

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 SELIM 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



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



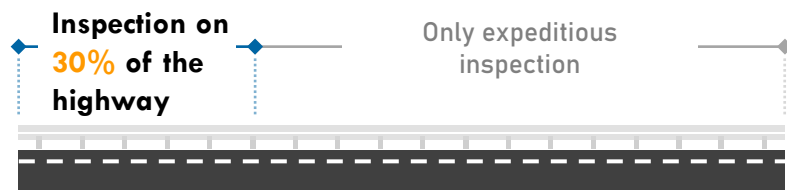
10.000 km and **n.330**
different types of safety
barriers

Safety Barriers Monitoring

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

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



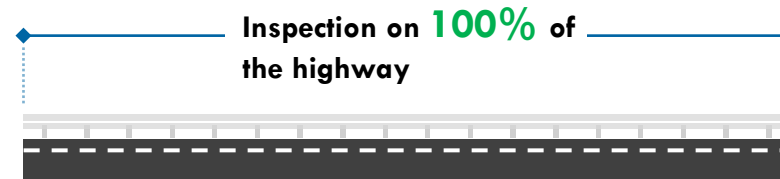
Four-year inspection frequency



Owner: internal staff

autostrade per l'italia

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



TECNOLAB

A SOCOTEC COMPANY



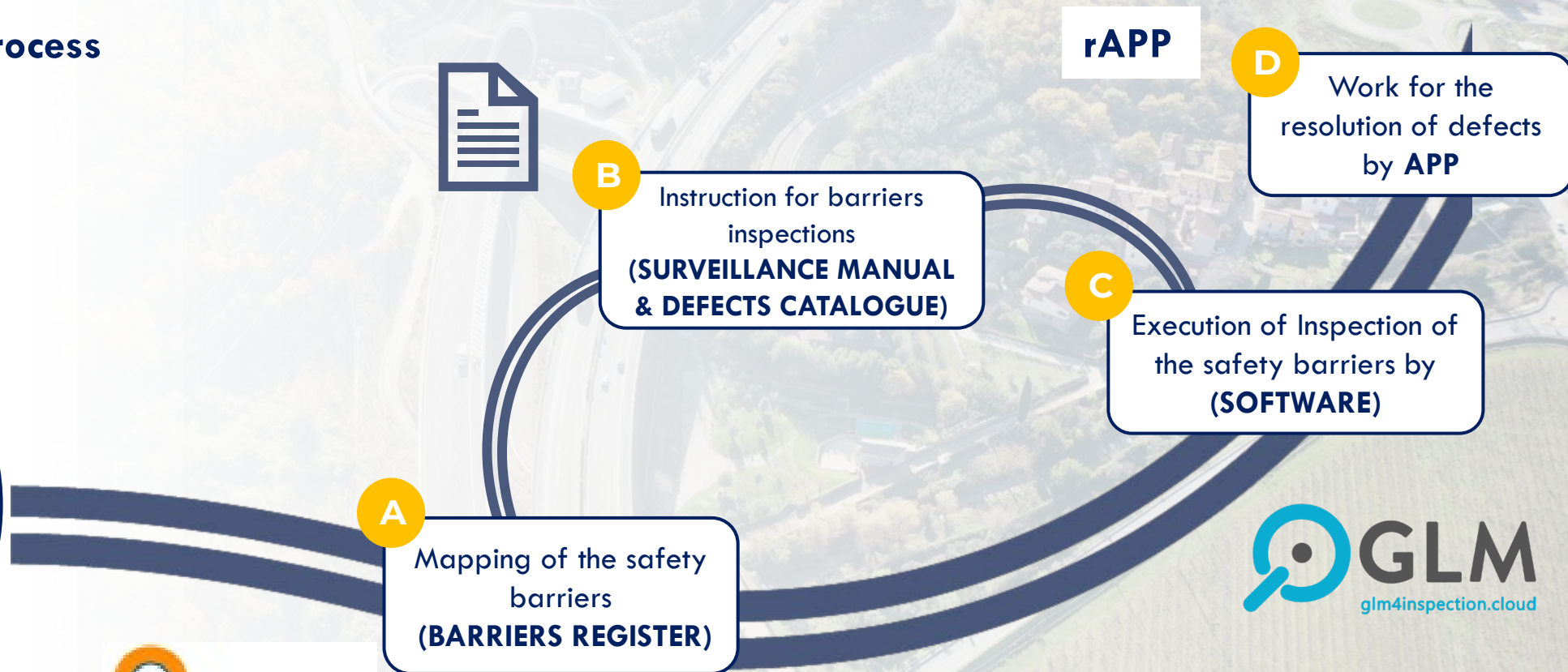
User safety



Increased duration
of barriers

New Safety Barriers Maintenance Methods

Surveillance definition process

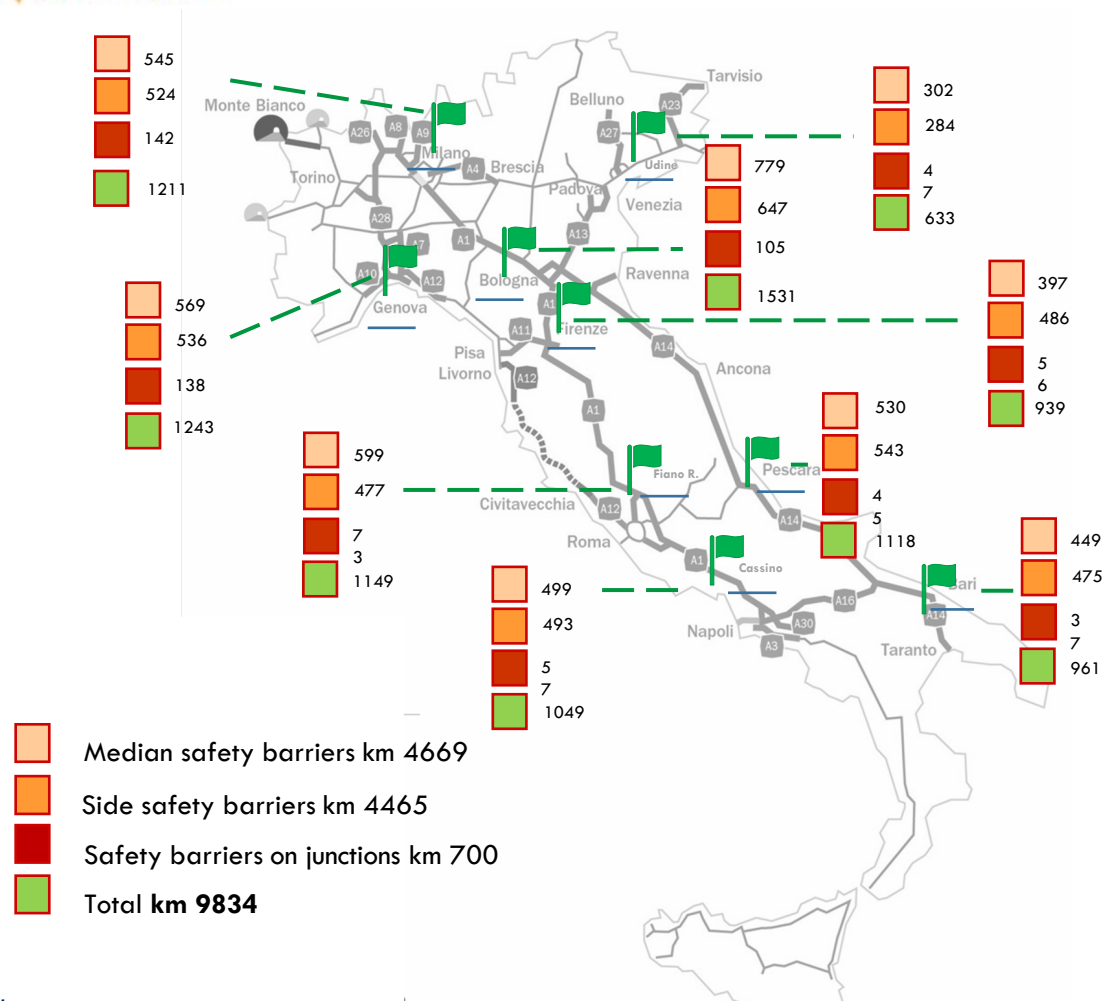


New Safety Barriers Maintenance Methods



A

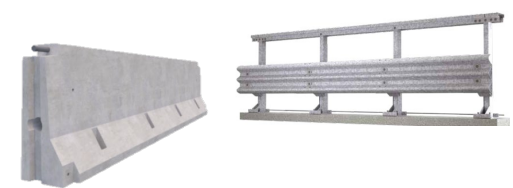
Mapping of the safety barriers



Side safety barriers



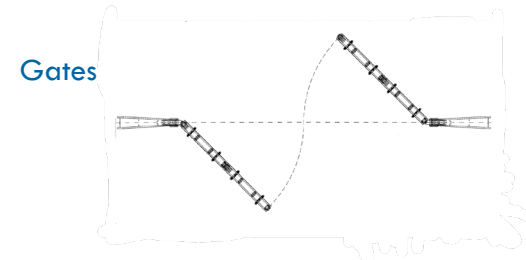
Median safety barriers



Traffic divider



Singular point devices



Attenuators

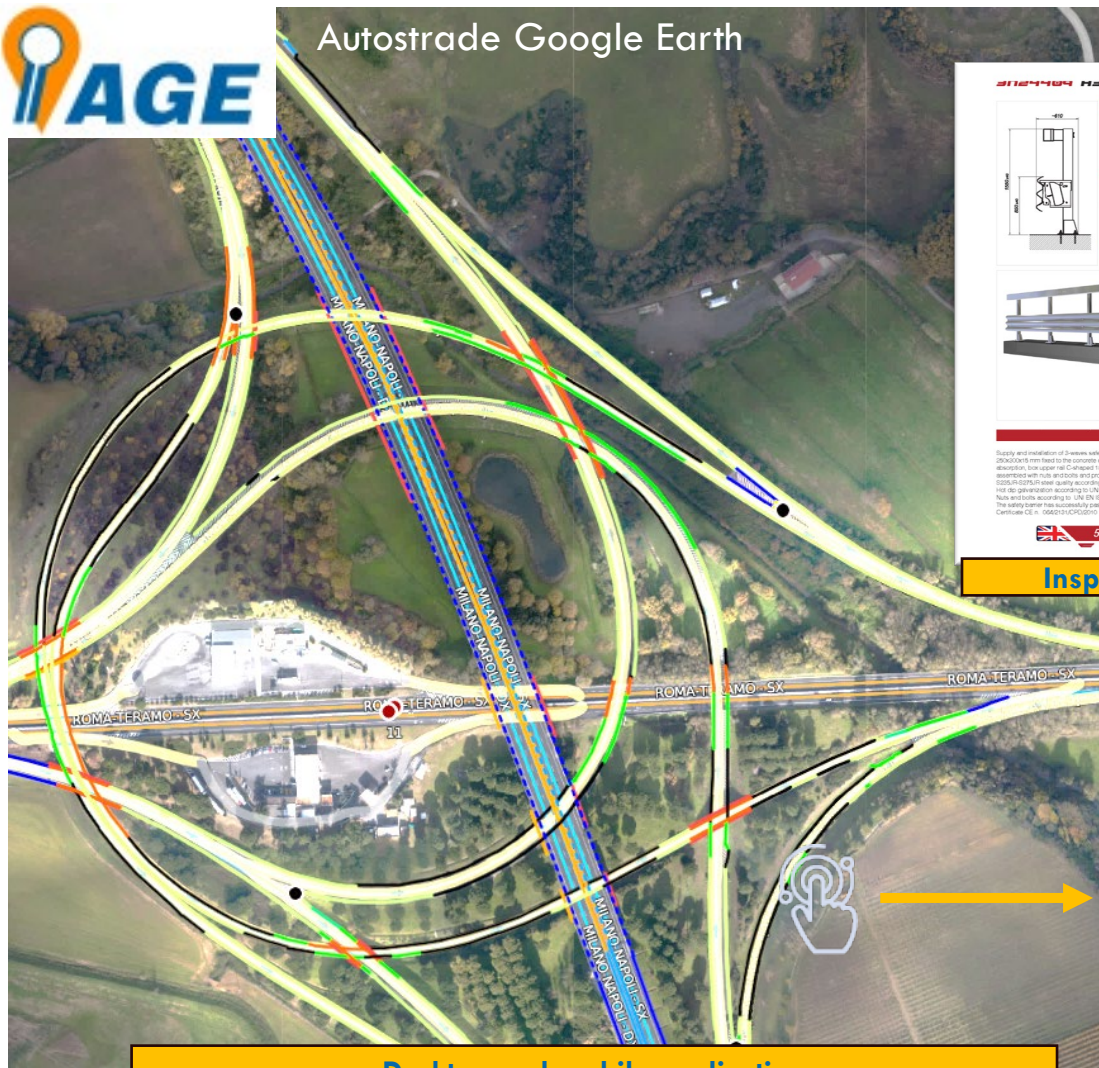


Special terminals



10.000 km of barriers – n.330 different types

New Safety Barriers Maintenance Methods



Autostrade Google Earth

Desktop and mobile application

3n 24409-W8B-H3BP

Performance	
Containment level	H3
Acceleration Severity Index "ASI"	8
Working width	W8 (2.80 m)
Dynamic lateral position of the vehicle	2.80 m
Dynamic deflection	2.10 m

Characteristics	
Height out of ground	800 mm / 1000 mm
Transverse overall dimensions	4100 mm
Centre to centre between posts	1900 mm
Technical minimum length without terminal end	84.80 m

