OMI RON

Intelligent Road Asset Management Platform

Smart intervention:
VR & AR-supported robotic platform actions

Ander Ansuategi — Tekniker, Member of Basque Research & Technology Alliance
José Ramón López — PAVASAL
Themis Anastasiou — LMS Laboratory for Manufacturing Systems & Automation

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OLD ROADS,
NEW TECHNOLOGIES
safe and intelligent road asset management

OMICRON solution:
A versatile robotic platform for safer and more efficient road maintenance tasks

- **Increases safety for workers**
  Controlled from the truck cabin, minimising exposure to hazards.
- **Multiple applications in one tool**
  Cleans assets; installs cones, barriers & signals; laser removes paint; seals cracks.
- **TESTED**
  1st functional, automated prototype

KPIs:

- Target: 15–20% reduction - maintenance intervention times.
- Up to 100% fewer people in danger zones.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°955269

Robotic platform: automated cone installation

Improving safety & efficiency during road closures

Traditional installation exposes workers to high-risk zones on busy highways.

- **Automates placement from truck cabin; removes workers from danger.**

Operators place & collect cones while controlling & monitoring from the truck cabin.

Impact:

- **10% reduction - intervention time**
- **0 workers in hazardous zones**

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Robotic platform: road asset cleaning

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Enhancing visibility & safety without personnel exposure

Dirty highway signs impact visibility. Traditional cleaning exposes workers to risks.

- Cleaning operated from truck; no need for personnel on roads.

High-pressure cleaning operated from the truck cabin

Impact:

- 100% reduction – personnel in danger zones on roads

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Robotic platform: safety barrier installation

Improving efficiency & worker safety in barrier placement

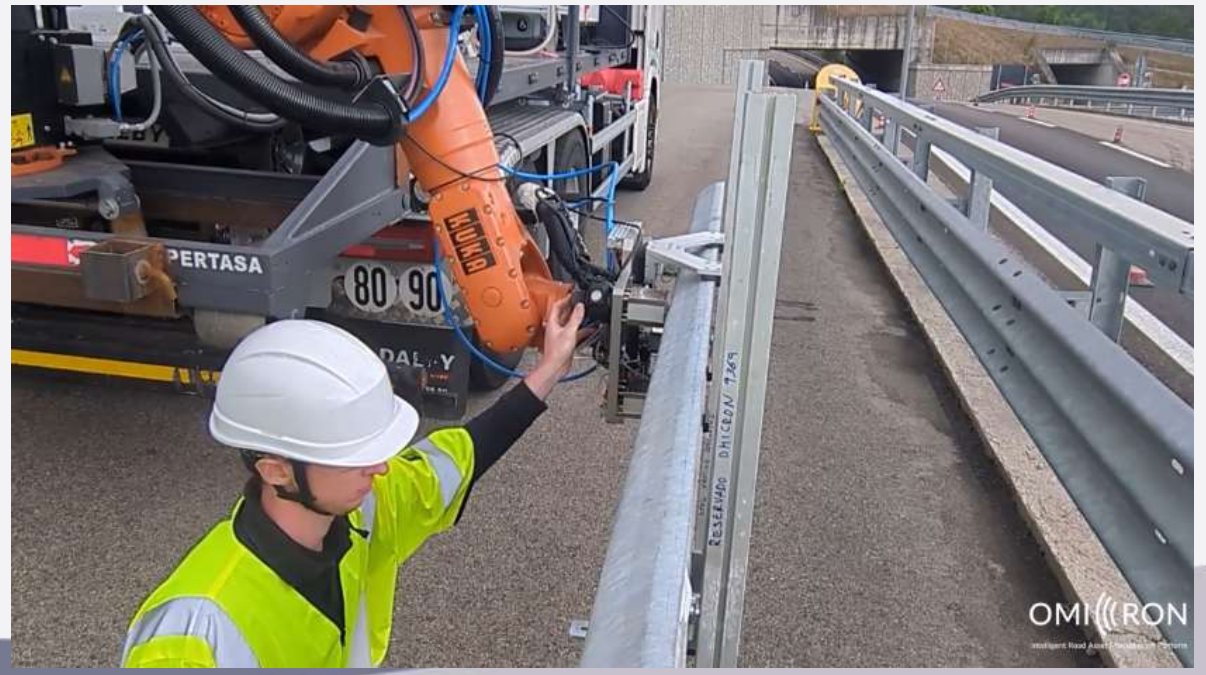
Traditional installation exposes workers to traffic; needs manual moving of heavy components.

