ASECAP DAYS
ISTANBUL 2023

Celebrating 50 YEARS OF Successful TOLL ROAD PROJECTS

NEW SAFETY BARRIERS MAINTENANCE METHODS

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autostrade per l'italia

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ICA
YAVUZ SULTAN SELİM BRIDGE AND NORTHERN RING MOTORWAY

New Safety Barriers Maintenance Methods

Autostrade per l'Italia Group

The largest highway operator in Europe

- ~ 3.000 km motorway network
- ~ 320 km tunnels
- ~ 4400 bridges and viaducts
- 4,6 M daily customers
- 2,7 M daily vehicle transit

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MOVYON	TECNE	AMPLIA INFRASTRUCTURES	ELGEA	FREETO
Technology, R&D	Engineering and implementation	Construction and related services	Energy from renewable sources	Services for travellers

- around ***3.000 km*** of highway managed
- ***4,6 million*** customers travel along the network every day

10.000 km and **n.330** different types of safety barriers

Safety Barriers Monitoring

- Guarantee **higher safety standards** for road users and
- Provide **greater durability** to the safety barrier asset.

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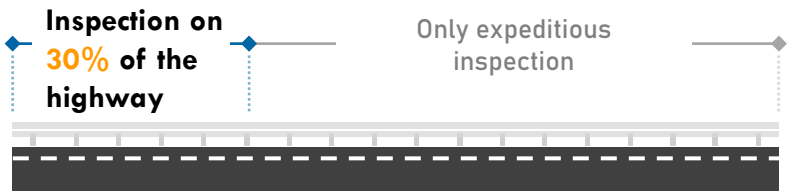
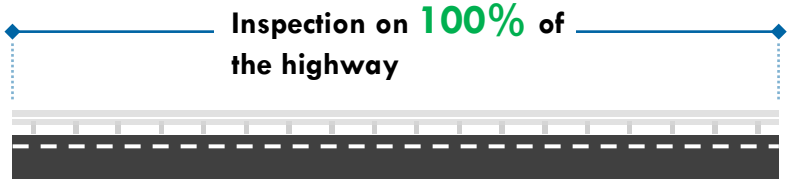
New Safety Barriers Maintenance Methods

OLD (ante 2023)



- **Absence of defects catalogue** → cataloging by anomalies as a grouping of defects
- **Partial mapping** of the barriers register
- **General software** for inspections
- **Four-year** inspection frequency
- Owner: internal staff

NEW (from 2023)



- **Defect catalogue certified by the university institution** → punctual cataloging for single defects and introduction of deadlines for defects resolution
- **Complete mapping** of the barriers register
- **Advanced software GLM** for the traceability of safety barriers inspection
- Inspection frequency **biennial**
- Owner: external companies

RINA · PROGER · SOCOTEC · NEXTA · TECNOLAB A SOCOTEC COMPANY

User safety

Increased duration of barriers

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New Safety Barriers Maintenance Methods

Surveillance definition process

rAPP

A Mapping of the safety barriers **(BARRIERS REGISTER)**

B Instruction for barriers inspections **(SURVEILLANCE MANUAL & DEFECTS CATALOGUE)**

