

Acoustic Asphalt Analyzer (A3). Listening to the road

On-board embedded system to reliably estimate the surface road conditions



GRUPO DE INVESTIGACIÓN EN
INSTRUMENTACIÓN Y
ACÚSTICA APLICADA



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Technological Offers type

Technological solutions

Research and innovation areas

- Climate, Energy and Mobility
- Digital Technologies, Artificial Intelligence, Cybersecurity, 5G, Robotics

ODS



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Where?

[Research into Instrumentation and Applied Acoustics \(I2A2\)](#)

Keywords: | [highway](#) | [rolling](#)

Brief description of the technology solution and the added value it provides

Acoustic Asphalt Analyzer (A3) is an on-board embedded system to reliably estimate the surface road conditions, by analyzing the noise produced because of the interaction of tires with the road. A3 is based on an electronic system, which is embedded on-board, for the detection of the weather road conditions by the acquisition and processing of the obtained acoustic signals. It can be applied to surface auscultation or active safety in vehicles, being useful in initiatives such as connected vehicles and unmanned vehicles. A3 will allow to know the surface road conditions in real-time and provide data to the infrastructure manager, other drivers and the driver himself.

Description of the technological base

Acoustic Asphalt Analyzer (A3) is a technology solution for detecting the different surface road conditions by analyzing the produced noise in the interaction of the tires with the road.

At its current development stage, it can discriminate between dry and wet road surfaces. It can also sort different types of surfaces according to its texture.

It can be applied to surface auscultation, regarding infrastructure maintenance: roads and airports, and also in vehicles as an active safety element.

“An electronic system, which is embedded on-board, for the detection of the weather road conditions by the acquisition and processing of the obtained acoustic signals”

Market demands

- Transportation
 - Currently, surface auscultation companies use different technologies in order to define the surface road conditions in roads, runways and airport platforms.
 - The main disadvantage in some of them is the need of wheeling at low speed (
 - It could be used to determine data regarding the road texture, with lower costs and with a use speed which is similar to the road traffic.
- ITC Mobility, smart transportation systems: Active safety in vehicles, connected vehicles, unmanned vehicles.
 - It can be used in vehicles in order to make real-time estimations of surface road conditions: dry, wet, frozen surface, notifying it to the driver.
 - By communication systems, it can send the information to the infrastructure manager and other connected vehicles, having real-time information about the surface conditions in its whole length.

Competitive advantages

- At its current development stage, A3 can discriminate between dry and wet road surfaces.
- It can also sort different types of surfaces according to its texture.
- In future developments it will be able to determine, at normal traffic speeds, the surface textures, the slip resistance and the sideways force coefficient, critical factors in road safety with wet surfaces.

“A3 will allow to know the surface road conditions in real-time and provide data to the infrastructure manager, other drivers and the driver himself”

Development stage

- Concept
- research

- Lab – prototype
- **Industrial prototype**
- Production

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