ASECAP DAYS
ISTANBUL 2023

Celebrating 50 YEARS OF Successful TOLL ROAD PROJECTS

THE ARGO PROJECT

Ing. Claudio Gambirasi

Autostrade per l'Italia

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ICA
YAVUZ SULTAN SELİM BRIDGE AND NORTHERN RING MOTORWAY

Autostrade per l'Italia Company Asset

Autostrade per l'Italia Group

The largest highway operator in Europe

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

autostrade per l'italia

MOVYON	TECNE	AMPLIA INFRASTRUCTURES	ELGEA	FREETOX
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

- **~ 2600** bridges/viaducts
- **~ 1800** overpasses
- **~ 600** tunnels (~ 320km)

Asset Management strategy

- Database for **full knowledge** of the assets
- Improving **preventive maintenance**
- **Maximise** the effects of interventions

THE NEW INTEGRATED SYSTEM FOR ASSET MANAGEMENT

ARGO - Bridge Management System (BMS)

Consolidate

data and expertise created through decades of motorway's asset management

Innovate

instruments introducing state-of-the-art technologies and tools

Increase

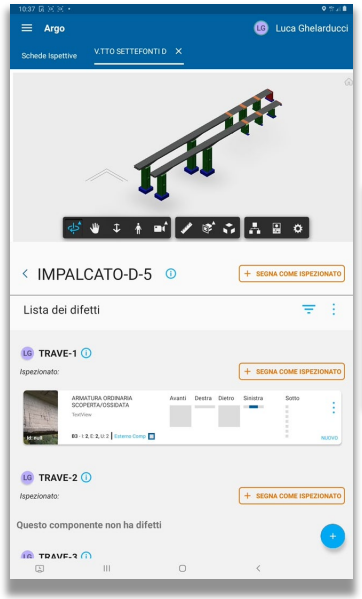
capabilities of key-figures operating in an increasingly demanding environment

