49th ASECAP DAYS

Decarbonizing Road Infrastructure : Challenges, Perspectives and Actions in Tough Economy

ASECAP DAYS
BRUSSELS 2022

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ASECAP DAYS

BRUSSELS 2022

HOW TECHNOLOGY CAN REDUCE ENERGY CONSUMPTION ON MOTORWAYS

Lengrand, Richard

EGIS Innovation Director

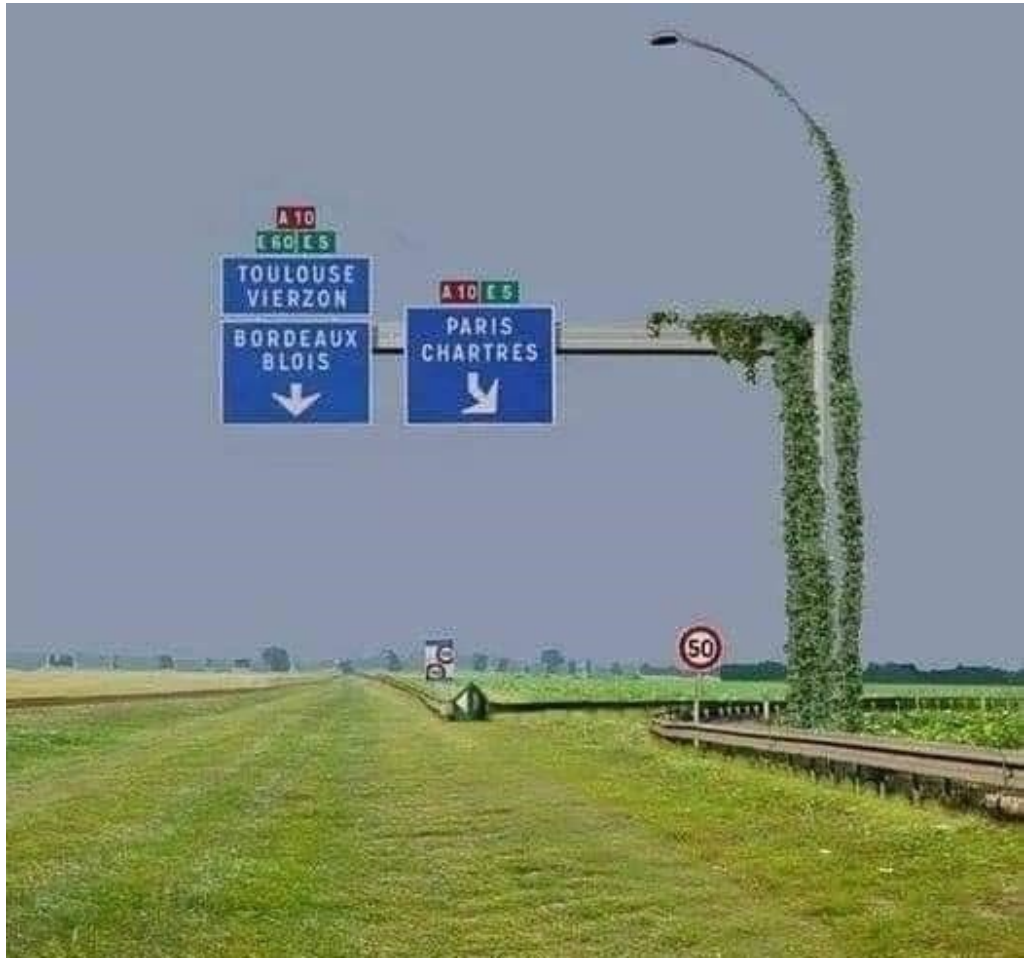
egis

“The best energy is the one we do not consume”

“The best energy is the one we do not consume”

… Is this compatible with our industry?

… Will our future motorways look like this?



SECTION 1

Egis Group

01.

