



Intelligent Vegetation Control (IVC)

Digitizing & Greening Railway Landscape Management





Sustainable Innovation from Italy since 2009



Our company

An Expert Team of 150 Innovators & Engineers

Our products

Data Driven Digital Inspection Systems
On Ground Environmental Management
Transport Infrastructure Maintenance Services

Our clients



Railway network





The problem

Every year, the EU's 300,000km of urban & rural railways transport 9.6 billion passengers and move 413 million tonne-kilometres of cargo. Maintaining this crucial infrastructure is vital for the health and wellbeing of our citizens and our economies, yet achieving this sustainably is a major challenge.

Inspection

- Prone to human error
- Slow rate of inspection (3.5 km/day)
- Costs per km per year: €30k-€100k



Data Analysis

- Manual Calculations
- Visual inspection and verification



Planning

- Planned for 6-months to 3-years



Operation

- Use of harmful chemicals
- Needs skilled, expert staff (€120/hour)



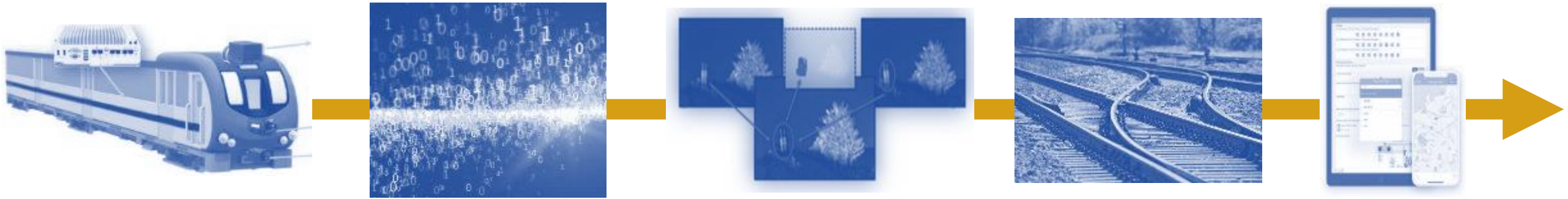


The solution

The **IVC platform** works for inspection, planning & maintenance optimisation tool offering satellite style data capture & analysis for at or below ground applications.

Roads, Waterways, Railways and Subways are almost impossible to monitor using satellites, due to the lack of data granularity, geography & situation issues, often beneath clouds, trees, bridges and underpasses.

Encompassing software, AI and Machine Learning, this unique platform removes key barriers to operational digitization in the sector.



Inspection

Sensors installed in the train to collect data from different natures and about different factors

- RGB Industrial camera
- LIDAR Laser Inspection

Data Analysis

Central database to process data and elaborate reports on the railway

Planning

Predictive maintenance scheduling using AI and Machine Learning

Operation

- Inspection speed 30x faster
- Less specialisation
- Pesticide Use Reduction
- Minimal errors
- 30% cost reduction

Optimisation

Mobile App to introduce further data on the railway scenario and consult any information.