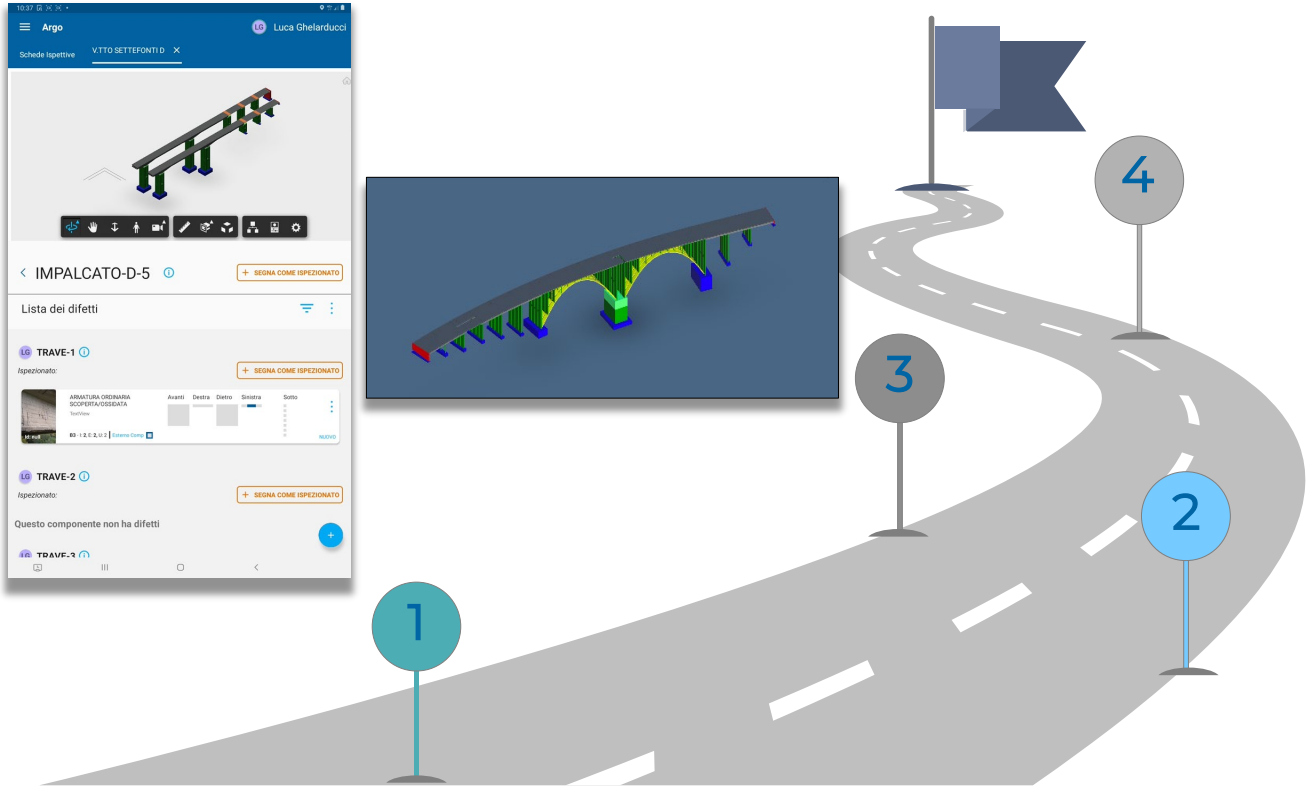
Share

and guarantee traceability of information with stakeholders in transparency

Argo

An **innovative**, **integrated** and **certified** system developed by MOVYON and based on IBM Maximo that integrate inspection, structural monitoring and maintenance processes

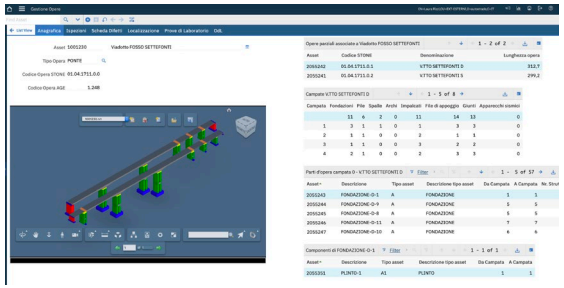




ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Main features

Digital Asset Registry



Fully management of the **information** related of the infrastructure assets (bridges, viaducts)

Inspection Process

Digitization of the **inspection process** through the use of a custom mobile app