OUR ACTIVITIES

SUSTAINABLE CITIES

- Buildings
- Cities

TRANSPORT

- Rail
- Aviation
- Mobility
- Road
- Water, environment, waterway transport

WATER & ENERGY

- Water
- Energy

FIELDS OF ACTIVITY UNDERPINNED BY CROSS-GROUP AREAS OF EXPERTISE

Environment ● Mobility and Systems ● Geotechnical & Complex Structures ● Digital

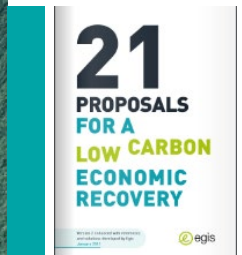
CLIMATE EMERGENCY, OUR ABSOLUTE PRIORITY

- **A wide range of engineering services and operational solutions**

  to fight against climate change and biodiversity erosion

- **The use of low-carbon alternatives with equivalent timeframes and costs**

  on operations and projects entrusted to us



→ *During the Covid-19 crisis, Egis drew up 21 proposals for a low carbon economic recovery*

egis

OUR ROAD NETWORK

+20
COUNTRIES

47
contracts covering
a wide range of activities

28
operating subsidiaries
in different countries

4,500 km
used daily

by **2 600 000** vehicles
and **92 km** of tunnels

SECTION 2

OUR DECARBONISATION STRATEGY

02.

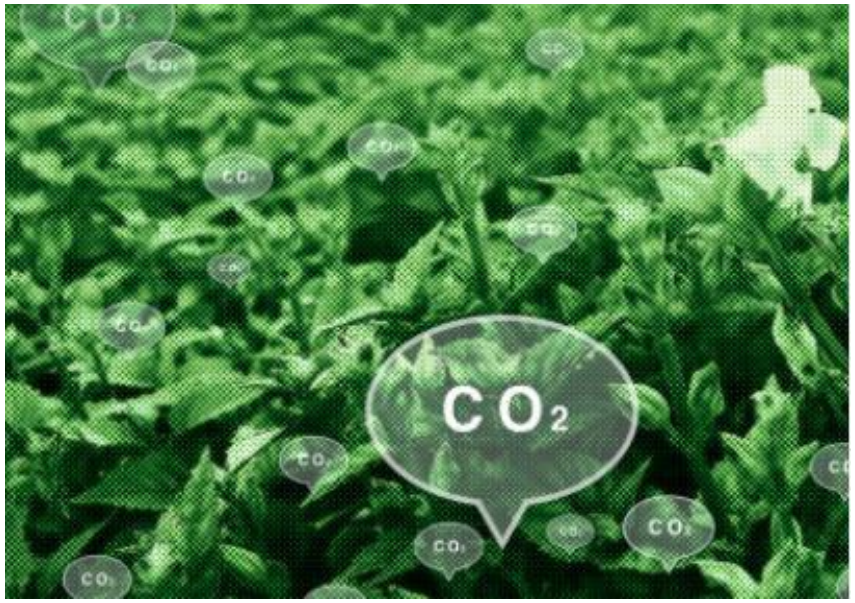
CO2 ROADMAP

Our commitment:

SBTi Scope 1 & 2 : -30% emission in 2030, net zero carbon in 2050

SBTi Scope 3 : be a facilitator to road transportation decarbonization

- Since 2018, Egis calculates, analyzes and reduces the **CO2 footprint of its O&M companies**
- Trends are analyzed which enables optimizations and reduction of CO2 emissions.



OUR APPROACH

1 **4 PILLARS : how can we reduce the CO2 emissions of :**

- **The Operator**
- **Our client the Concessionaire**
- **The customers of the motorway**

+ we work on the **resilience of the infrastructure**

2 **PRIORITY STEPS TO ACHIEVE NET ZERO CARBON**

- **Avoid**
- **Save**
- **Reduce** carbon content of energy
- **Remove** residual carbon emissions

3 **LEVERAGING**

- **State of the art**
- **Technology**
- **Cross-Industry insights**

Egis – M25 UK

ACTIONS ONGOING AND PLANNED

- Retrofitting **lighting with LED** (savings up to 60%)
- **Installing PV** (total capacity of MWp 1,2 - 4 projects)
- **Purchase green electricity**
- Increasing use of **e-vehicles**
- **Thermal-isolation of office and technical buildings**
- **Purchasing policy with ESG criteria**
- **Asset management expertise to optimize works lifecycle**
- **Re-forestation project**

Energy intensity (MWh/km)
Average YoY reduction 2018-2021

- 9% p.a.