IVC in action



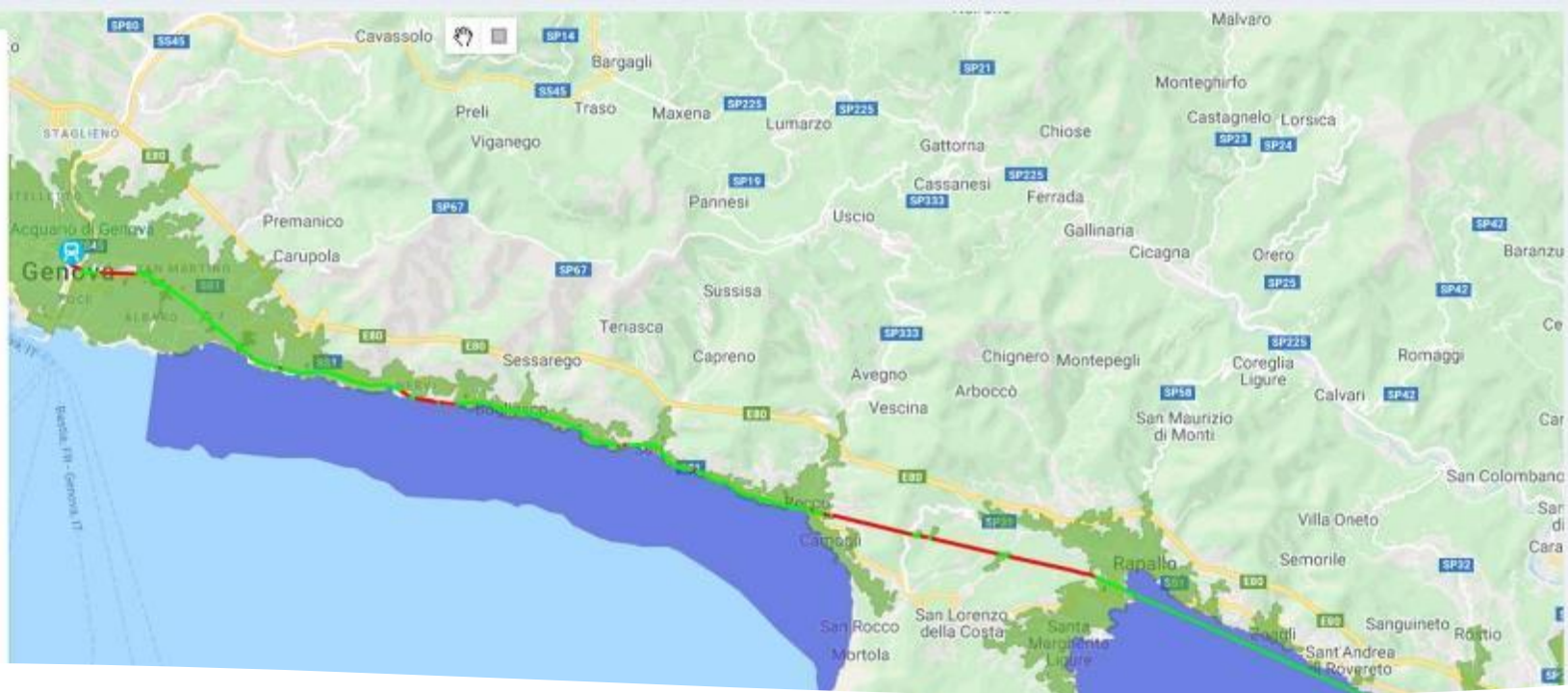
Pianificazione intervento su:
Seleziona una Linea
Genova Brignole - Stazione La Spezia Centrale

Genova Brignole - Chiavari

Genova Brignole

Chiavari

Chiavari - Stazione La Spezia Centrale



The IVC Solution



A dedicated train equipped with front cameras and a series of sensors is responsible for collecting the data (photographic and laser). The following data are collected: presence of vegetation on the railway track, morphology of the surrounding infrastructures, slope conformation, distance and speed travelled.

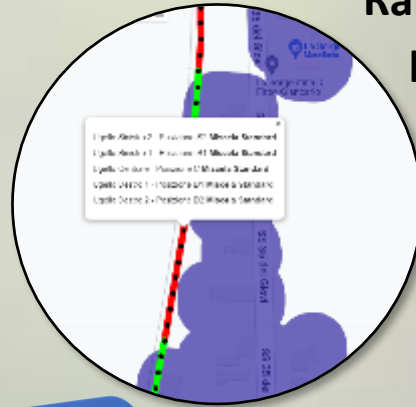
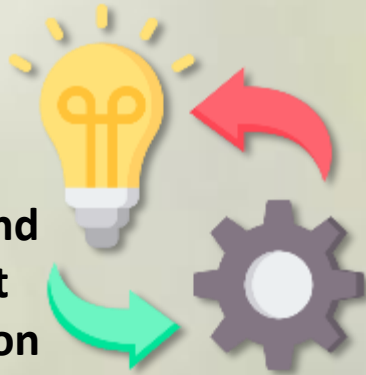
Post-processing is applied to generate LIDAR (CloudPoint) laser maps and to process railway scenario reports.

Once enough data is captured, our AI and machine learning-based tools automatically generate priority and status reports, informing operators where/when preventive maintenance needs to be performed.

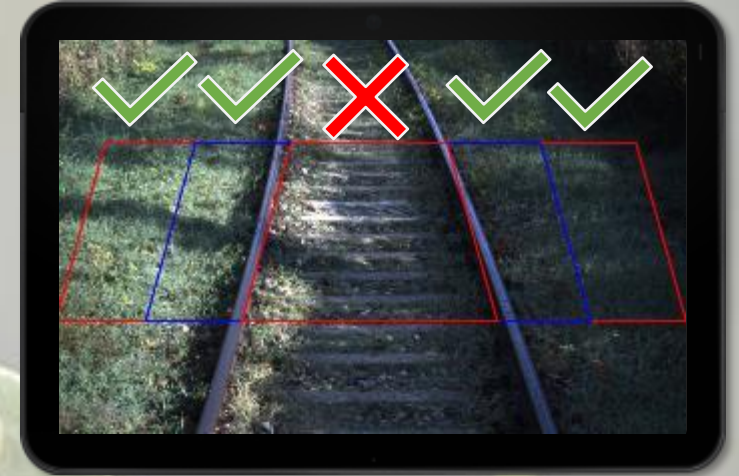


Life cycle

Collect information and improve next weeding session



Railway track planning



Checking existing weed






Spray only where weed is present



First: Why? Many reasons

Savings (Italy experience)

