# Gradient Scanning 10m Wall

## In Dark Room facility

**L.E.T.**
**AUTOMOTIVE**

**Luminoscope**®

n.v.     Vaartlaan 20     B-9800 Deinze

ISO 9001 CERTIFIED
VINÇOTTE
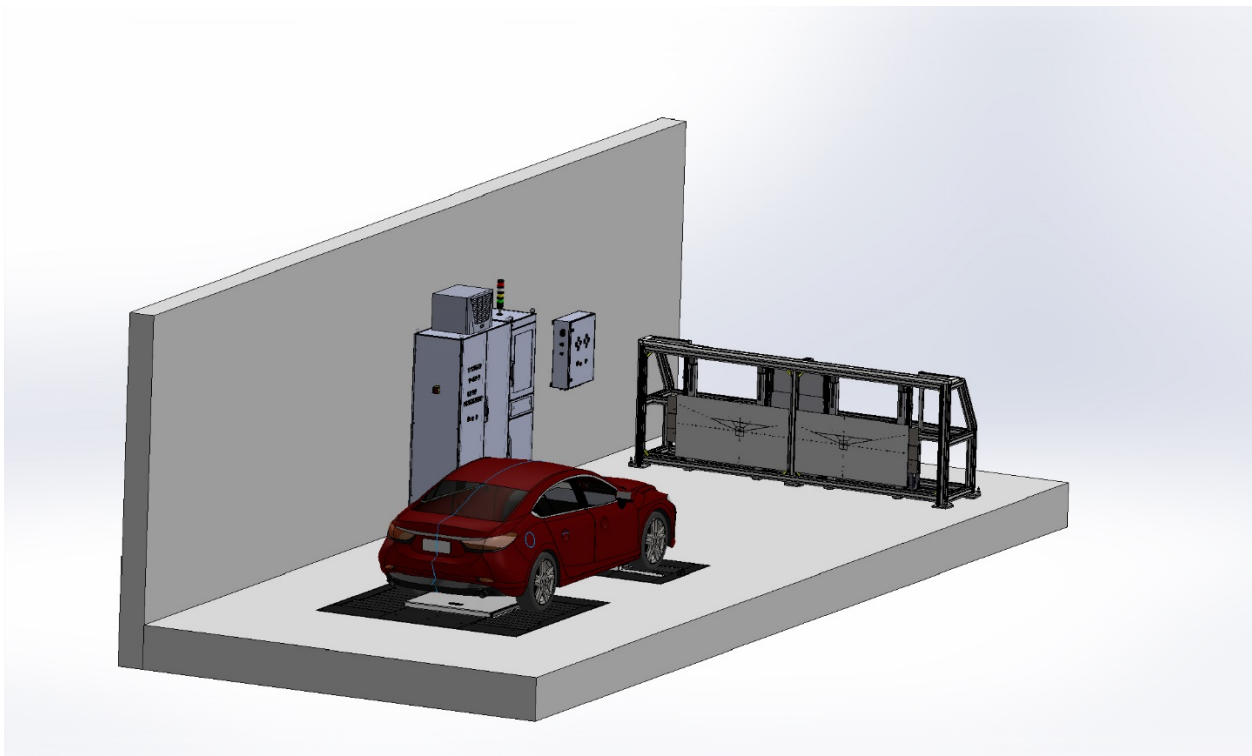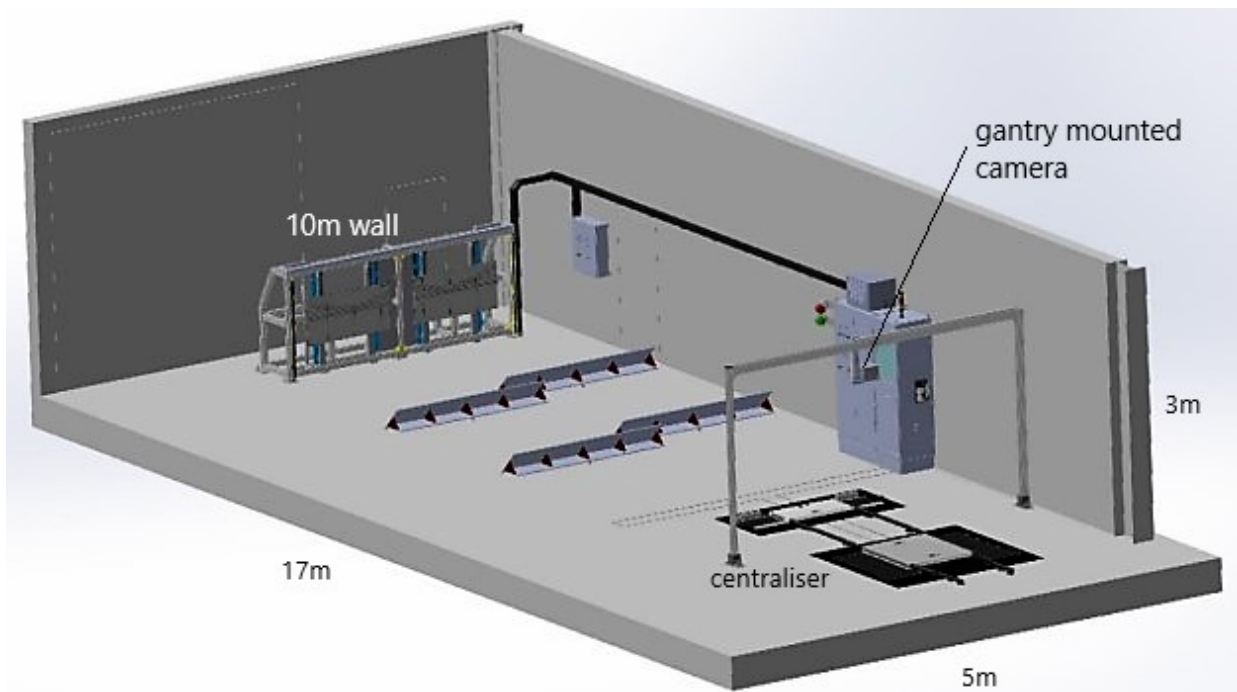