CO_2 intensity (CO_2 T/km)
Average YoY reduction 2018-2021

- 19% p.a.


Egis – Vienna ring road - Austria

SECTION 3

OUR INNOVATION INITIATIVES

03.

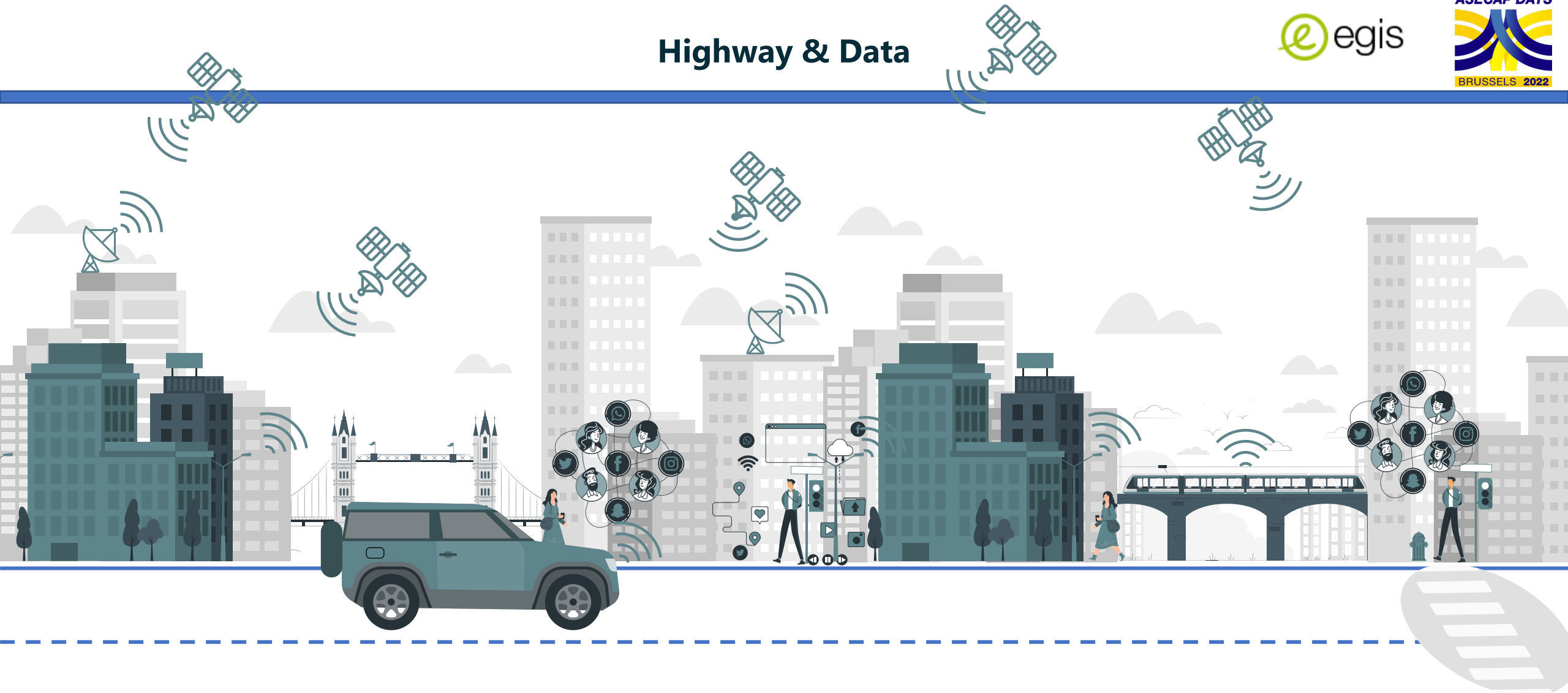
“Digital technologies could reduce emissions by 20% by 2050”

Davos World Economic Forum

Goals :

- ✓ Leverage technologies
- ✓ Test all relevant innovations
- ✓ Support innovative eco-systems

Highway & Data



MANY **DIFFERENT DATA SOURCES** COULD BE LEVERAGED IN ADDITION TO OURS

Satellite databases

Bought or found at a lower resolution for free

See for example: Imagery Data Sources - GIS Geography

Open-source data

Legal database, weather data, some geological surveys, materials references, etc.