CE

Inspection sheet



Mapping of the safety barriers

FRACASSO

BARRIERA STRADALE DI SICUREZZA
"3n 24409" Classe H3 per opera

MANUALE DI USO, INSTALLAZIONE E MANUTENZIONE

Installation and maintenance manual

Installation and maintenance manual

Barriera di sicurezza

Editing | Dati generali | Segnalazione | Documenti

Codice Barriera 3332

Autostrada / Tronco A1 / DT5

Lato / Carreggiata laterale / sx

Rilievo Aran 1° rilievo 2016

Chilometrica (Da / A) 497+926 / 497+905

Lunghezza (m) 21

Lunghezza reale (m) 0

Codice catasto 1 [3n24409-W8B-H3BP](#)

Scheda | Manuale | Disegno

Codice MIT 3 - barriera per opere d'arte

Discontinuità -

Note n.a.

Descrizione discontinuo

Cod. Catasto semp. 3N

Riferimento DM 92 e s.m.i

Codice catasto 2 n.a.

Materiale ACCIAIO

Tipologia -

Barrier code

Technical design

POS.	CODICE	DESCRIZIONE COMPONENTI	MATERIALE
1	110101	Barriera di sicurezza	ACCIAIO
2	110102	Posto di sostegno	ACCIAIO
3	110103	Posto di sostegno	ACCIAIO
4	110104	Posto di sostegno	ACCIAIO
5	110105	Posto di sostegno	ACCIAIO
6	110106	Posto di sostegno	ACCIAIO
7	110107	Posto di sostegno	ACCIAIO
8	110108	Posto di sostegno	ACCIAIO
9	110109	Posto di sostegno	ACCIAIO
10	110110	Posto di sostegno	ACCIAIO
11	110111	Posto di sostegno	ACCIAIO
12	110112	Posto di sostegno	ACCIAIO
13	110113	Posto di sostegno	ACCIAIO
14	110114	Posto di sostegno	ACCIAIO
15	110115	Posto di sostegno	ACCIAIO
16	110116	Posto di sostegno	ACCIAIO
17	110117	Posto di sostegno	ACCIAIO
18	110118	Posto di sostegno	ACCIAIO
19	110119	Posto di sostegno	ACCIAIO
20	110120	Posto di sostegno	ACCIAIO
21	110121	Posto di sostegno	ACCIAIO
22	110122	Posto di sostegno	ACCIAIO
23	110123	Posto di sostegno	ACCIAIO
24	110124	Posto di sostegno	ACCIAIO
25	110125	Posto di sostegno	ACCIAIO
26	110126	Posto di sostegno	ACCIAIO
27	110127	Posto di sostegno	ACCIAIO
28	110128	Posto di sostegno	ACCIAIO
29	110129	Posto di sostegno	ACCIAIO
30	110130	Posto di sostegno	ACCIAIO

Technical design

New Safety Barriers Maintenance Methods



Inspection method

Detailed inspection

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

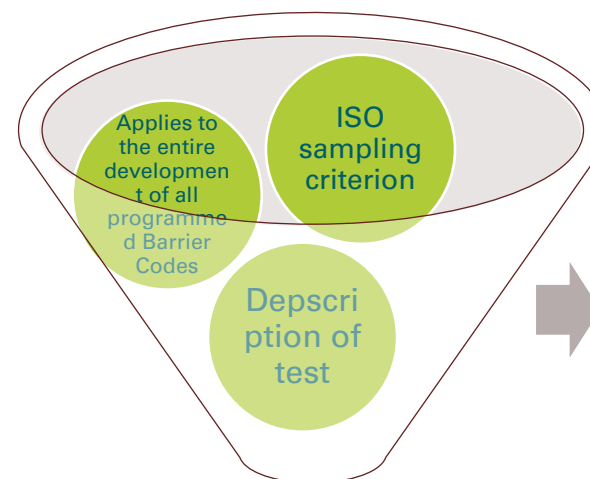
Operating instructions

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



Instruction for barriers inspections

Strumental inspection



STRUMENTAL

Tightening

Pull Out



Selection of anchors to be inspected

Test execution

Registration of results

- Sampling according to «Procedure ISO2859-1»

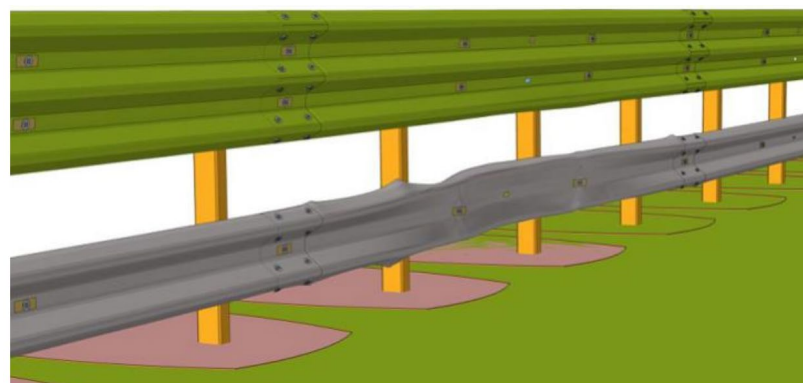
New Safety Barriers Maintenance Methods



Defects Catalogue

B

Instruction for barriers inspections



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.