## Description
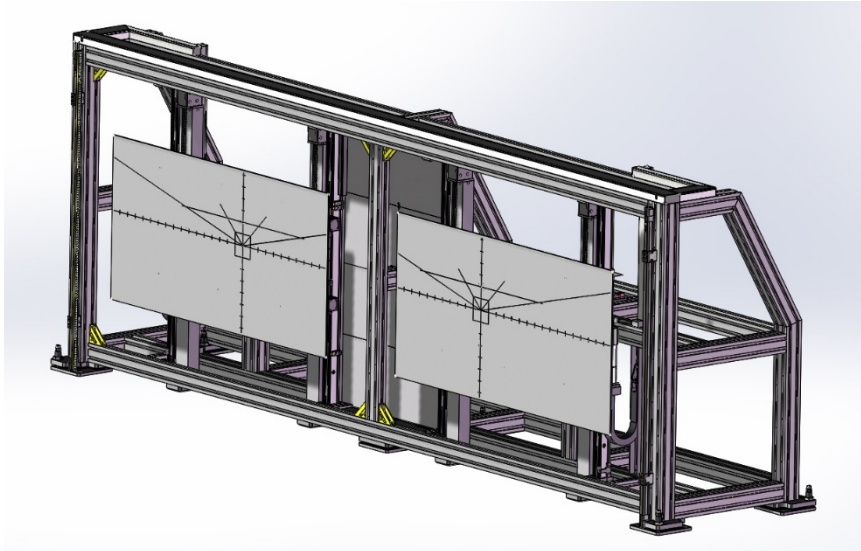


The 'intelligent' 10m wall is a construction, made of aluminium profiles and two white panels with specific markings, for interpreting and estimation of the headlamp images and their adjustment.