See for example: Listing of Open Access Databases - LOADB

Purchasable databases

Weather data, competitors' roads utilization, social media data, etc.

See for example: Online Purchase Data: APIs 2022 \| Datarade

Data from partnerships

From potential partners: academic, client, contractor, etc.

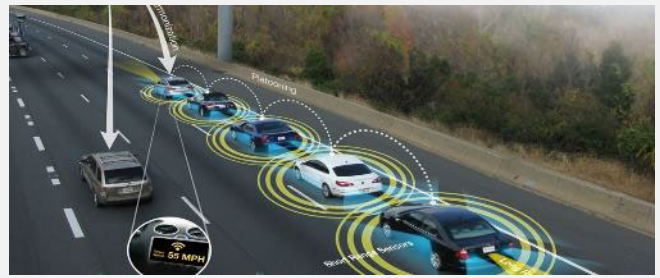
VARIOUS APPLICATIONS

Data collection & use cases

IoT

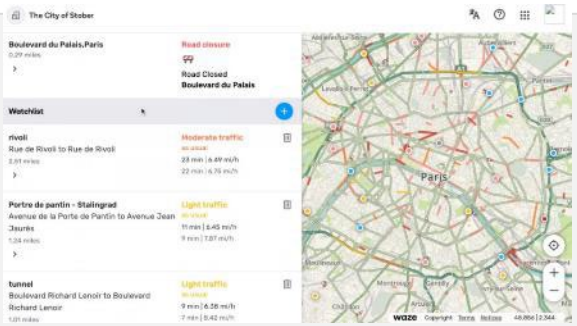
1

Smart Ventilation



Autonomous vehicles

Leveraging additional data sources



Leverage of social media data

Satellites and Remote Monitoring

2

Drone Patrolling

1 HOW CAN THE ROAD OPERATOR KEEP AN EYE ON THE INFRASTRUCTURE ?

Project description

Beginning : Q3 2022

Location : A63, France

Innovation : IOT sensors **to track assets conditions** (safety gates, guard rails, traffic management, water consumption, etc.) or vehicles (diesel consumption, idle time, patrol time) in real time & generate alerts.

TRL : 7, system qualified.

Potential gains

Lower cost and CO2 reduction as fewer patrols

Increase safety of staff; early notifications for enhanced service

Process overview

Sensors → **Data collection** → **Server** → **Exploitation**

Project description

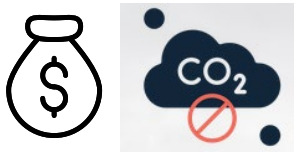
Beginning : 2020 (first POC), 2022 (cross-fertilization & expansion of use cases)

Location : A24 Portugal, GIIB Turkey

Innovation : monitoring of embankments, vegetation, pavement and structures, guard rails, road markings with **satellite radar imagery.** Cumulative displacements and future/retrospective time analysis.

TRL : 7, system qualified.

