

UNIBOX V BI-TRACE - Lengthwise Profile Measurement -



Principle

The UNIBOX is a simple, compact and inexpensive system capable of measuring, at an auscultation speed of more than 30 km/h, the profile along an infrastructure for variations of wavelengths included between 50cm and 50m (optimal functioning range compatible with the uni measurement).

This system works with a computer program (under Windows) which, at the end of the measurement, in addition to performing the classical tasks of data acquisition, automatically renders the lengthwise profile and the associated indicators.

Optionally, the acquisition of environment images from a webcam can be carried out simultaneously to the uni measurement.

UNIBOX :

- Is equipped with low-cost sensors (accelerometer and laser sensor)
- Uses a GPS for the distance and geolocation functions
- Can also use a distance encoder if the vehicle has one
- Renders the results according to the usual method (profile, NBO, DSP, IRI)
- Has a viewer to display the profile, the indicators, the images as well as the events topped during the measurement

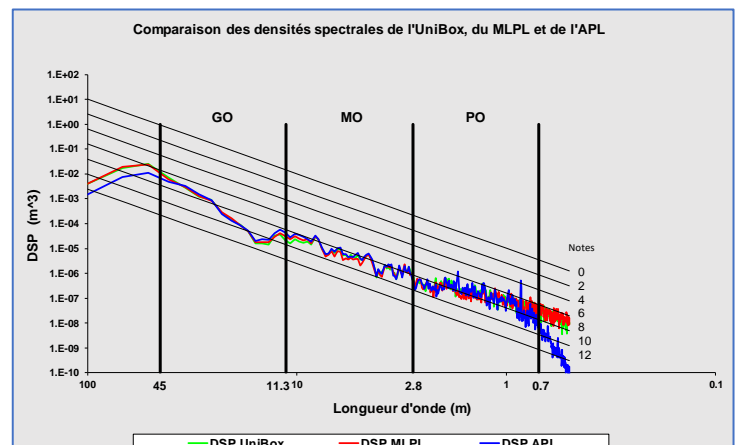
Performance and field of use

The UNIBOX performances were assessed on the road compared to French reference devices (APL and MLPL). Its measurement capabilities are as follows:

Faithful restitution of wavelength defects included in the range relating to the uni measurement ($\lambda \in [0.7 \text{ m}; 45 \text{ m}]$);

Small differences that can be observed with the APL in small waves due to the mechanical filtering of the APL which slightly mitigates the profile between 0.7 and 1 m

Due to the use of an optical distance sensor (laser), the best results are obtained on dry or slightly wet roads. On wet roads, the laser measurement can be altered and lead to an erroneous final result, especially in short waves.



Features

Physical system

UNIBOX is intended to be easily integrated in any support vehicle.

It is a single-track system composed of inertial sensors with analogue output and an optical distance sensor (class 2 laser).

This equipment operates with a power supply box that plugs into the vehicle cigarette lighter (12V).

The UNIBOX sensor signals are acquired through an acquisition card positioned in the power supply case and connected to the computer via the USB cable.

The GPS issuing the distance information, and the Webcam are also connected to the computer by USB cable.

SOFTWARE (one acquisition software and one viewing software)

Acquisition: UNISOFT

The UNIBOX data management is provided by the UNISOFT software that allows to synchronize the UNIBOX data with distance information (incremental encoders and/or GPS). At the end of the measurement, a process is automatically executed to deliver the profile along the road (sampled in 5 cm steps) as well as the various usual indicators (NBO, DSP, IRI), all in accordance with the standard MEC (roadway testing means) format. A test report is automatically generated (PDF format) showing all the results as itinerary diagrams.

Viewing: UNIVIEW

The UNIVIEW software is the UNIBOX measurements viewer. It allows reading and displaying the contents of the various files in the form of tables, itinerary diagrams or cartography, as well as environment images synchronized with the measurements.



Applications

APPLICATIONS

- Monitoring the networks (very adapted to the secondary network)
- Verification of the uni of the different layers during their implementation (auto checking by companies)
- Checking the pavement support platform profile

POSSIBLE APPLICATIONS

- Profile measurement on other infrastructures (rail, tram, busway,...)
- Alternative to Bump Integrator
- Measure very long waves (> 50 m) for airport pavement

