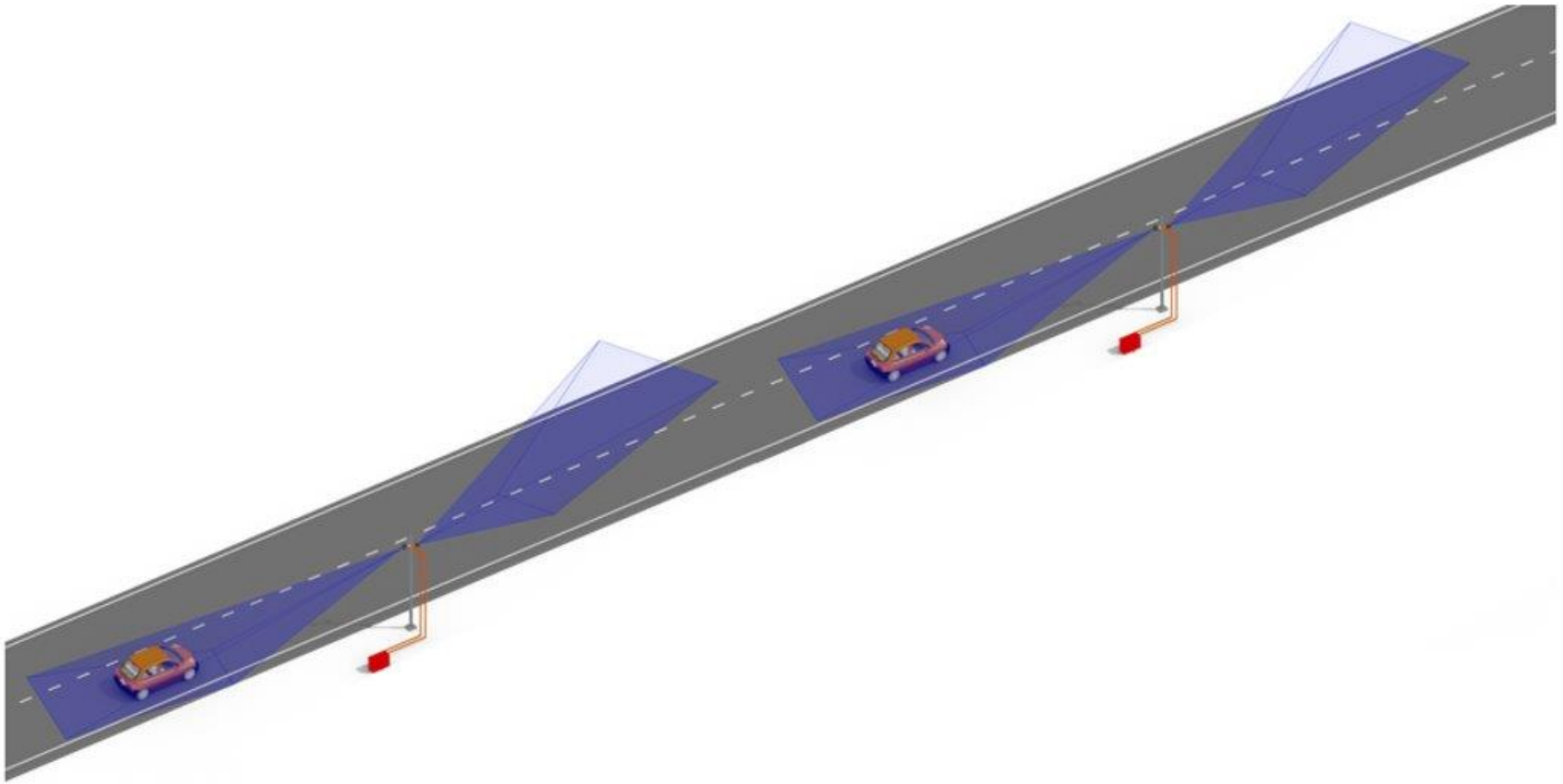
% of drivers that respect the speed limit