PURPOSE OF THE " DEFECTS CATALOGUE"



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



&

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



UBICATION

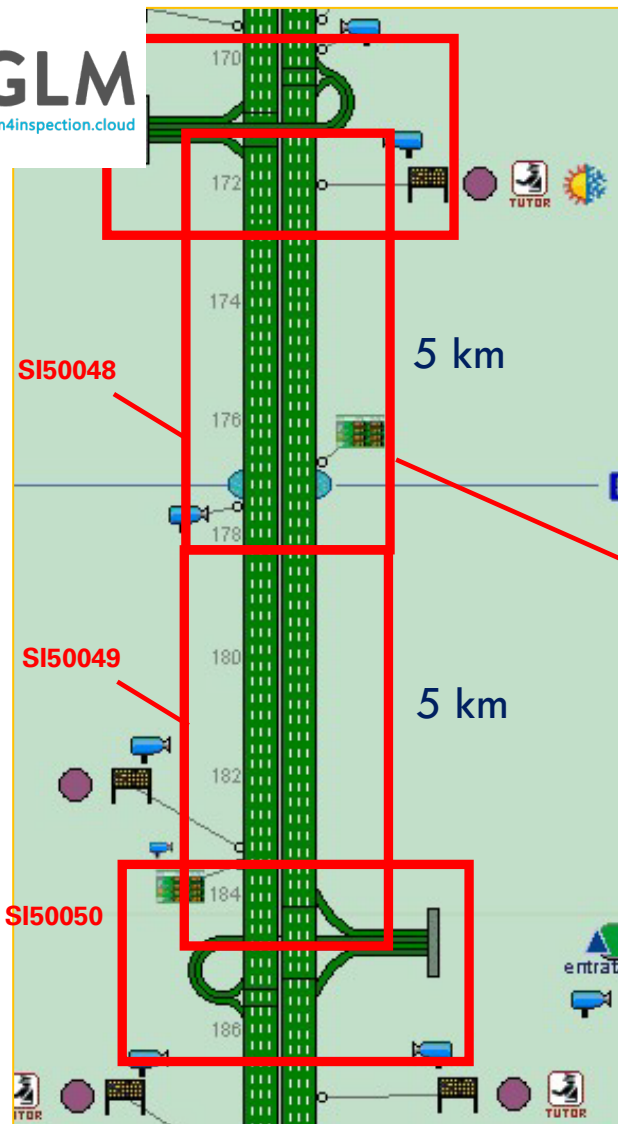
INTENSITY

EXTENSION

JUDGEMENT
A ₁
A ₂
B ₁
B ₂
C ₁
C ₂

CLASSIFICATION
Urgent intervention
Planned intervention
Monitoring

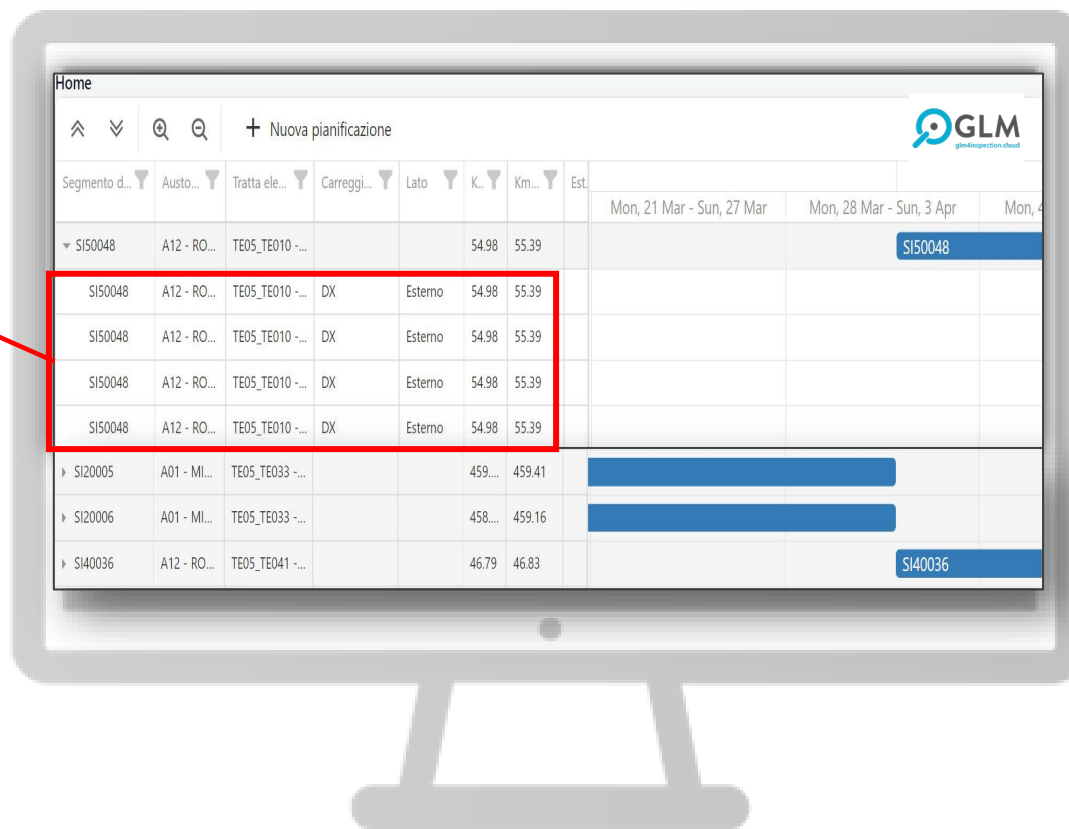
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Planning

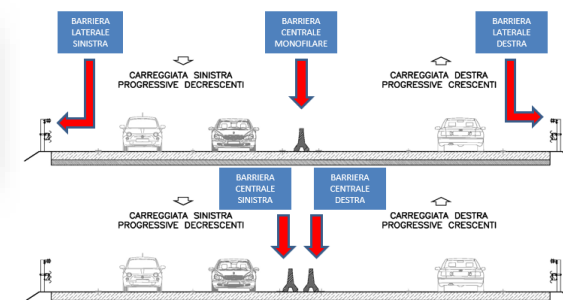


