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# Europe, the laboratory of green innovation for infrastructures

FOCUS ON LIAISON, THE EU PROJECT WHICH INVOLVES 15 PARTNERS, INCLUDING 3 FROM ITALY, FIVE DEMONSTRATION SITES AND TECHNICAL SOLUTIONS SUPPORTED BY AN INNOVATIVE APPROACH TO IMPROVE THE ENVIRONMENTAL SUSTAINABILITY STANDARDS OF ROAD AND RAIL INFRASTRUCTURES.

The EU's recent projects include LIAISON, which aims to develop knowledge and innovative technical solutions to limit emissions produced from road and rail infrastructure throughout their life cycle. The methodology is holistic, centered on the Dynamic Multi-Infrastructure Governance Framework (DMIGF). This framework activates, articulates and monitors compliance with circular economy principles through the individual technical solutions developed and validated. The 15 partners of LIAISON come from 6 different European countries, with Tecnalia, a Spanish foundation dedicated to research and innovation, as the coordinator. Other partners are École Nationale des Ponts et Chaussées (France), Universidad de Cantabria (Spain), Zavod za Gradbeništvo Slovenije (Slovenia), Universidade do Minho (Portugal), Research Driven Solutions limited

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The LIAISON project



Group photo of the LIAISON project partners

(EIRE), RINA Consulting (Italy), ACCIONA (Spain), Zitrón (Spain), VITA International (Italy), CEDEX (Spain), Ministerio de Transportes Movilidad y Agenda Urbana (Spain), Prometni Institut Ljubljana (Slovenia), Autostrade per l'Italia (Italy), Fondazione Icons (Italy). The solutions:

- Smart and sustainable beams;
- Rigid road pavements and improved ballast;
- Bio-asphalts and pavements monitoring system;
- Intelligent tunnel control system;
- Photovoltaic safety road barrier.

The LIAISON partners met for the first time in Bilbao, Spain, at the TecNALIA headquarters on 23<sup>rd</sup> May for the Kick-off Meeting. The General Assembly was held in Ljubljana, Slovenia, on 14<sup>th</sup>-15<sup>th</sup> November, hosted by the Zavod za gradbeništvo Slovenije. On this occasion, a prototype of the photovoltaic panel that will be integrated into VITA International's safety barriers was presented.

## GREEN-TECH EUROPE

As David Garcia Sanchez, LIAISON coordinator for TecNALIA, points out, "Europe must move towards a 100% renewable transport system by 2050 for environmental, energy, and sustainability reasons". LIAISON is moving in this direction, focusing on the enormous potential of the infrastructure system to create resources and to achieve sustainability on the 136,700 km of roads and 234,037 km of railways that make up the great European network today. There will be five demonstration sites of LIAISON Innovations in Spain (2 sites), Slovenia (1 site), Italy (1 site), and Poland (1 site).

### POLAND: Road Construction

On the S19-Rzeszów-Babica motorway LIAISON will test and validate innovative structural solutions and precast pavements. In the first case, highly sustainable beams will be used to construct a wildlife subway, while in the

second case, rigid geopolymer concrete pavements will be laid. In test:

- Geopolymer blends for modular rigid pavements;
- Performance based design and production models to reduce material consumption in construction and maintenance activities;
- Improved modular construction, maintenance and paving interventions capable of reducing the life cycle cost of works by at least 30%;
- Industrialisation of the construction of structural elements through the integration of 3D printing, digital twins, and SHM/WIM systems.

### **SLOVENIA: Eco-friendly Ballast**

A new type of improved and sustainable ballast will be tested in Slovenia. The goal of the trial is to test and validate a railway track with a low-noise and low-vibrations ballast and thermoelectric concrete elements. The rubber-modified ballast will generate the following benefits:

- At least 80% recycled material;
- Improved mechanical performance of the track;
- Reduction of permanent deformation of the ballast by more than 50%;
- Noise reduction of 3-6 dB and vibration reduction of at least 50%.
- Energy harvesting in elements made of secondary raw materials functional to optimize energy use (with maintenance costs reduced by at least 30%).

### **SPAIN: Tunnels and Energy**

In the Mamariga tunnel in the Basque Country, a digital twin will be tested to optimize maintenance in terms of energy. Under test:

- An intelligent lighting control system based on outdoor luminance and real-time traffic flow;
- Optimization of energy consumption for lighting services;
- An adaptive fan control system using variable frequency motor control (FVMC);
- A 40 per cent reduction in ventilation system consumption and 20 per cent energy savings compared to conventional systems.

### **SPAIN: Bio-Asphalt**

On the A-67 in Cantabria a section of 13 km (third lane and upgrading of junctions) LIAISON will test and validate some aspects of DMIGF and bio-asphalt. Under test:

- The DMIGF framework and associated digital tools;
- A tendering system based on 'green procurement' principles for the construction of bio-asphalt;
- The use of bio-asphalt on the N-623 road, including a PMS (Pavement Management System) based on automatic detection of deterioration.

### **ITALY: Solar Safety Barriers**

A photovoltaic safety barrier developed by VITA International will be installed at the Italian pilot site, located in a Sebino service area on the A4



*Polish S19 motorway: rendering*

Milan-Brescia motorway (between Milan and Brescia), managed by Autostrade per l'Italia. Under test:

- A new photovoltaic safety barrier aimed at optimizing energy use and increasing the share of renewable energy sources in infrastructure management.
- Environmental and economic sustainability of the solution (self-production);
- Reduction of overall energy demand and CO2 emissions;
- The same performance standards as those already in use, especially when it comes to user safety;
- Identification of maintenance needs.

Scalability, replicability, and adaptability of the solution to new needs, requirements, and specifications for the future development of a family of safety barriers for different types of infrastructure. ■

### SUSTAINABLE SAFETY: AN ITALIAN TEAM JOINING FORCES WITH THE REST OF EUROPE

With the 100<sup>th</sup> anniversary of the Autostrada dei Laghi, operated by Autostrade per l'Italia, and the 10<sup>th</sup> anniversary of VITA International, among the protagonists at Intertraffic Amsterdam 2024, the last pilot site described brings us into contact with two operators who are touching important milestones this year. VITA, based in Travagliato (Brescia), is a leading manufacturer of steel and wooden safety barriers. It has two factors in its DNA: environmental sustainability and internationalization, which it shares with LIAISON. All the solutions proposed by VITA are made of traceable (wood) and recyclable (steel) materials with a design that not only allows them to blend in with their surroundings but also guarantees double durability, since they are tested both with and without wood cladding. The second factor is supported by the numerous cases of product recognition in foreign markets and European and global partnerships. VITA International, which will be among the protagonists at Intertraffic Amsterdam, together with Tecnalìa, ASPI, and all the partners, is committed to meeting the challenges defined by the LIAISON project, including that of generating clean energy directly from road equipment such as barriers, without compromising their first duty, regulated by the EN 1317 standards: the protection of users. The new solutions aim to add to passive safety some basic active safety elements, such as the possibility of lighting the barriers at night or in bad weather conditions, a practice already widely used (think GuardLED), but in the case of LIAISON with the added value of green energy produced and supplied on site thanks to the use of photovoltaic modules based on Tecnalìa's patented technology.



Prototype of the module to be integrated in the barrier

#### Road safety solutions at Intertraffic



VITA International road safety barriers in Spain