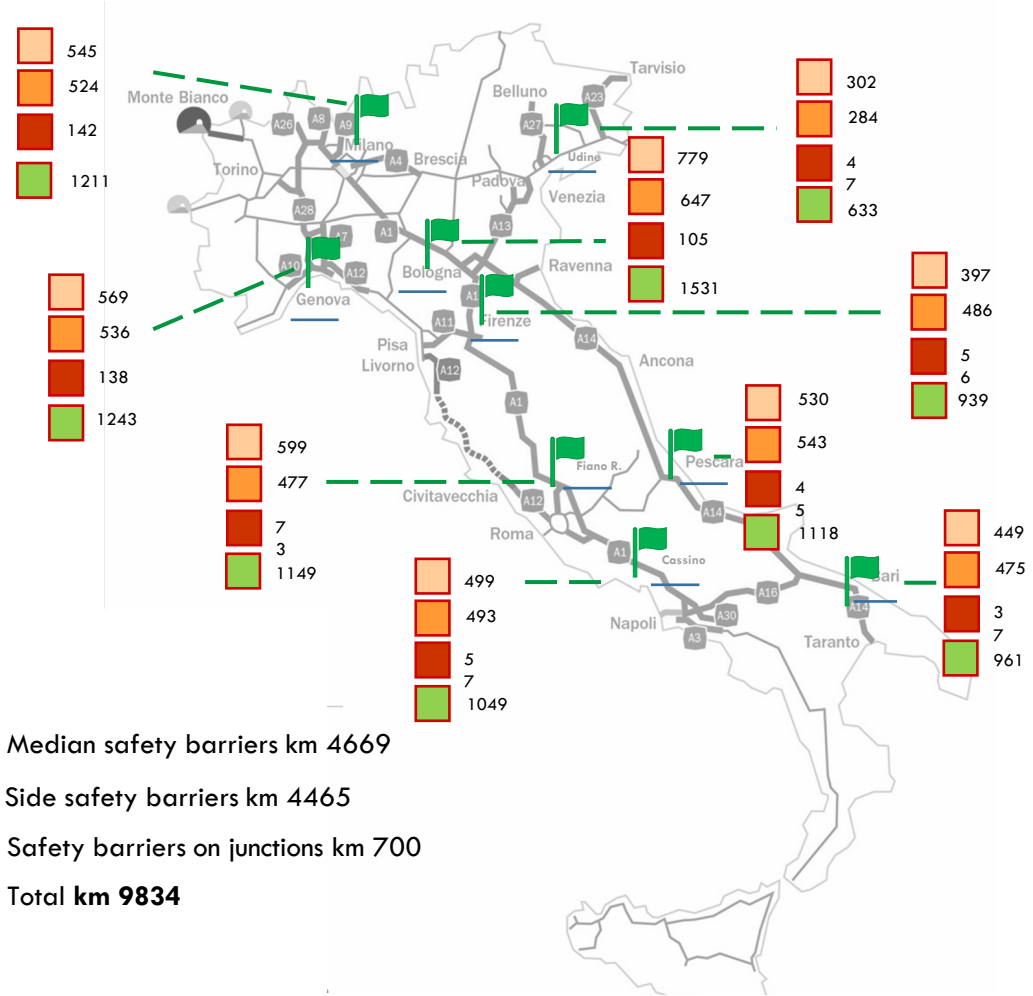
C Execution of Inspection of the safety barriers by **(SOFTWARE)**