Execution of Inspection of the safety barriers



GLM desktop

Detailed weekly planning for each side of the roadway



sections of about 5 km planned every week

New Safety Barriers Maintenance Methods



Detailed inspection 1/2



Execution of Inspection of the safety barriers

GLM mobile

Geospatial location

Automatic research of type of barrier using AGE mapping

Rugged Tablet

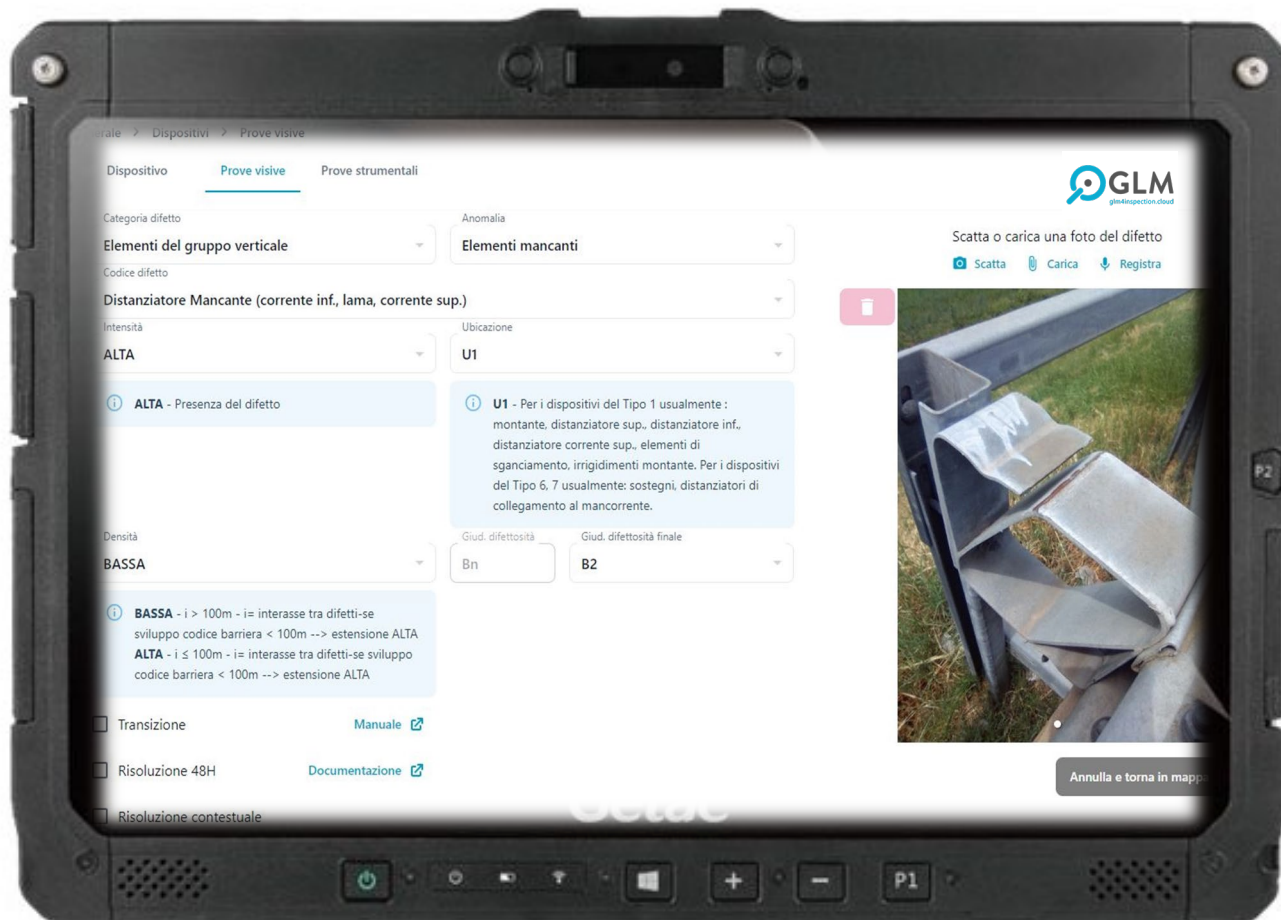
Compiling of the defects form in any weather condition