bilzen

Macq 100 years

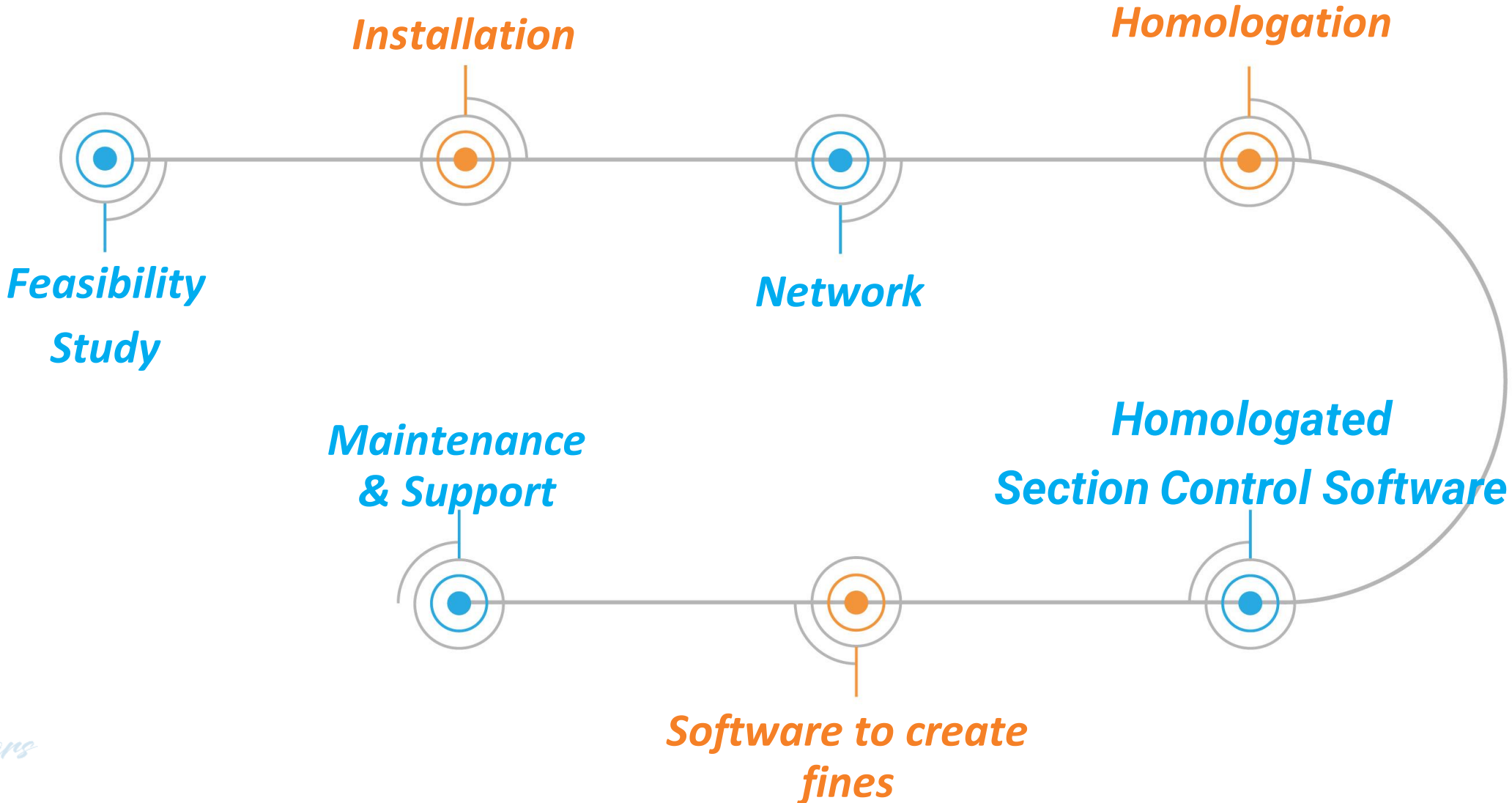
The new, more sustainable business model (XaaS)

Section Control – Average Speed



The new, more sustainable business model (XaaS)

What do we offer?