The panels are motorised in Y/Z and can be remotely controlled.

A centrally integrated red laser can project a laser dot onto the headlamp of the vehicle in front to refer to the centre or zero point of the lamp.

A number of photocells is horizontally positioned and integrated in the panels.

By moving the panels in both horizontal and vertical direction, a scan can be made of the headlamp image.
All measurement data of the light intensity is stored and used in the algorithm to calculate the gradient and the position of the cut off line.

At the end of a cycle, the panel is positioning it's reference line onto the calculated location of the cut off line, to allow the operator to verify the result with his own visual interpretation.
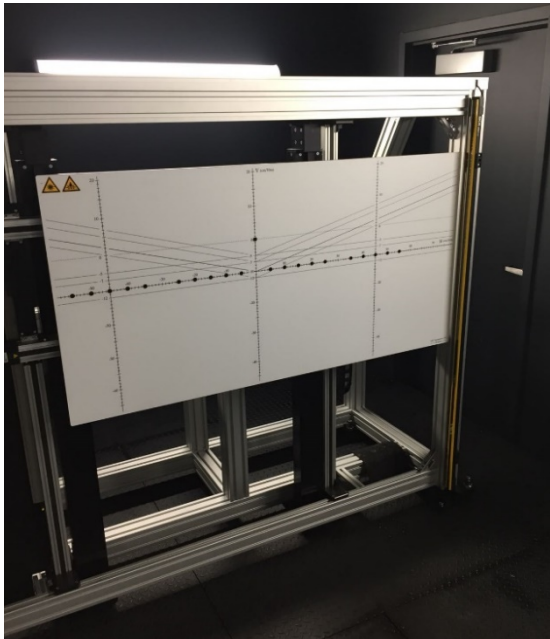
The equipment shall be installed in a **dark room** – for a good functionality, it should be possible to dim the ambient light to < 3 Lux.

Civil works and the construction of the dark room itself are not part of L.E.T.'s supply and should be organized by the customer.

Also the light reflection preventing wooden baffles (to avoid reflections from the floor) are not foreseen – L.E.T. can provide the drawings for these so that the customer can outsource this locally.

The concept of the system is based on the use of a **mechanical centralizer** to ensure the straight positioning of the vehicle in front of the 10m wall
The vehicle is physically pushed in the straight position to ensure a correct alignment with the 10m wall in front, prior to the evaluation of the headlamps.

In most cases, the centralizer can be integrated into the floor.
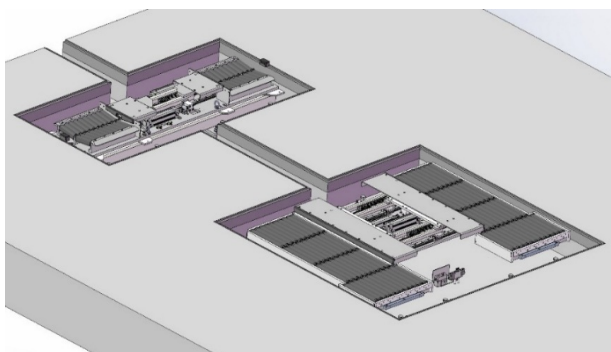
- Layout of the wall boards according to the specifications
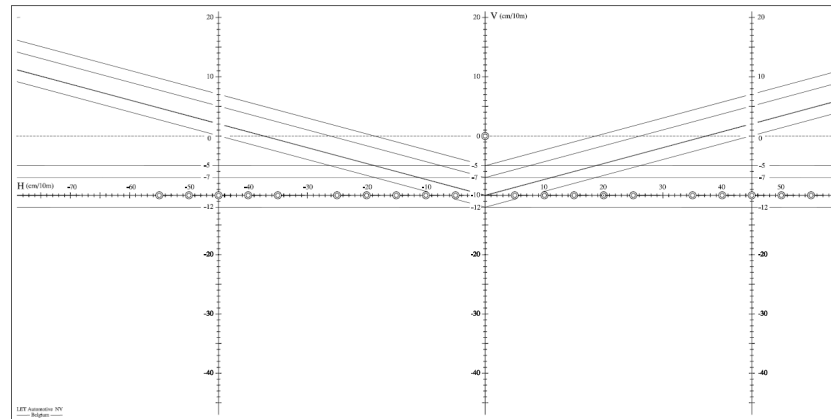


