

INNOVATIVE, HIGHLY-EFFICIENT ROAD SURFACE MEASUREMENT AND CONTROL SYSTEM



HERMES

The Project

One of the most important aims in today's transport systems is the security they provide. Even though in air and rail transports we have managed to have extremely low accident and death rates, this is not the case with road transport. The majority of the EU countries are now heading towards the "Vision Zero" philosophy in which road deaths become as unacceptable as they are in a factory, in the air or on a railway. However, in order to reach this aim several improvements are needed in numerous areas including cars, driving habits and road quality.

Moreover, the majority of EU citizens in a recent pan-European survey considered that **road infrastructure safety should be improved** as either a first or second priority towards reducing the road accidents. Furthermore, 31% of the citizens responded that this should be the first measure that their government focuses on in order to improve road safety. In response to this demand, the **HERMES** project aims at improving the road infrastructure by proposing a novel road quality measurement solution based on a pioneering approach.

The system under development enables measurements of both the longitudinal and transversal profiles of a road to be simultaneously undertaken from a specially equipped vehicle travelling at normal road speeds and at a low infrastructure cost. This approach represents a significant advancement in the state-of-the-art by eliminating the requirement for an inertial reference level whilst, additionally, improving accuracy of measurements by providing a solution for resolving errors otherwise resulting from the dynamics of a moving vehicle. Moreover, within **HERMES**, the road profile measurements will be integrated with their precise geographical location, while an innovative toolset for data analysis will be developed so as to allow efficient processing of the huge amounts of data collected by the measurement vehicles.

HERMES augments the traditional road roughness indices by additionally identifying and pinpointing locations requiring urgent repair, to result in improved safety for road users, while those locations can be identified with very high accuracy, low-cost and at normal road speeds. This latter feature is very important since in large countries the national road network requires the measuring and maintenance of thousands of kilometres per year. Also, weather conditions play a part in deteriorating road surface quality and, for instance, in northern European countries, winter freeze/ thaw conditions result in more rapid deterioration (e.g., in Norway, the complete road network of 92,800 km requires inspection each year)..

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Project Website

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Community Contribution to the Project

1,228,353 EUR

Project Start Date

1st August 2012

Duration

24 months

Project Objectives

The key scientific and technical objectives of the project are:

- Development of an innovative, highly accurate longitudinal measurement methodology.
- Development of an innovative, highly accurate transversal measurement methodology.
- Design and implementation of a low-cost, yet sophisticated, embedded system executing the novel longitudinal and transversal measurement methodologies.
- Implementation of a pioneering complete integrated solution for road profile measurements incorporating state-of-the-art GIS techniques for accurate localisation.
- Development of a novel information system for data logging, data extraction and data exchange with existing relevant systems.
- Execution of numerous real-world field-trials, in different countries, of the complete system in roads with significantly different characteristics and fine-tuning the end-system depending on the underlying road characteristics and specific end-user requirements.

Project Contributions

The project is expected to make a valuable contribution to improving the road safety throughout Europe since the highly innovative, yet cost-effective, end-product will be marketed in several countries by the **HERMES** partners. Moreover, the condition of many European roads raise concerns relating to comfort and safety for drivers. Drivers of commercial vehicles report extended journey durations and much higher fuel consumption on rough roads. These factors explain the growing interest in Route Optimisation solutions. Such systems require up-to-date road surveys as a necessary input, thereby creating a further demand for the novel **HERMES** profile measurement technology. Finally, the end-system will be integrated with a high-end data-hazard system allowing for the transmission of the road condition data directly to the driver so as he is able to react accordingly (e.g., by reducing his speed).

The project will allow the participating SMEs to offer new and highly promising products, while it will strengthen the current offerings of certain **HERMES** partners. As a result, the project will contribute towards the strategic objectives of the specific call by supporting the community growth of the four SMEs involved based on an innovative system mainly implemented by the RTD performers.

Project partners	Country
Ardoran OÜ	EE
Wing Computer Group	RO
MobileMedia	GR
Prometeo Innovations	ES
National Institute of R&D for Optoelectronics	RO
Tallinn University of Technology	EE
Electronics Design	EE
Telecommunication Systems Institute	GR