D Work for the resolution of defects by **APP**

GLM
glm4inspection.cloud

AGE

New Safety Barriers Maintenance Methods



Median safety barriers km 4669

Side safety barriers km 4465

Safety barriers on junctions km 700

Total **km 9834**

A **Mapping** of the safety barriers

Safety barriers

Side safety barriers

Median safety barriers

Traffic divider

Singular point devices

Gates

Attenuators

Special terminals

10.000 km of barriers – n.330 different types

New Safety Barriers Maintenance Methods

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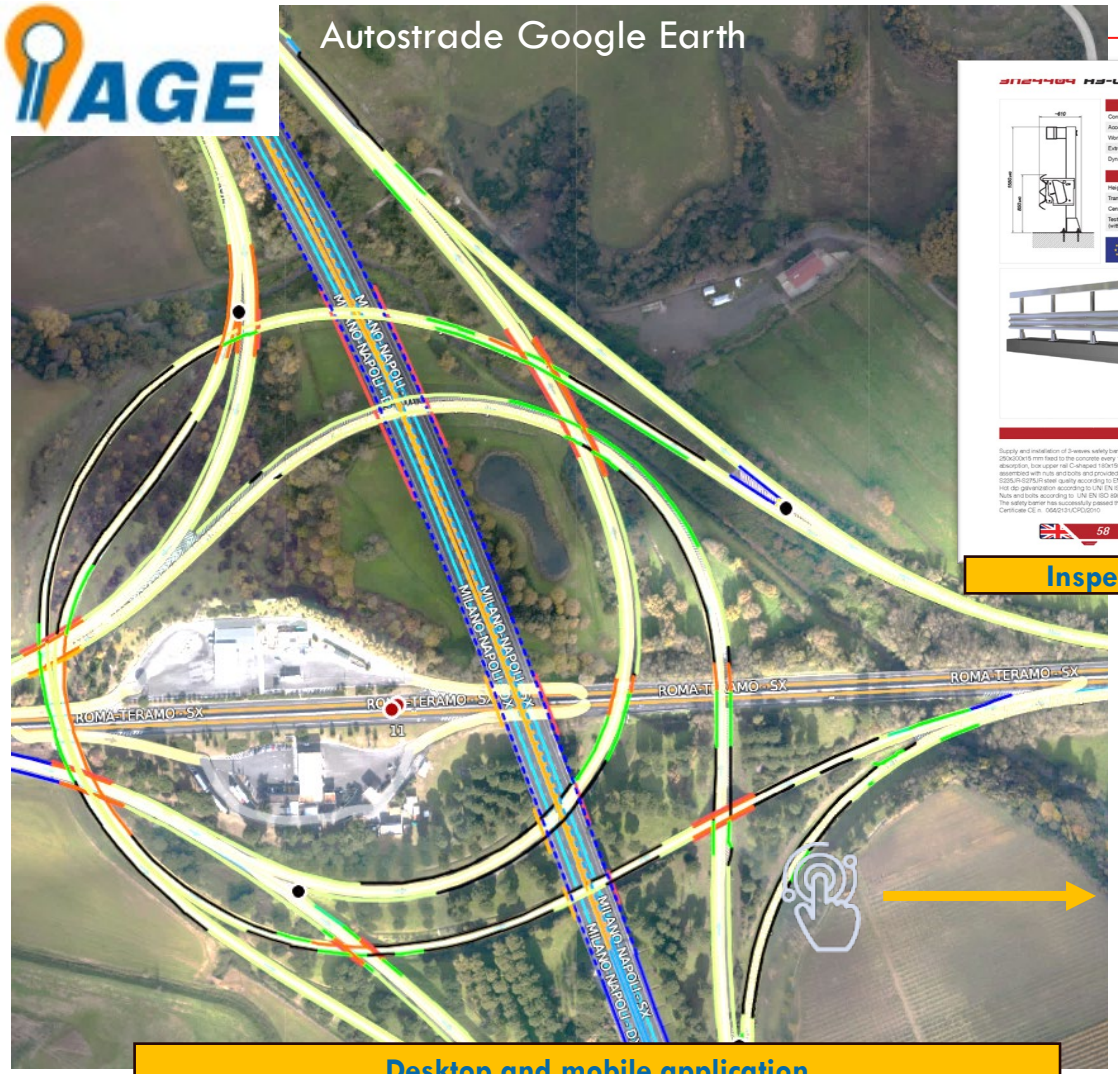
AGE

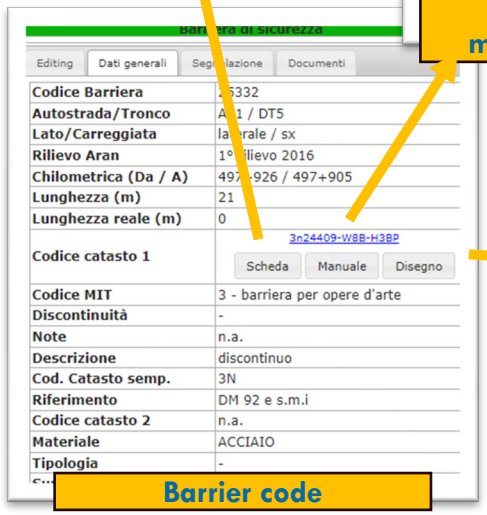


Desktop and mobile application

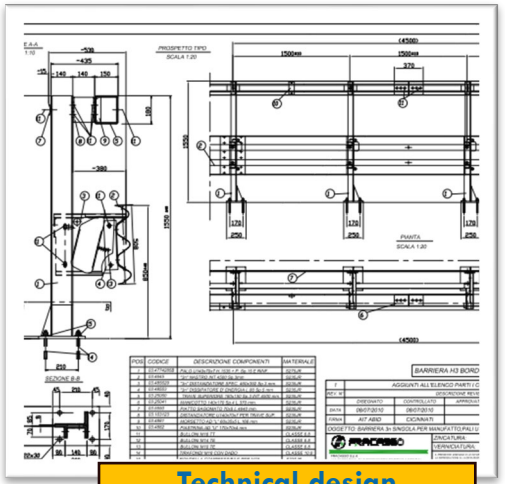
Inspection sheet

A **Mapping** of the safety barriers

Installation and maintenance manual



Barrier code



Technical design

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New Safety Barriers Maintenance Methods