example of a possible layout for the 10m wall board

- The left and right board can be electrically positioned in Y (horizontal) and Z (vertical) direction.
  Control components will be integrated into an extra electrical cabinet, type Rittal AE. The cabinet will be painted in black.
- Each board will have an integrated laser for alignment purpose.
  Movement range of the boards, referred to the laser position:

| | |
|---|---|
| Left board (into driving direction): | Y: -1000mm till -550mm |
| | Z: 500mm till 1225mm |
| Right board (into driving direction): | Y: 550mm till 1000mm |
| | Z: 500mm till 1225mm |

Accuracy positioning: ± 0,1mm

The boards will be equipped with photocells positioned in such a way that by scanning the transition from dark to light on a section of the headlight pattern, the correct position of the cut-off line can be determined.

Size of the panels: 700mm height – 1400mm width

- The frame is made of Alu-profiles and shaped into a rigid structure.
- A wired control box and a wireless remote control system are foreseen.

## Calibration concept

A master frame is used for calibration

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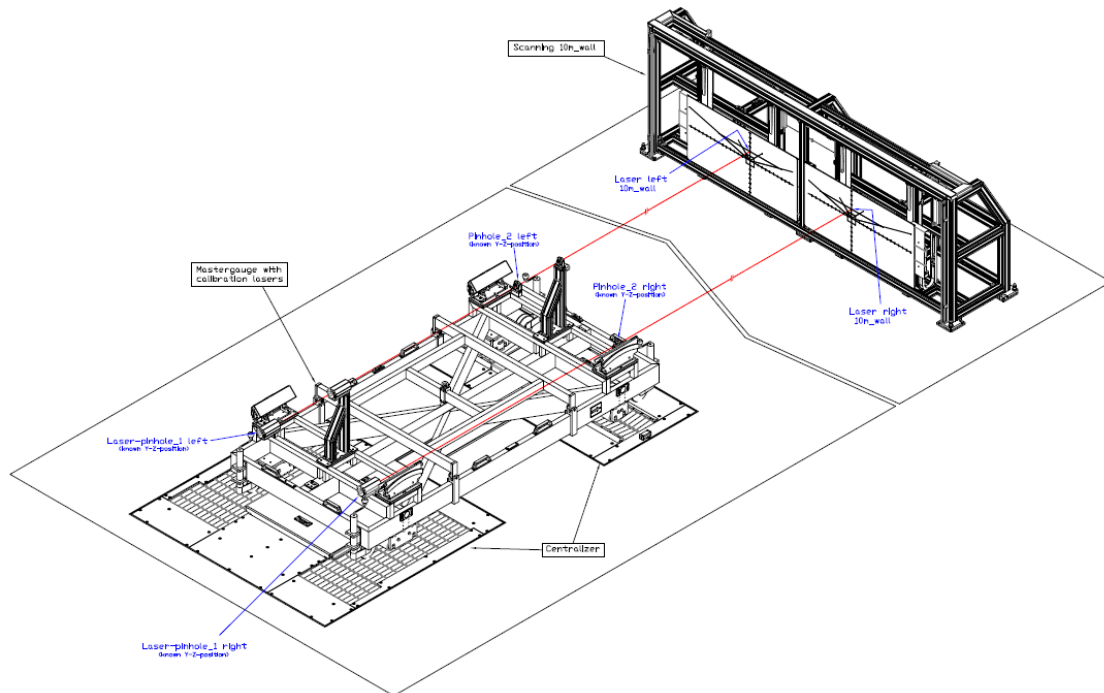
For the calibration process, the lasers on the master will be directed through their two pin holes towards the reference laser holes in the two 10m wall panels.