Monitoring and IoT

Automatic detection of data from **sensors** based on the **IoT paradigm**

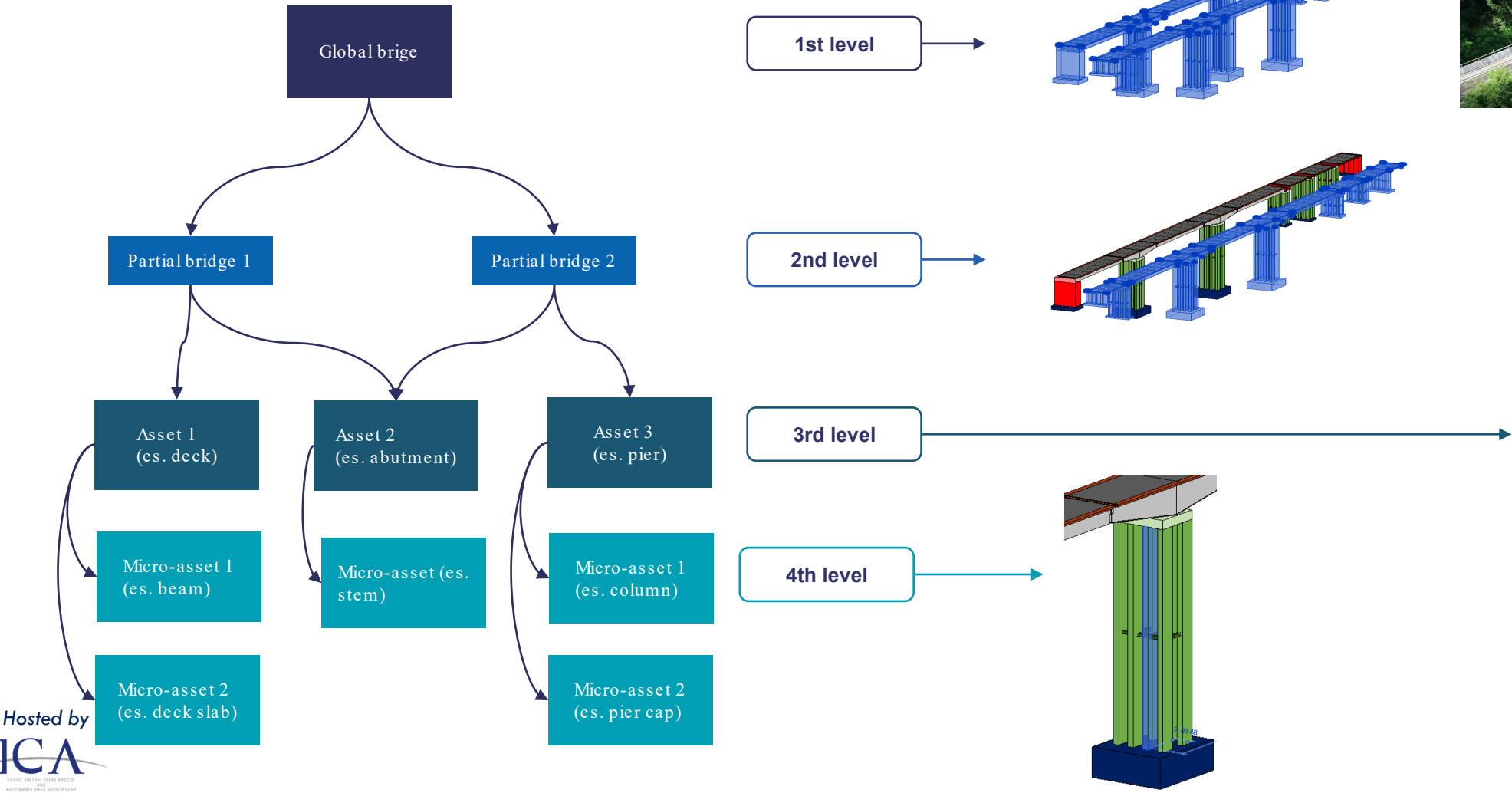
Digital Twin

Use of Lidar, drones and photogrammetry to obtain a **digital twin** of the asset

ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Digital Asset Registry

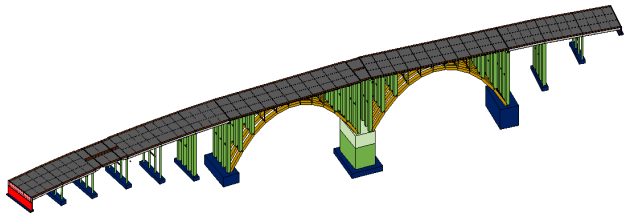
Every bridge/viaduct is discretized in detail to have the information related to the specific element.

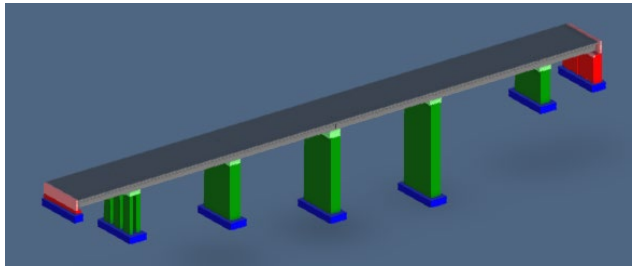


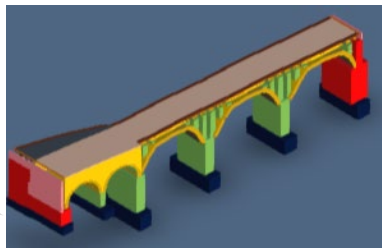
ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