Inspection method

B **Instruction for barriers inspections**

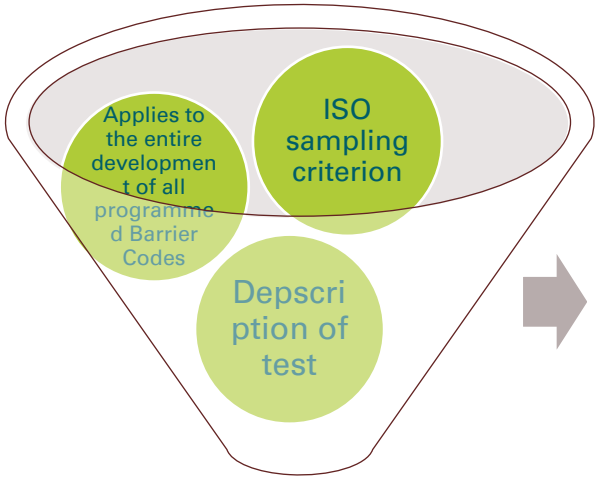
Detailed inspection

Visual inspection applies to the entire development of all programmed Barrier Codes

Operating instructions

- It is performed by walking alongside the barrier
- Requires frequent stops
- Analyze each part of the device
- Analyze the support

Strumental inspection



STRUMENTAL

- Tightening
- Pull Out

Selection of anchors to be inspected → Test execution → Registration of results

- Sampling according to «Procedure **ISO2859-1**»

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New Safety Barriers Maintenance Methods

Defects Catalogue

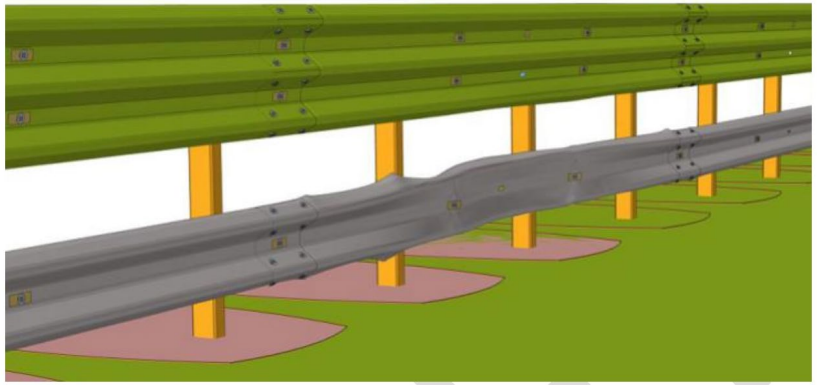
B **Instruction for barriers inspections**

PURPOSE OF THE " DEFECTS CATALOGUE"

To provide help for the most **PROPER RECOGNITION**

&

To provide help for the **ASSIGNEMENT of THE DEFECT'S JUDGEMENT**



The Finite Element Method is used to identify the extension of the damages and defects.

The defect's **judgement** describe the defect as detailed into the Defects Catalogue. For each type of defect is defined a different time of restoration.

UBICATION

INTENSITY

EXTENSION

JUDGEMENT	CLASSIFICATION
A_1	Urgent intervention
A_2	Planned intervention
B_1	
B_2	
C_1	Monitoring
C_2	

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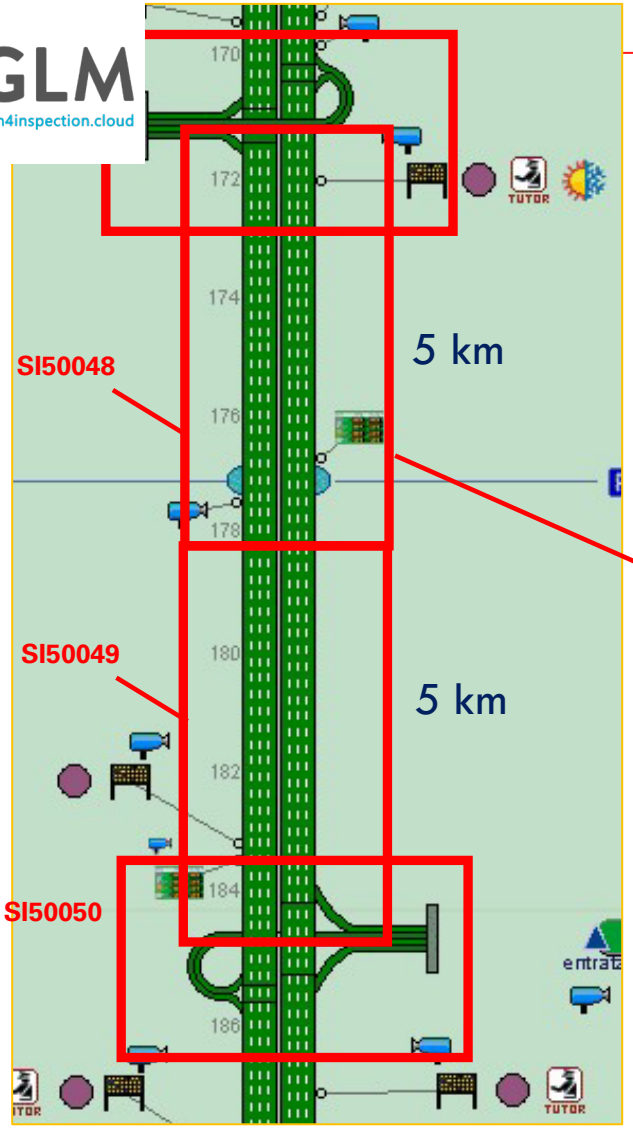
New Safety Barriers Maintenance Methods