The panels will have to be moved such that the master lasers hit the location of the 10m wall lasers.
Switching off the master lasers will allow the 10m wall lasers to be adjusted in their supporting mechanism behind the panel such that, by activating them, they pass perfectly through the pinholes of the master frame.


**Gradient measurement**

A software package is foreseen for scanning and gradient measurement on the transition from dark to light on a section of the headlight pattern.
With these data the correct position (Up/down and Left/right) of the cut-off line and as such the position of the V-point can be determined.


The algorithms will be developed so that all headlamp types of the concerned plant can be treated on the audit stand.
New types of headlamps or headlamps of a next generation that might afterwards not respond to the developed algorithms will be subject of a separate investigation.
In this case, by mutual agreement, a separate quotation for fine tuning of the algorithm might have to be offered.

For saving a picture of the beam pattern, a separate camera in a
protecting housing on a gantry or mounted to the ceiling of the dark room, can be
supplied.
This camera can take a picture of the beam pattern as projected on the 10m wall
panels, which can then be stored for later use. The gradient curve is
always calculated and stored as part of the standard supply.

Reports and graphs can be consulted on a webpage.
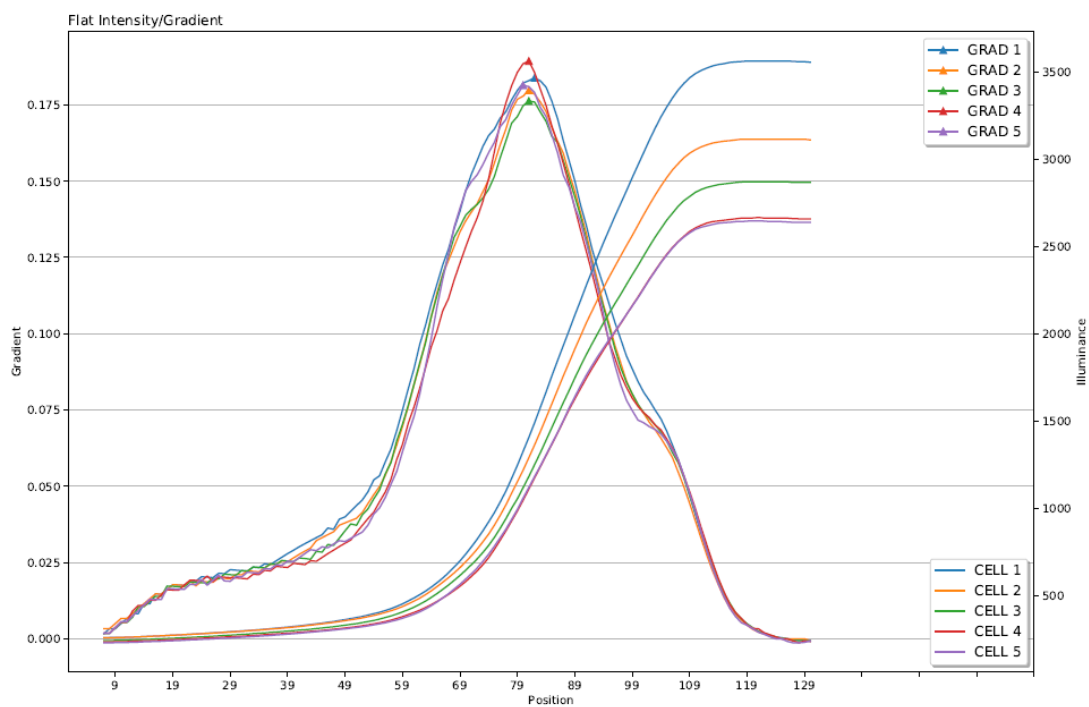


Example of intensity and gradient curves