Potential gains



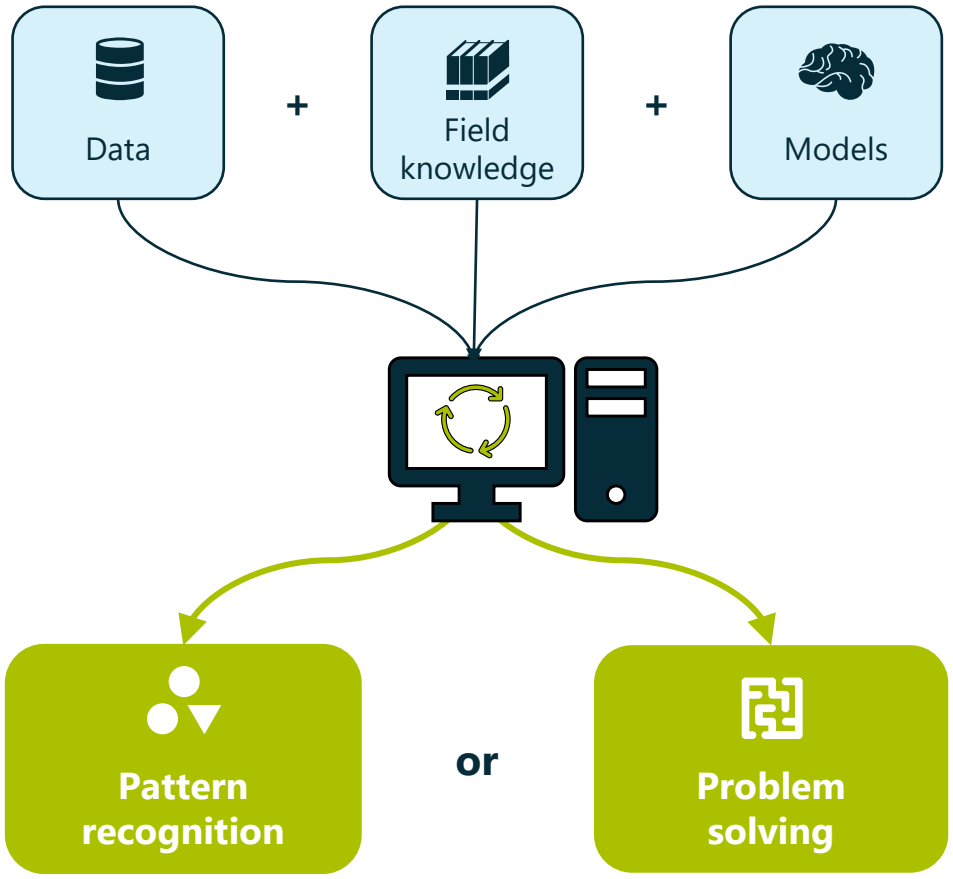
Lower cost and CO2 reduction as fewer patrols

Increase safety of staff; Early notifications for enhanced service

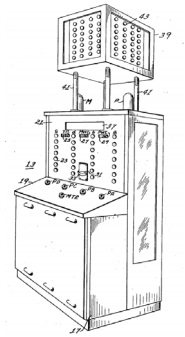
Process overview

Highway & Technologies

ARTIFICIAL INTELLIGENCE

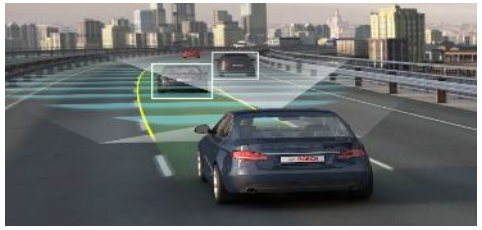


The evolution and spread of IA



Nimatron, a computer playing Nim game (1940)

80 years later



Autonomous vehicles

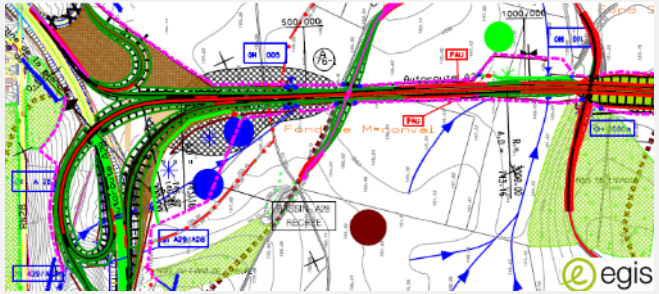
93.5 Billion dollars of private investment in AI in 2021