GLM
glm4inspection.cloud

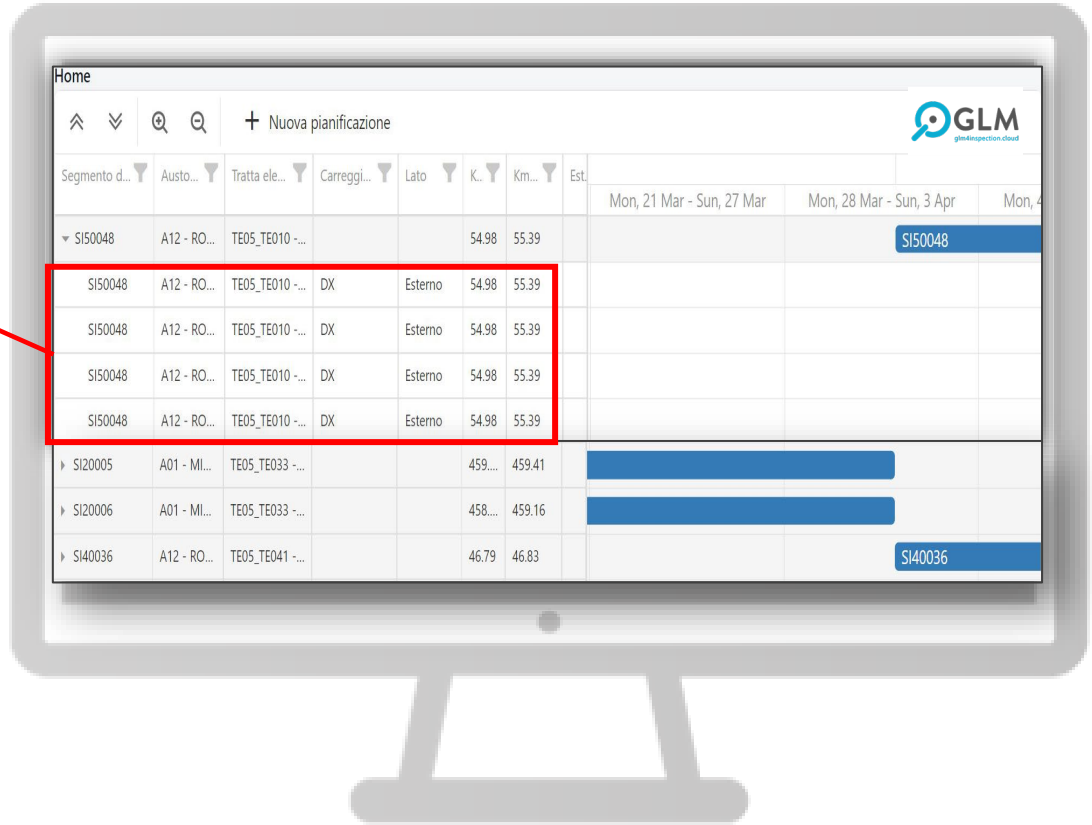


Planning

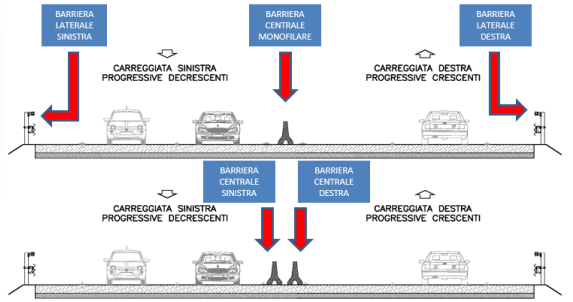
C

Execution of Inspection of the safety barriers

GLM desktop



Detailed weekly planning for each side of the roadway



sections of about 5 km planned every week