- **Automates placement, eliminating component handling & reducing personnel exposure.**

Reduces manual handling & personnel exposure during physically demanding tasks

Impact:

- **10% reduction – placement time**
- **50% reduction – personnel exposure**



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Robotic platform: signals installation during construction works

Efficient & safer set-up for temporary roadworks signage

Setting up signals exposes workers to traffic & manual handling of heavy equipment.

- **Automates equipment (un)loading, reducing workers' physical strain & traffic exposure.**

Reduces manual handling & personnel exposure during physically demanding tasks

Impact:

- **Reduces physical strain**
- **50% reduction – personnel exposure**

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Robotic platform: laser-based pavement paint removal

Automated paint removal with lasers increases operator safety

- Optimising & studying horizontal road paint stripping with lasers.
- Solves current quality problems, e.g. surface degradation/shadow reflections

Operators remove paint remotely from the truck cabin

Impact:

- 75% reduction – personnel exposure
- 26% reduction – maintenance costs

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Robotic platform: automatic pavement crack sealing

Automatic crack sealing system avoids major road hazards

- Increases safety: workers supervise & operate from truck cabin, avoiding traffic dangers.
- 3 operations in 1 tool

1st functional & automatic prototype tested

Impact:

- 75% reduction – personnel exposure
- 13% reduction – maintenance costs

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Robotic platform: technical results and key achievements

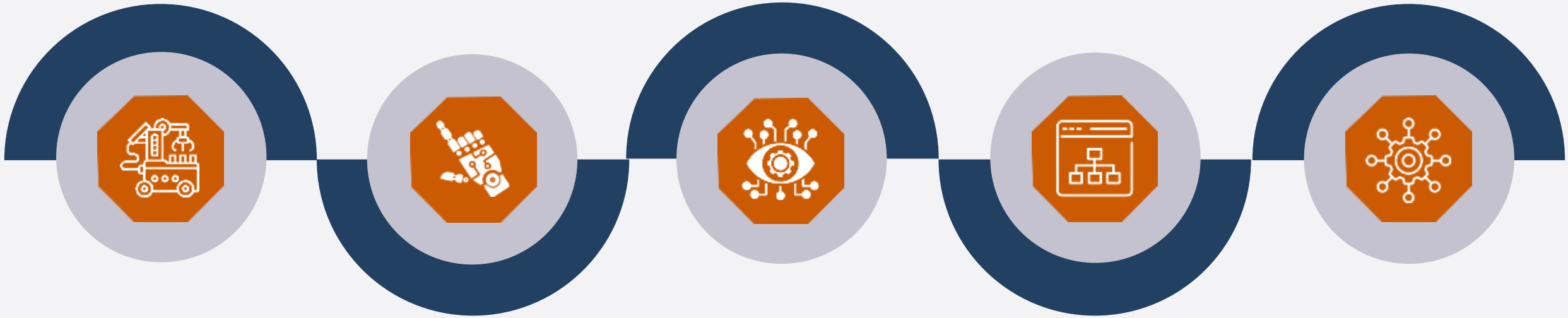
Hardware architecture design & development

Tools design & development

Automatic detection capabilities

Software design, AR & VR tools

System integration



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Robotic platform: video

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Robotic platform: key findings

- **Proven practical viability:**
  - Tests confirm **effectively performs variety of maintenance operations** on highways.
- **Enhances safety and ergonomics:**
  - **Reduces roadside risks** and minimises ergonomic strain on operators.
- **Competitive performance:**
  - **Demonstrates time-efficient execution** with potential for further optimisation.
- **Reduces required level of experience / training:**
  - Intuitive AR/VR interfaces enable **easy operation with minimal training**.
- **Future Potential:**
  - Modular platform **ready for advanced functionalities and scalability**.

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Robotic platform: key findings

- **Certification path:**
  - Need risk analysis & certification to **ensure safe operator–system collaboration**.
- **Versatility and specialisation:**
  - **Ability to perform multiple operations** with minimal adjustments **may limit specific task performance**
    - focus on single operations could allow optimised design.
  - AR & VR **applications can be tailored** to increase efficiency and safety.
- **Targeted applications:**
  - Suitable for **construction companies**, **road maintenance operators**, and **public administrations** (state, regional, and local).
  - Separation of functionalities into specific use cases could make the system **more affordable** and **operationaly effective**.

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Thank you

Tekniker
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

PAVASAL

LMS
Laboratory for Manufacturing Systems & Automation

Ander Ansuategi

ander.ansuategi@tekniker.es

+34 673 935 685

José Ramón López

jrlopez@pavasal.com

+34 616 428 869

Themis Anastasiou

anastasiou@lms.mech.upatras.gr

+30 2610 910 160