more affordable thanks to new technological tools and a broader diffusion

more efficient thanks to more data collected and new technological tools

ARTIFICIAL INTELLIGENCE SHOWS POTENTIAL WITHIN THE WHOLE SCOPE OF HIGHWAY INDUSTRY

AI in the design and construction phases



Find the best route under a set of specific constraints

Identify high-risk days to increase safety on construction site

AI for operations and maintenances

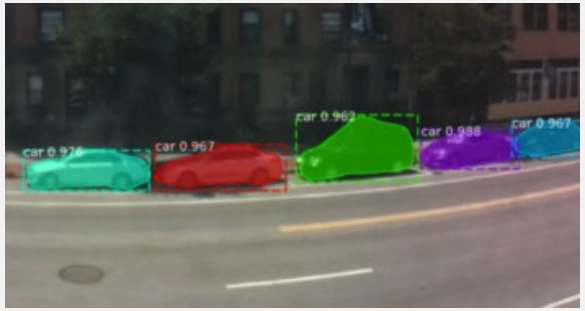
Patrol optimization

1

Predictive maintenance

2

Smart Inspections with Computer Vision



Parking control

1 PATROLLING : URGENT TASK TO OPTIMIZE AIMING FOR DECARBONISATION

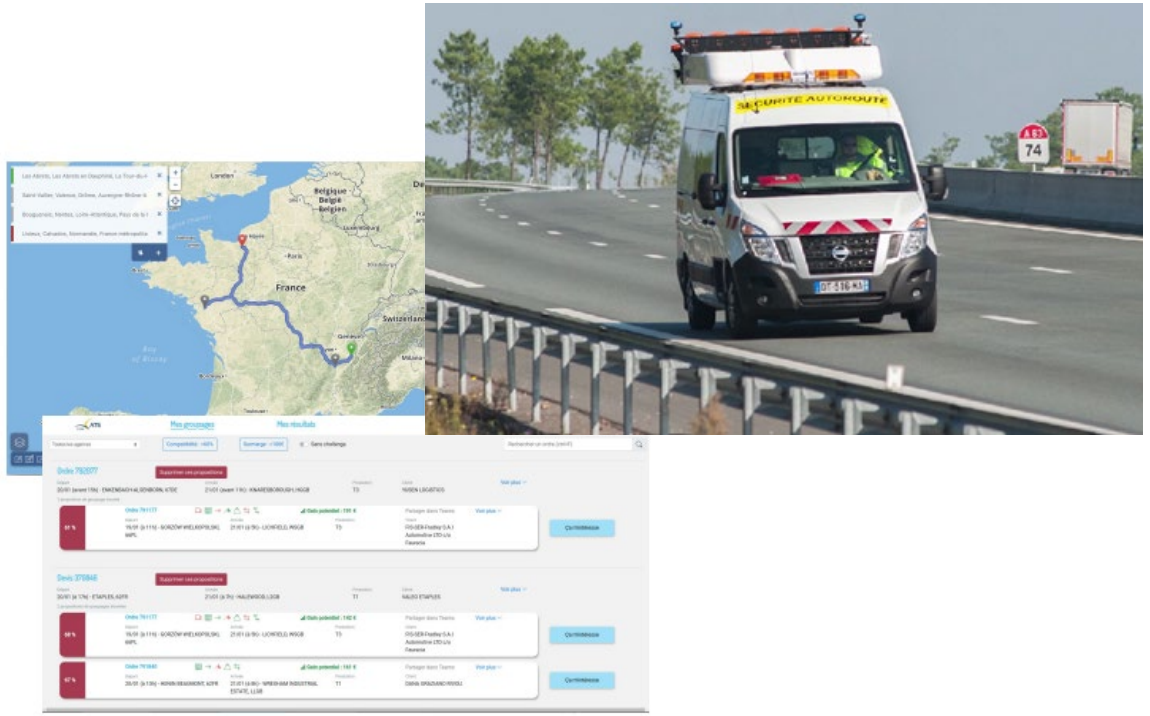
Project description

Beginning : Q3 2022. Early results already available.

Location : A63, France

Innovation : **optimization of patrol routes and planning**, used already in the logistics sector for delivery purposes.

TRL : 7, system qualified.



Potential gains

Estimated 15% reduction in patrolled kilometres.

Direct reduction of a very carbon intensive activity

2 PREDICTIVE MAINTENANCE

Project description

Beginning : Q3 2022 for data assessment & development

Location : Ireland, Australia, Turkey

Innovation : combining machine learning, data and operational expertise = **maintenance optimization, prevent corrective maintenance, increased lifetime**.