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Detailed inspection 1/2

C

Execution of Inspection of the safety barriers

GLM mobile

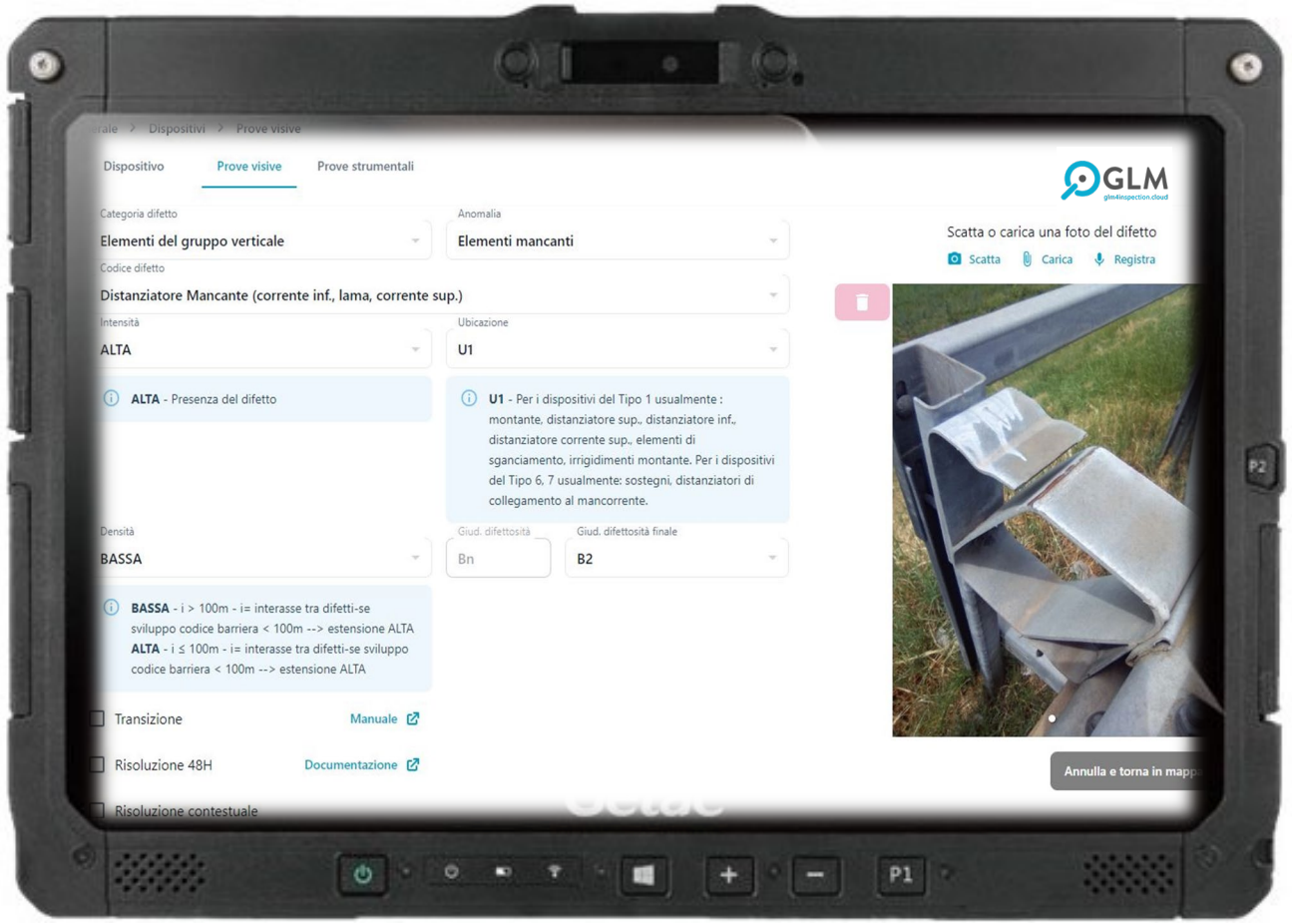
Geospatial location
Automatic research of type of barrier using AGE mapping