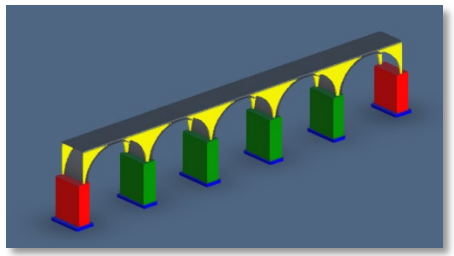
Digital Asset Registry – Automatic BIM Model

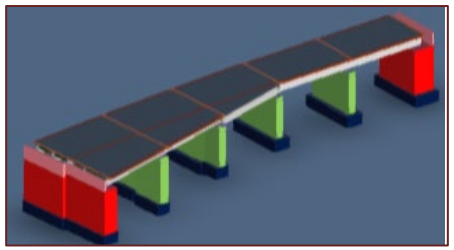
Examples of Automatic BIM Models











INPUT

- ASSET DISCRETIZATION (4 Levels)
- ELEMENT POSITIONS (x, y, z)
- SPAN
- ELEMENT PROGRESSIVE NUMBER
- RELATIONSHIPS BETWEEN ELEMENTS (Adjacent or Overlying)
- ATTRIBUTES (dimensions, morphology, etc.)

ALGORITHM

OUTPUT

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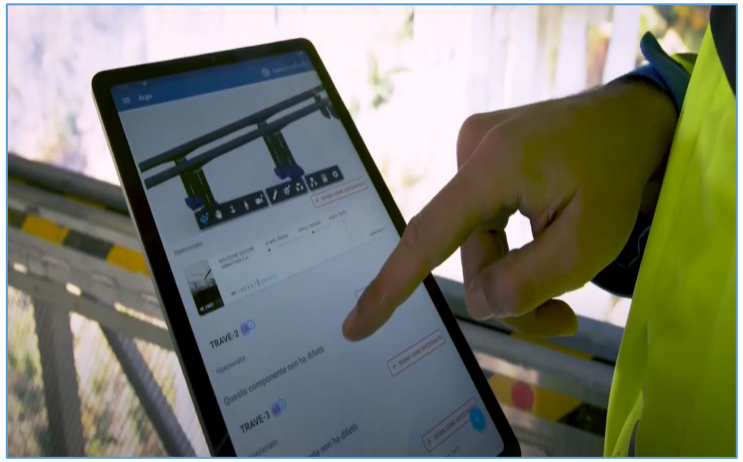
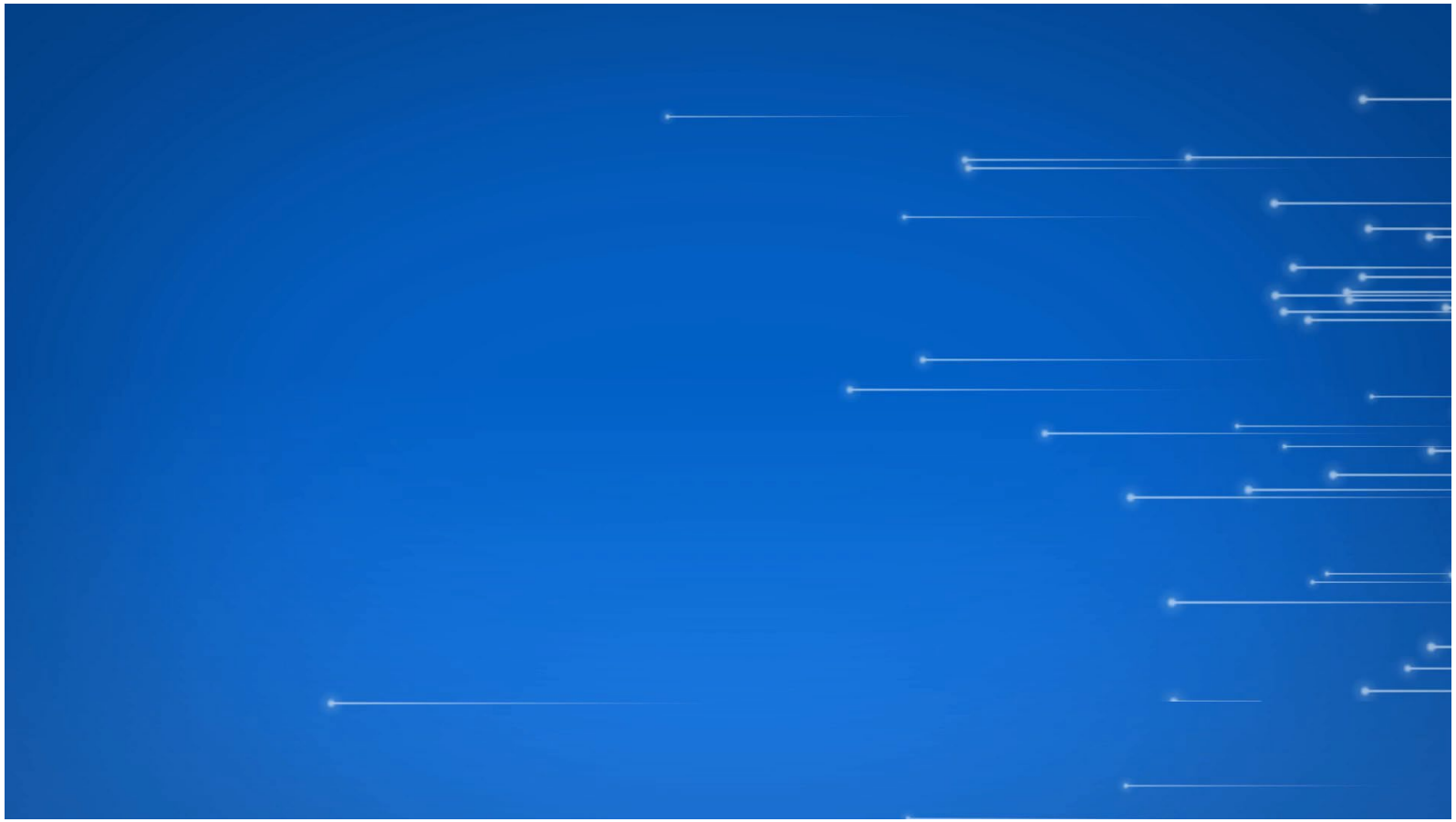
ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Inspection Process