TRL : 7, system qualified.

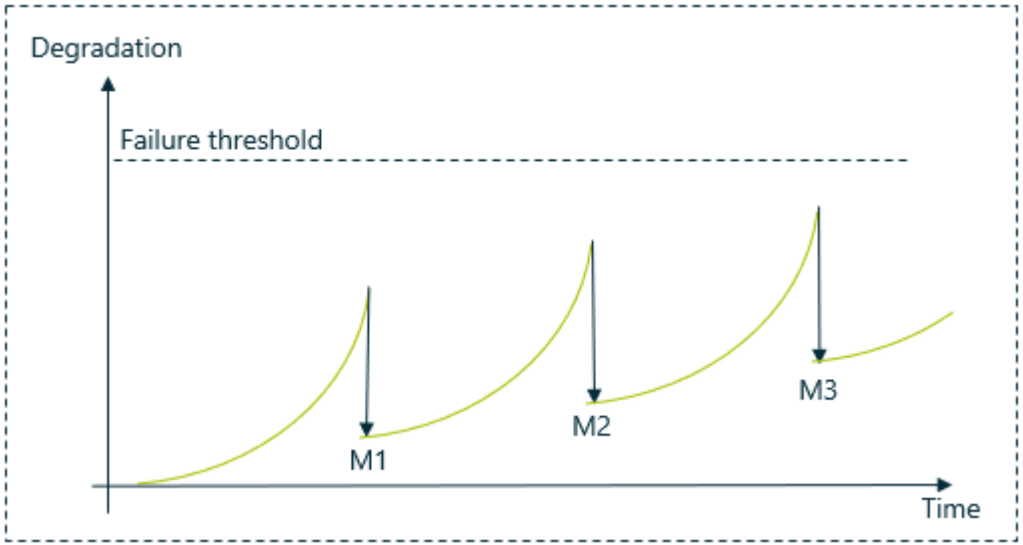
Potential gains

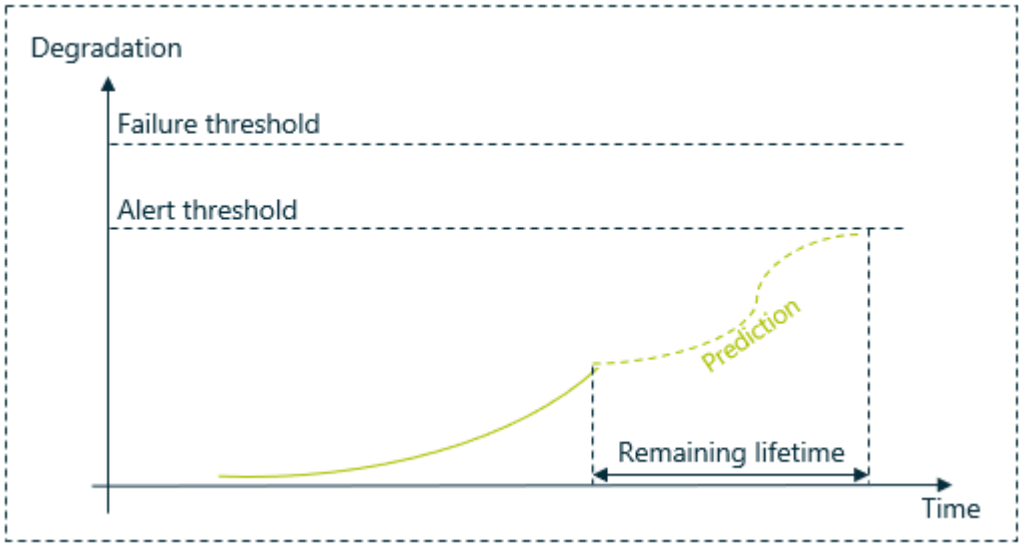
-30% maintenance costs: better ROI by reducing repair and maintenance costs

-45% reduced downtime: minimized production lost because of technical failures

Reduced failures leading to safety issues

Saved resources and reduced environmental impact





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BRUSSELS 2022

THANK YOU FOR YOUR ATTENTION

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EGIS Innovation Director

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