The new, more sustainable business model (XaaS)

The Business Model

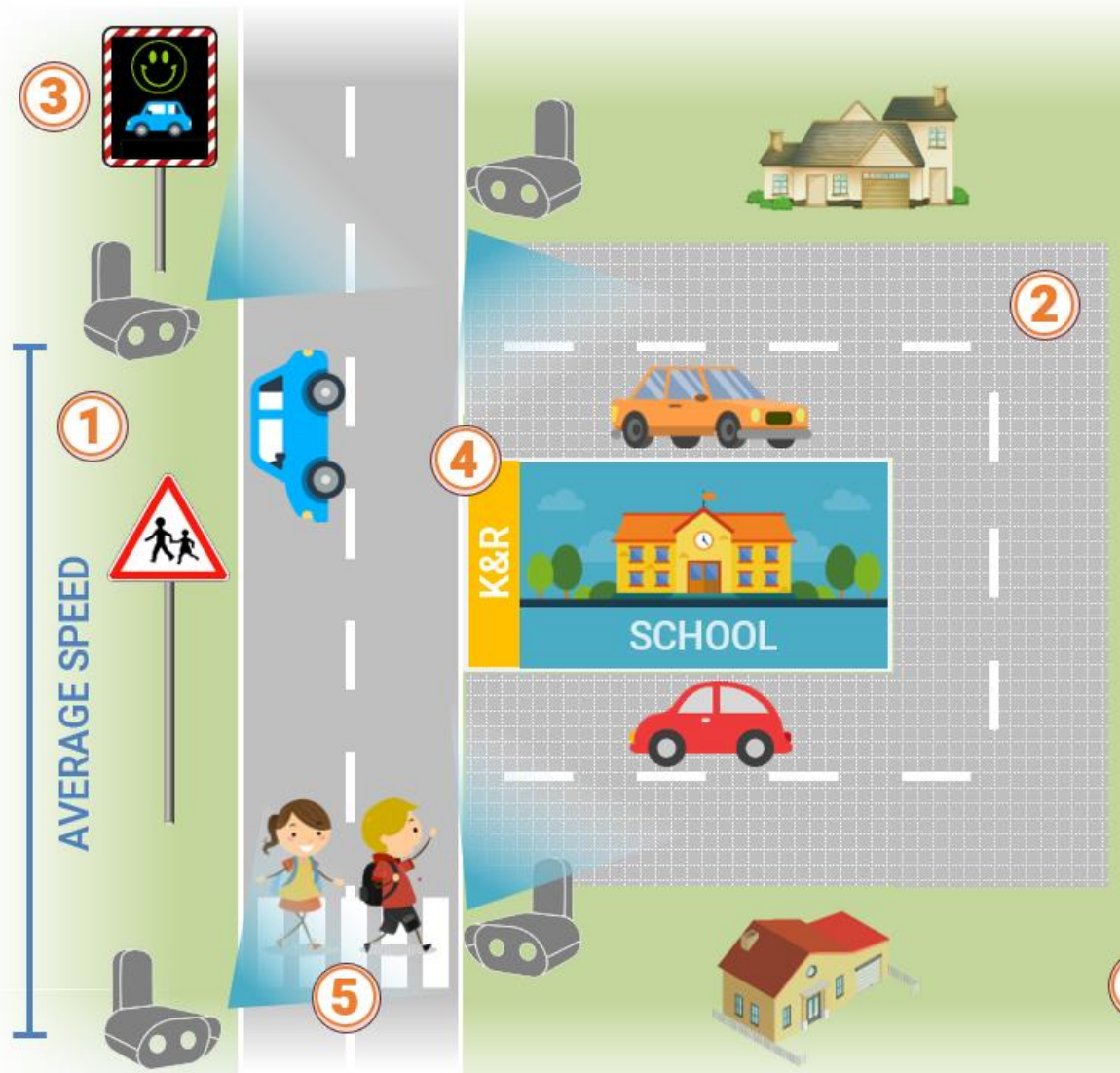
The new, more sustainable business model (XaaS)

Why as-a-Service?