- **Mobile App** that assists the inspector and makes the inspection phase more effective and efficient
- **BIM Model on Mobile App** fully navigable and searchable in situ;
- **Detailed defects on each micro-asset (4th level)**of the works (ie on the single beam, transverse, elevation, etc.)
- **Picture** for each defect at each inspection cycle with immediate comparison with the past;



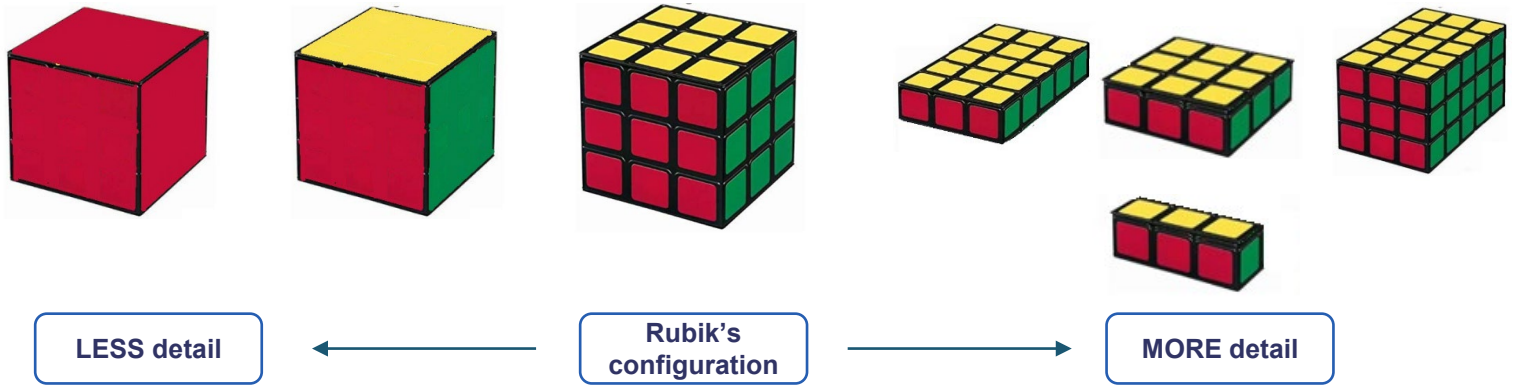


ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

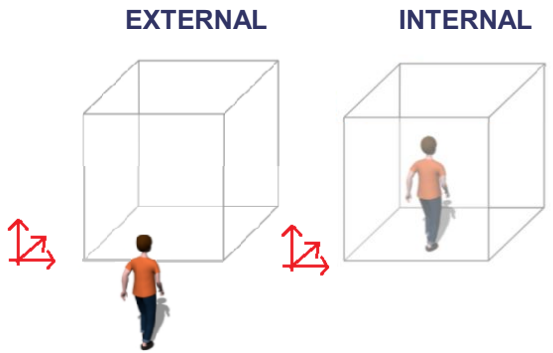