Rugged Tablet
Compiling of the defects form in any weather condition

New Safety Barriers Maintenance Methods

GLM
glm4inspection.cloud

Detailed inspection 2/2



C Execution of Inspection of the safety barriers

GLM mobile

Defects Catalogue inside to support inspector for defect's judgement

Documentation of each single barrier inside to support inspector for defect's judgement

Geolocated Foto for each defect to support work resolution

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New Safety Barriers Maintenance Methods

GLM
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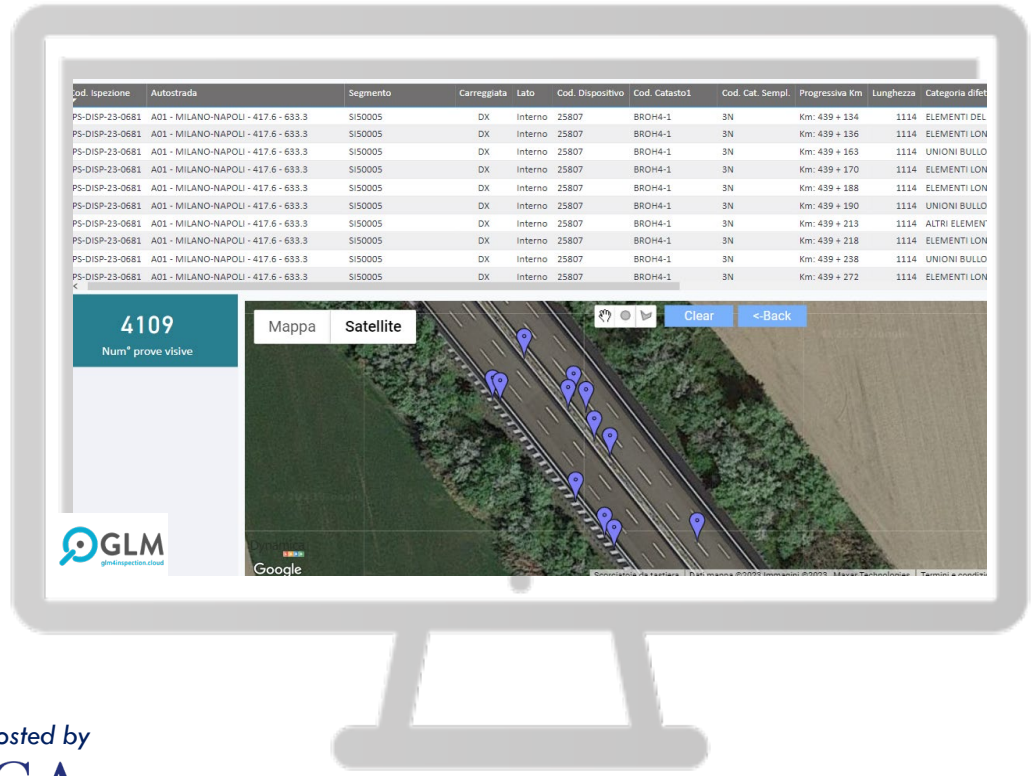
Reporting

