

OF TRANSPORT

# TRL Leads the Implementation of AI based Condition Surveys for Infrastructure Malta

#### Introduction

Infrastructure Malta (IM) oversees the road network of Malta, a Mediterranean island country renowned for its strategic location and vibrant tourism.

The network spans approximately 3,096 km, encompassing primary highways, urban streets, and rural roads. Managing this extensive infrastructure presents considerable operational difficulties.

#### Challenges

Current road condition surveying methods at Infrastructure Malta were expensive and time consuming that were machine-based and manual.

#### About the Pilot project

After a demonstration, a pilot for IM's arterial and distributor roads was commissioned by Infrastructure Malta with TRL as their implementation partner in October of 2023.

The project aimed to assess the condition of their primary road network, identify areas that needed maintenance and bid for EU Commission funding.

All results from RoadMetrics AI was available directly on TRL's iROADS asset management system.

This project aimed to explore an innovative and cost-effective way to perform condition surveys and better understand the integration capabilities of the system with iROADS.

## Solution

RoadMetrics provided a smartphone based solution for capturing video surveys and an an AI based road condition assessment tailored for planned maintenance, performed biannually.

The RoadMetrics RouteNav App was used to facilitate routing and realtime tracking for IM's driven survey operatives.

Road condition and asset data was seamlessly integrated with iROADS, that involved conversion from GIS referencing to linear referencing.

Thus, helping Infrastructure Malta highlight areas requiring investigation and further investment for road maintenance.

## Implementation

Two hardware kits, equipped with an Android smartphone, polarising lens and a specialised windshield mount, was provided by RoadMetrics.

The first driven survey (of 350 km) was led by TRL's trained professionals and subsequent surveys led by four highways inspectors at IM, to a total of 900 km.

The assessment output was customised to meet iROADS' requirements, in formats such as CSV, GeoJSON, and TXT.

The output included road section IDs, asset and defect data, traffic sign information, and point data, enabling smooth integration and actionable insights for road maintenance.

## **Trial Objectives**



**On-demand Surveys** 

Perform routine and adhoc surveys throughout the year.



**Cost-benefit Analysis** Transition to a costeffective and automated solution for road maintenance.



Defect Mapping Track specific road defects, including sunken manholes, on primary roads.

# Challenges



Ensuring seamless visualisation of road condition data on iROADS.



Maintaining a digital archive of defect and asset information.

## **New Developments**

- New road defect class for sunken manholes
- Customised output files compatible with iROADS
- Road chainage based sections.

## Key Findings and Future Developments

- Road Condition Report: RoadMetrics generated an automated report indicating good, satisfactory and poor condition on a five level classification.
- Enhanced Asset Inventory: RoadMetrics' technology cataloged images of over 5,000 road signs and other assets, augmenting Infrastructure Malta's asset management system.



Identifying overhanging trees

API integration with iROADS to automate defect reporting.

(()) Audio functionality built into the Bluetooth clicker button







"We started using the RoadMetrics AI software in 2023. Using a smartphone equipped with the RoadMetrics Data Collection App, our technicians can effortlessly collect data for the arterial and distributor roads across the island of Malta while driving at 50-60km/hr. At Infrastructure Malta, we conduct road condition surveys twice a year using this software to update data on road defects, including their geolocation and severity. RoadMetrics automatically calculates also the Road Maintenance Index (RMI) for multiple sections of each road, helping us prioritise interventions effectively. The collected data is seamlessly uploaded into our asset management software – iROADS for further analysis and processing by our team. Additionally, RoadMetrics has enabled us to collect, identify, and catalog images of all road signs, enhancing our asset inventory within the Asset Management System. —Antoine B Psaila Infrastructure Malta

## Conclusion

The pilot project successfully demonstrated the value of AI-driven road condition surveys, providing Infrastructure Malta with actionable insights and streamlined maintenance processes with iROADS. Based on the positive outcome, IM have further extended their license in October of 2024.