SEISMIC-NOISE RECORDING SYSTEM WITH REAL-TIME DATA VISUALISATION

TECNOLOGÍA PATENTADA

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RESUMEN

The **Engineering and Earthquake Risk Group (GIRS)** has developed a comprehensive system for the synchronised and simultaneous recording of environmental vibrations (also known as ambient noise or seismic noise) by means of a sensor array. After that, by means of the corresponding analysis, the dispersion curve of the surface waves or Rayleigh will be obtained, which will allow us to **characterise the soil**.

This invention solves the drawbacks of current systems and is characterised by the creation of a Wi-Fi network for communication between nodes and server or by its real-time data display.

The group is looking for companies interested in acquiring this technology for its commercial exploitation.

VENTAJAS Y ASPECTOS INNOVADORES

MAIN ADVANTAGES OF THE TECHNOLOGY

The main advantages of this technology are the following:

- **Simultaneous recording** of the different seismic sensors, this synchronisation between all the nodes is fundamental for the subsequent analysis of the recorded signals.
- **Quick and easy** deployment of the entire system to carry out a series of measurements, saving time as no wiring has to be deployed to the nodes.
- **Centralisation** of sensor samples and **availability** of the log in standard format immediately after logging.
- Communication between nodes and server using a **unique proprietary protocol** via UDP. This has involved the invention and implementation of a proprietary system that controls the orderly flow of the packets containing the samples and error control and recovery.
- **Low noise signal** conditioning circuitry at each node, which allows the low amplitude of the seismic noise to be adapted to a volt signal adapted to the dynamic range of the analogue-to-digital converter.
- The **autonomy** of the nodes with their two batteries, recording continuously, reaches 32 hours without interruption.

INNOVATIVE ASPECTS

In terms of its most innovative aspects, it is worth highlighting the following:

- Creation of a **Wi-Fi network** for communication between nodes and server. This means leaving behind the limitations of wired equipment, allowing its implementation in any type of urban environment or natural space. Also, the fact that the nodes are on the same Wi-Fi network has led to the implementation of an exclusive mechanism based on transmission time slots for each node to transmit without collision, as the medium is shared and the nodes start sampling at the same time. The retransmission mechanism for lost frames is also dependent on the transmission time slots.
- Display of each of the signals sampled by each node in **real time**. In this way, it is possible to detect whether the measurement is being taken correctly or whether there is a problem with any node, thus avoiding the economic cost of having to travel again and repeat the

measurement.

APLICACIONES DE LA OFERTA

It is primarily aimed at the **geotechnical and geophysical** sector, more specifically, companies manufacturing geophysical measuring instruments.

COLABORACIÓN BUSCADA

The group is looking for companies or institutions interested in acquiring this technology for **commercial exploitation**.