Inspection Process

The innovative idea was to consider each asset to be inspected as a 6-sided element like a Rubik's cube where the inspectors can indicate the defects and their extension.

Each of the faces has been divided into many areas according to the size of the asset to be considered.
This has determined different configurations where to insert the defects



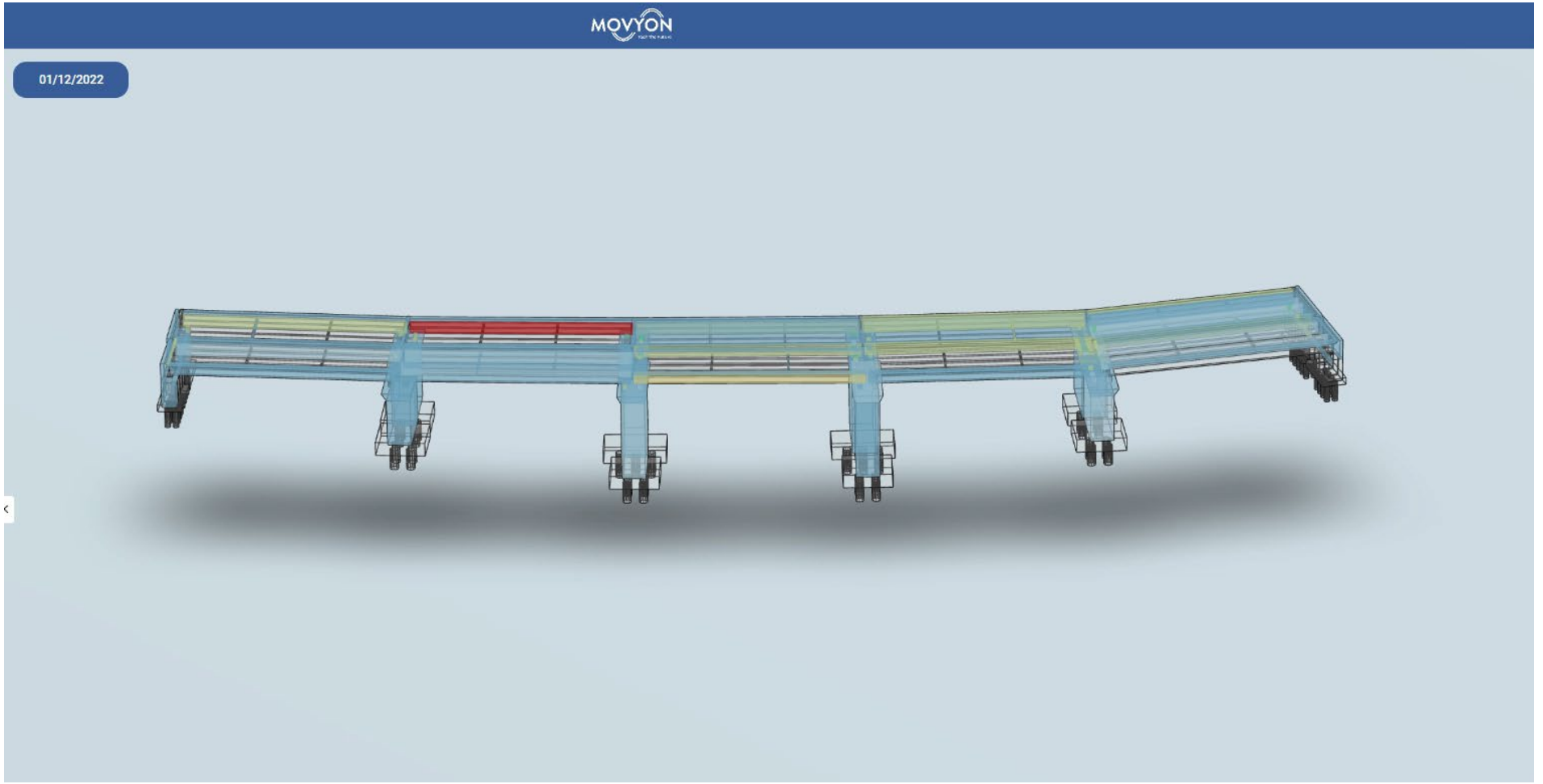
All assets are inspected externally. Hollow assets are also inspected from the inside with the same 6-sided split:



ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Inspection Process

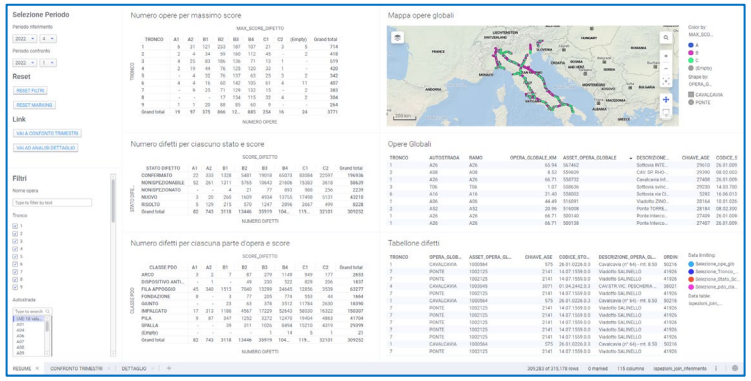
Easy review of the results of the inspections with the viewer in which the **BIM model** is **colored** according to the defects present on the components.

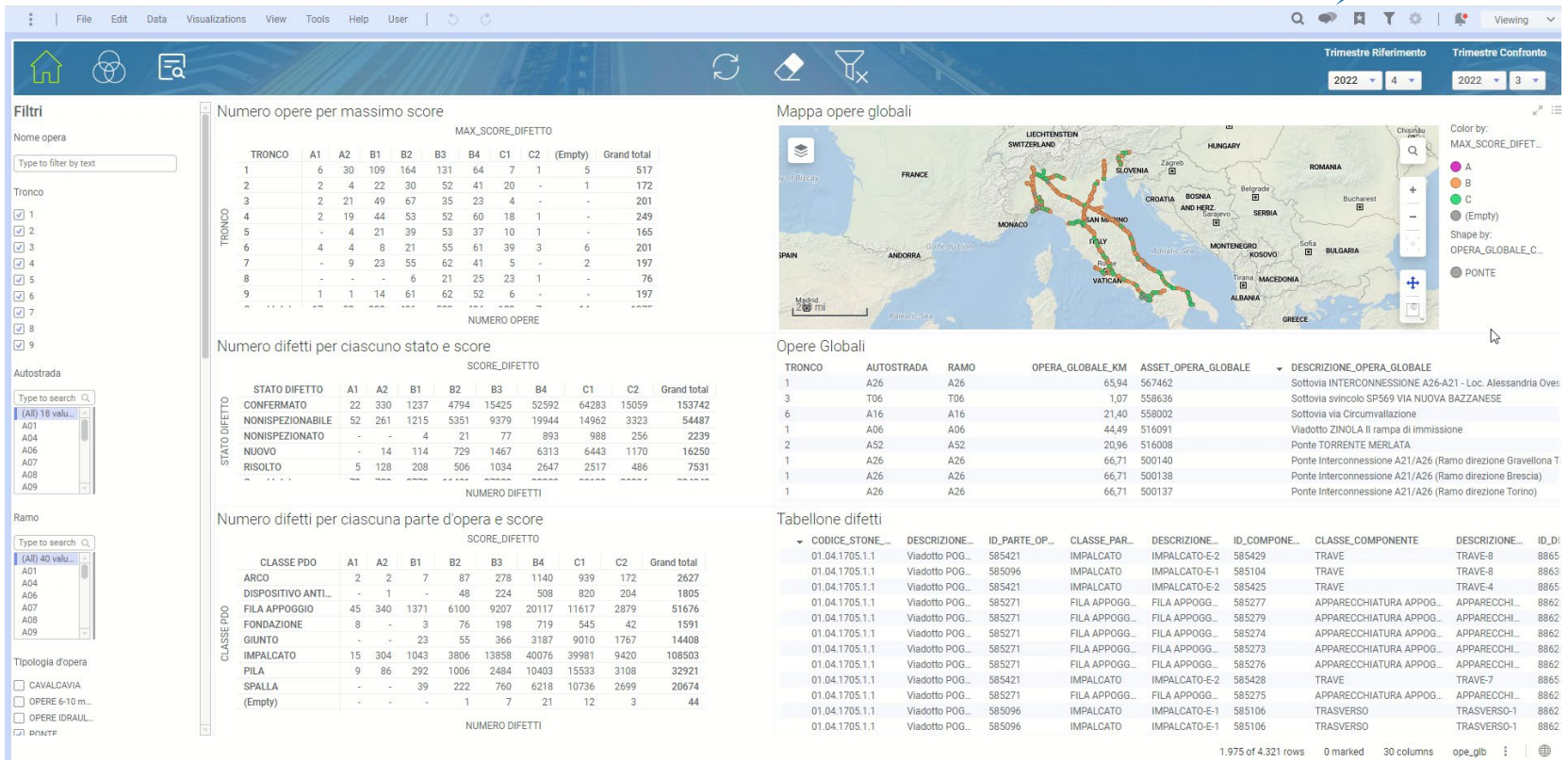


ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Inspection Process

The **asset data** and **inspections data** can be combined and analyzed to perform all types of reports, graphs and tables useful for **monitoring the network status** and **plan the maintenance with a data driven approch**.





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ARGO – BRIDGE MANAGEMENT SYSTEM (BMS)

Key Numbers

4.400+ ASSETS between Bridges, Viaducts and Overpasses;

600.000+ MICRO ASSETS (4TH LEVEL) to discretize assets and automatically generate all BIM models of the ASPI network;

5.000.000+ MASTER ATTRIBUTES associated with the 600,000 assets (~ 10 attributes/micro-asset);

200+ USERS/DAY between ASPI employees and consultants

15.000+ INSPECTIONS/YEAR managed with a defined process, a dedicated mobile app and data analysis tools.

THANK YOU

For further information:

Ing. Claudio Gambirasi

Business Unit Operations
Head of Asset Management Office

claudio.gambirasi@autostrade.it

Ing. Fabio Visioli

Asset Management Office

fabio.visioli@autostrade.it

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