



The LTL-M mobile retroreflectorometer features

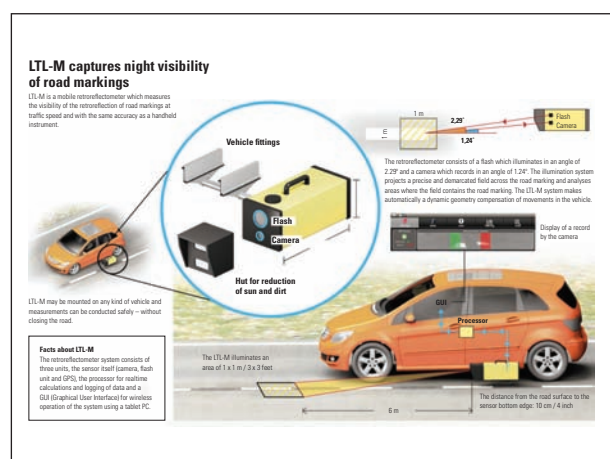
The efficient way to measure the retroreflection of road markings

LTL-M measures all types of road markings at a simulated distance of 30 m with the highest level of accuracy. LTL-M is to be used mounted on a vehicle measuring retroreflection at normal traffic speed proving full overview of the condition of the road markings. The instrument operates with an accuracy of typically +/- 5 % in line with DELTA's handheld retroreflectorometers LTL-2000, LTL-X, and LTL-XL.

LTL-M is a robust, reliable and advanced instrument designed for professionals using the latest camera and illumination technology. This technology results in high accuracy independent of changes in the geometry of the system through an automatic image processing compensating for vehicle movements.

The LTL-M system consists of three parts

- The sensor system base unit mounted on the outside of the vehicle with camera, flash light and GPS
- The real time processor placed in the car
- The GUI (Graphical User Interface) Tablet PC placed next to the driver



LTL-M illustration from the Danish Engineering magazine Ingeniøren



LTL-M mounted on a car

LTL-M measures R_L (nighttime visibility) under dry and wet conditions, daylight contrast as well as records line geometry and missing or non-working road studs (RRPMs).

LTL-M measures white and yellow of road markings up to 25 mm/1 inch in profile with no adjustments needed. Both calibration and change of light source can be done with a simple operation in the field.

LTL-M comes with built-in precision GPS and can be delivered with DMI (Distance Measuring Instrument) and an overhead camera. GPS makes it possible to determine exactly where any specific measurement has been carried out. A DMI unit ensures correct distance measures if GPS contact cannot be established. An overhead camera will make visual inspection of problem areas possible when data are reviewed.

Measurement data, GPS data and other recorded data will be automatically stored. The system will give the driver the option of stopping and marking measurement during operation as well as inform about possible problems and malfunctions.



Video overlay

The software supplied with the instrument will be able to generate an easy-to-read report on the measurements as well as transfer data to Excel for further processing. LTL-M is prepared for easy software upgrades when new advanced road marking analysis is offered.

LTL-M calibration standard is calibrated at DELTA's DANAK-accredited laboratory and is traceable in accordance with standards issued by PTB (Physikalisch-Technische Bundesanstalt, Germany) and NIST (National Institute of Standards and Technology, USA). The instrument itself does not need re-calibration unless damaged. The recommended daily field calibration of the instrument is simple and easy to carry out.

DELTA offers service of the instrument at its factory and re-calibration of the calibration unit at its DANAK-accredited laboratory.



LTL-M GUI tablet PC

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The LTL-M features in brief

- Provide continuous measurements of full width and length of markings at traffic speed
- Measure R_L under dry and wet conditions
- Measure 1x1 m/3x3 feet
- Accuracy comparable to handheld retroreflectometers*
- Measure daylight contrast
- Measure plane and profiled markings up to 25 mm/1 inch
- Show and store day and time
- Record road studs (RRPMs)
- Record line geometry and marking off-set
- Provide average values between 1 m/3 feet and indefinite

* LTL-M has been tested October 2009 on Danish and Swedish roads in a NMF, the Nordic Meeting for Improved Road Equipment, project. The study was carried out by VTI, the Swedish National Road and Transport Research Institute. The results are reported in "Evaluation of the LTL-M. Mobile measurements of the road marking" by Sven-Olof Lundkvist 2010.

LTL-M has been tested by CEN (European Committee for Standardisation). September 2010. The results are reported in "Draft report of the first round robin test for mobile retroreflectometers - Final version".

The reports can be viewed and downloaded from roadsensors.com

LTL-M complies with the following standards

EN 1436, ASTM E 1710 and EN 1463-1.

Contact and further information

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