- **No investment**, minimal risk
- **No know-how** required
- **Hardly any follow up** on the project
- **No** 2-yearly **homologation costs**
- **Very short time to implement:** operational in **6 months**
- **High Quality Guarantee**, pro-active monitoring
- **Fast ROI**, no investment but income for the commune
- Only supplier of **SHORT SECTION CONTROLS starting at 200m**

Macq 100 years

School Safety Solution



1. AVERAGE SPEED
2. RESTRICTED TRAFFIC ZONE
3. VARIABLE MESSAGE SIGN
4. KISS & RIDE ZONE
5. PEDESTRIAN WARNING SYSTEM
6. MEANINGFUL STATISTICS

Macq 100 years

Our Marketplace
How can we create product with added value ?

Our Marketplace
How can we create product with great added value ?

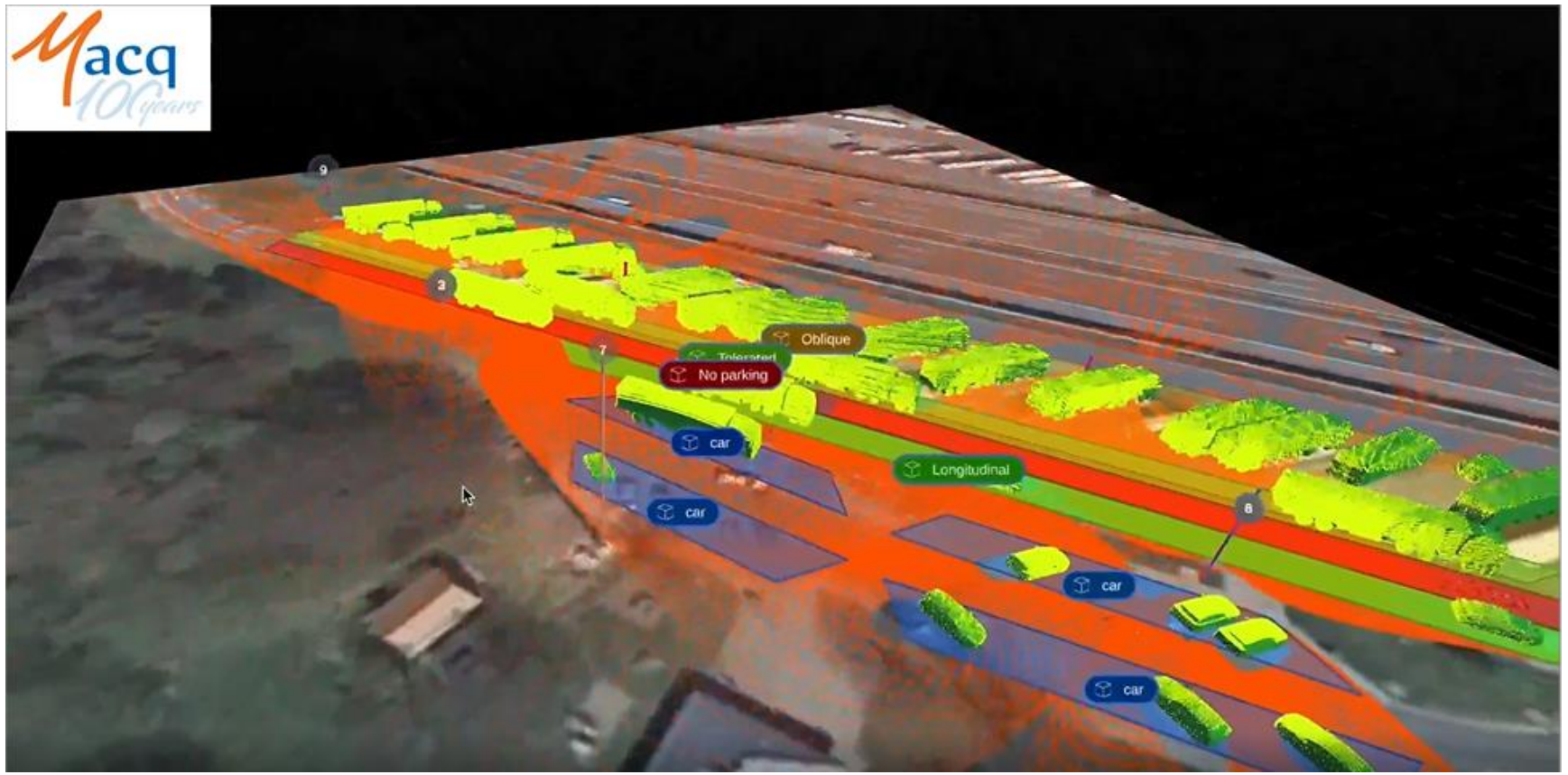
Always use partnership !