C

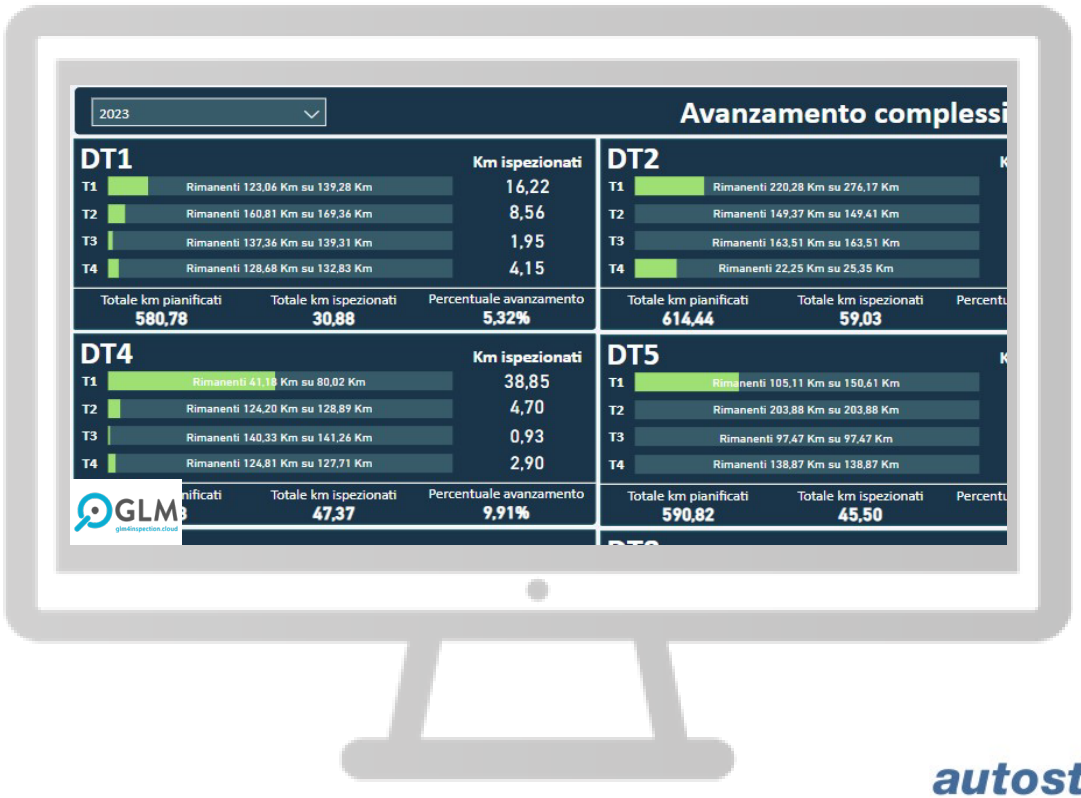
Execution of Inspection of the safety barriers

GLM desktop

Geolocation of the single defect



Numerical reporting of the number of defects and of the progress of the inspection activity



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New Safety Barriers Maintenance Methods

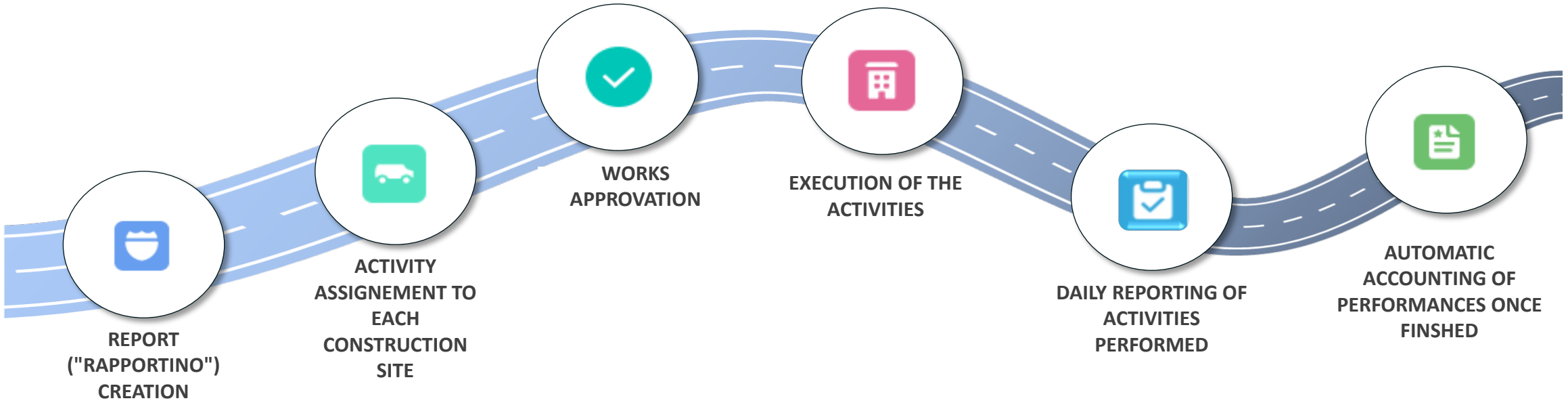
rAPP

Resolution

rAPPortino is an app for **desktop** and **mobile devices** developed on **Salesforce** platform. The aim of its use is to **manage** the **ordinary and recurring Maintenance** held by external enterprises. The use of the app is inserted in the process of **Digital Transformation** in which Autostrade per l'Italia is involved in its own **Transformation Plan in 2021-2023.**

D **Work for the resolution of defects**

by APP and maintenance company



THANK YOU

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