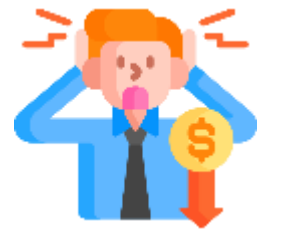
-  Less chemical: up to 50% chemical savings
-  Predictive maintenance: operational and economic Planning
-  Cost saving: 1,35 MLN€ every 1.000km

Manual weed cutting case

Man cost/h	11.00 €
h/km	4
Tot. km	4,000
People/km	5
Cycle/year	15
Cost	13,2 MLN €



146,000 km





IVC current Italy rail tracks coverage

Currently operating in Italy:

- Covered area (**green**):
~45% Italian railway tracks
- Upcoming area 2024 (**blue**):
~10% Italian railway tracks



New Requirements base for Italian railways



New tenders from FNM (2020) and RFI (2021) has been updated to set technical requirements from and above IVC system skills.

VALUTAZIONE OFFERTA TECNICA		85
		<small>percentuale per valore max</small>
1. CARATTERISTICHE AZIENDALI		13
1.1 Certificazioni		11
1.1.1 Possesso certificazione ISO9001		2
1.1.2 Possesso certificazione OHSAS 18001		2
1.1.3 Rating Corporate Social Responsibility (CSR)		7
1.2 Accertamenti relativi ad atti o comportamenti discriminatori		2
1.2.1 Accertamenti relativi ad atti o comportamenti discriminatori		2
2. PROPOSTA TECNICA		72
2.1 Organizzazione		15
2.1.1 Capis Cantiere		2
2.1.2 Squadre tipo per taglio/stalido		6
2.1.3 Personale abilitato M+M+PC		2
2.1.4 Personale abilitato M+M+D+M		2
2.1.5 Adozione di un sistema informatico per la localizzazione delle attività svolte		3
2.2 Elementi innovativi per il contenimento/abbattimento dell'uso di prodotti fitosanitari (DM 15/2/2017 – CAM)		57
2.2.1 Elementi innovativi per il contenimento/abbattimento dell'uso di prodotti fitosanitari contenuti nel Piano degli Interventi (in alternativa all'adozione esclusiva nel lotto di metodi meccanici e/o chimici)		32
2.2.2 Modesto di distribuzione mediante impiego sperimentale a bordo del mezzo distributore di sistemi innovativi informatici per l'individuazione e il contenimento della quantità e delle tipologie delle specie infestanti al fine di ottimizzare e minimizzare l'impiego di prodotti fitosanitari.		20
2.2.3 Piano degli Interventi redatto con supporto di un consulente in materia di difesa integrata nell'ambito dello specifico appalto		5

2.2.1.1) Exclusive adoption in the Lot of mechanical and/or chemical methods with the exclusion of the following Phytosanitary Products:
 - active substances candidates for substitution pursuant to regulation (EU) n.2015/408 and with hazard classification and labeling different from those already identified in article 4.1.3.1 of the "CAM" (ministerial decree of 15 February 2017);

2.2.1.2) Adoption in the Lot of an innovative experimental methodology for weed control activities for the entire duration of the contract with exclusive use of physical and mechanical methods out of 100 km of line track and 1000 square meters of yard.

If the innovative experimental type methodology, referred to in point 2.2.1.2), is certified by Universities/research organizations

What differentiates from rest: our USP

One of a kind

Our solution is unique on the market.

Affordability

Our solution helps the company to accomplish its strategy in the most affordable and cost-efficient way.

Specificity

Our solution has a strong focus on Vegetation Management and Weeding Systems Technique.

Scalability

Our solution is scalable - it works in combination with external systems.

Experience

Our planning teams have years of experience in industrial planning.

Dedication to Success

We are dedicated to success throughout our work - we leave only when the job is completed to the highest satisfaction of the client.



Target (companies)

Main target for IVC solution is represented by the following type of stakeholders:

- Railway Vegetation Management companies (weeding)
- Railway Infrastructure companies (cable de-icing)
- Railway Network Manager (all)





Target (decision makers)



With reference to the mentioned target companies, here the list of key decision maker:

- Research & Development Director
- Operation Director
- CFO
- CEO

Inspect collect analyse plan execute

IVC automates the execution of repetitive jobs

Today Tomorrow