- ***Use internal and external hardware product with high performance***
- ***Use internal and external software with high maintainability***

Hardware

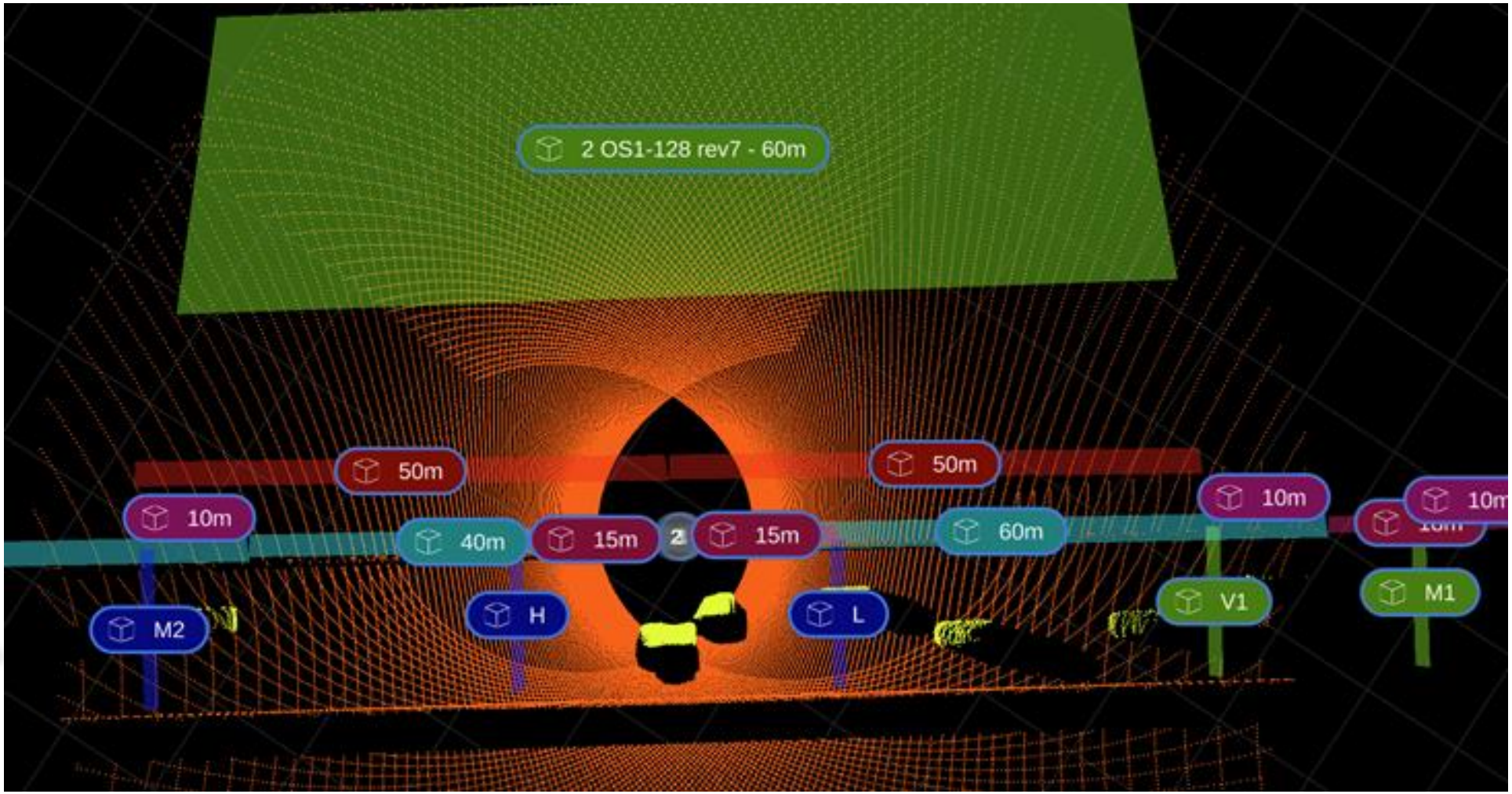
Macq Technology detecting vehicle noise

Lidar parking monitoring