New Safety Barriers Maintenance Methods



Detailed inspection 2/2



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



New Safety Barriers Maintenance Methods



Reporting

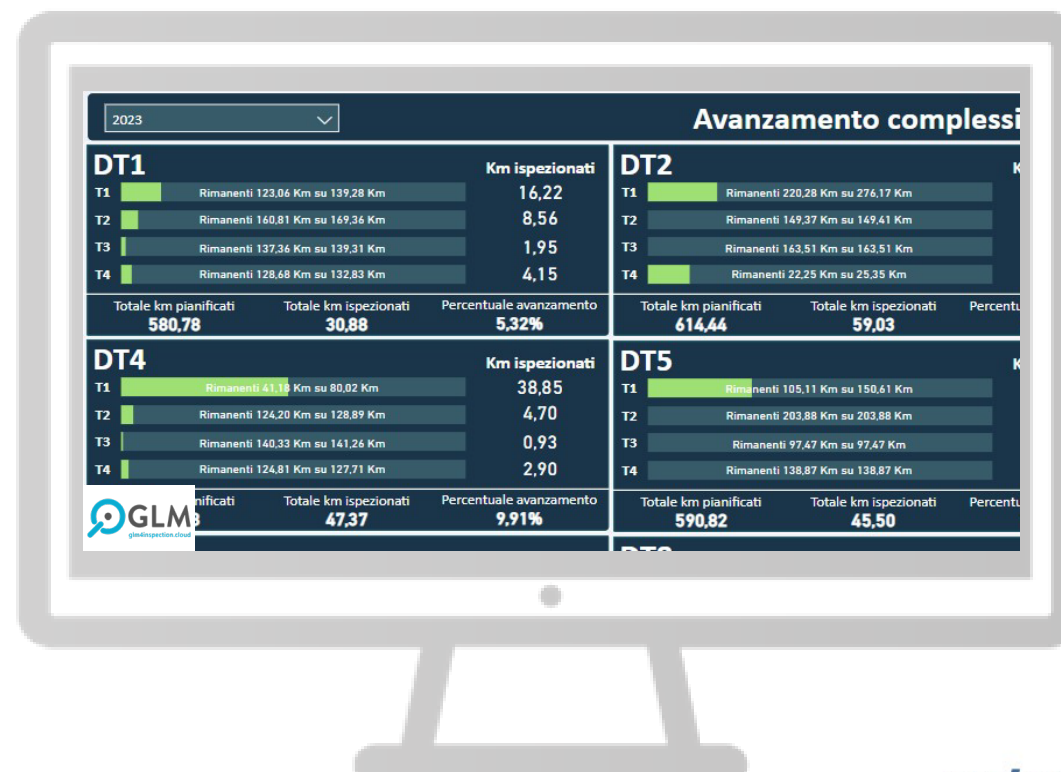
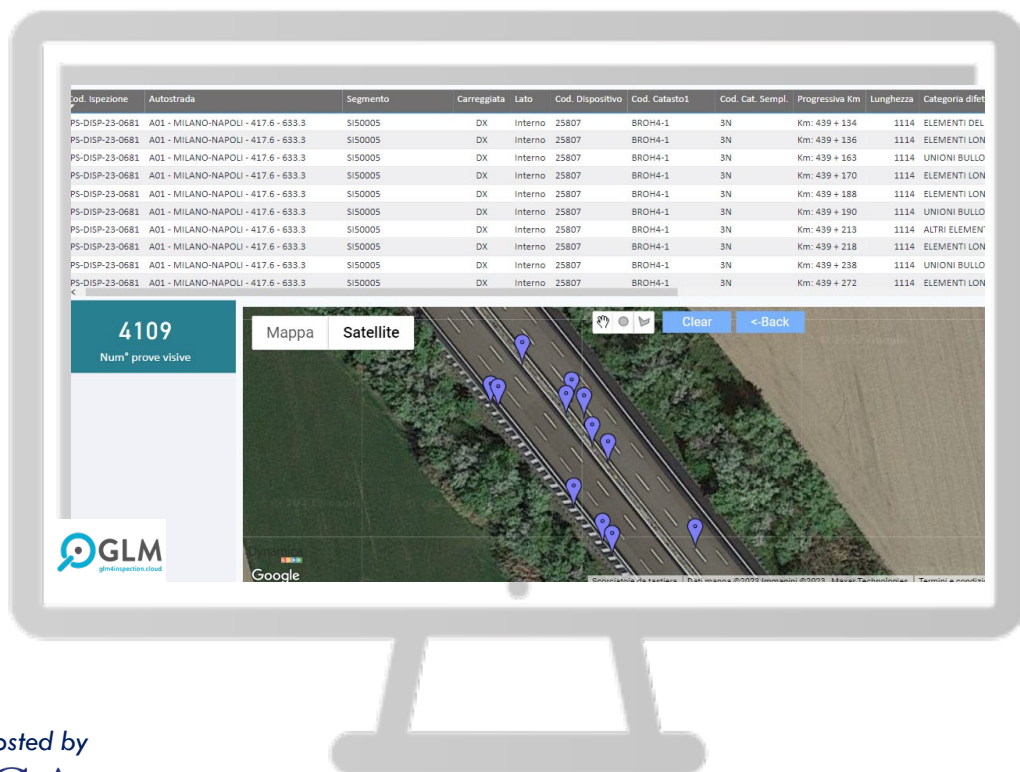