Macq
100 years

Vehicle interdistance

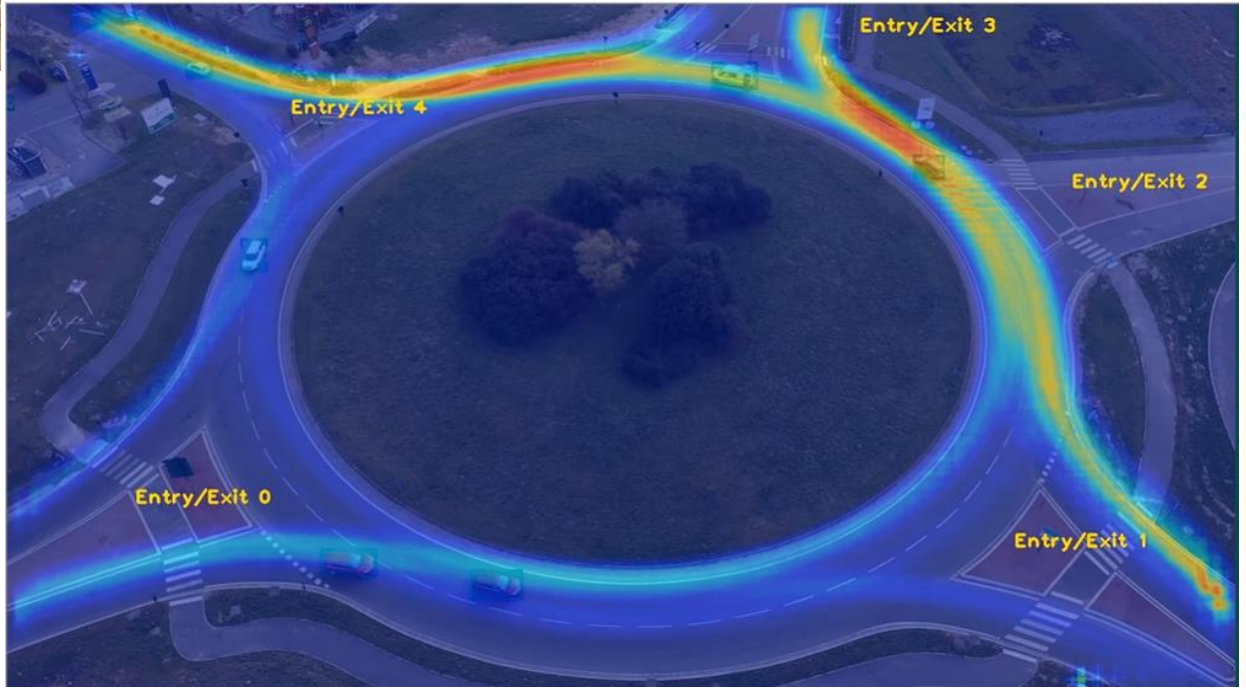


Software

Axle counting & Truck dimensions (L,H,W)

Vulnerable road users & Helmet detection

Drone traffic monitoring




THANK YOU ALL FOR
YOUR ATTENTION