Execution of Inspection of the safety barriers

Geolocation of the single defect

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

GLM desktop



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rAPP

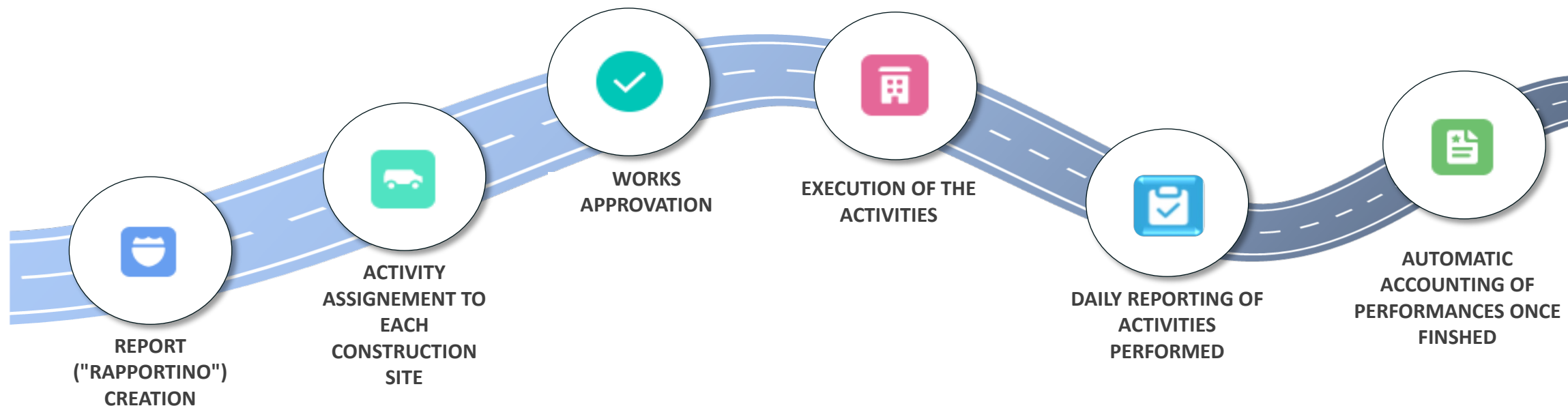
Resolution

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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Business Unit Operations

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