These release notes are describing changes in LIMES 2000 since version 17.0922.942. The new release deals with features for aiming of automotive headlamps only. Besides, a number of cosmetic issues discovered since the introduction of the last version have been fixed.

Installation

LMTAO version 1.2.83 or higher is required for LIMES 2000 rev. 18.0119.961. If the LMTAO library is not installed or shows a wrong version, Limes and LimesControl will not start. LMTAO is available for download on the LMT homepage.

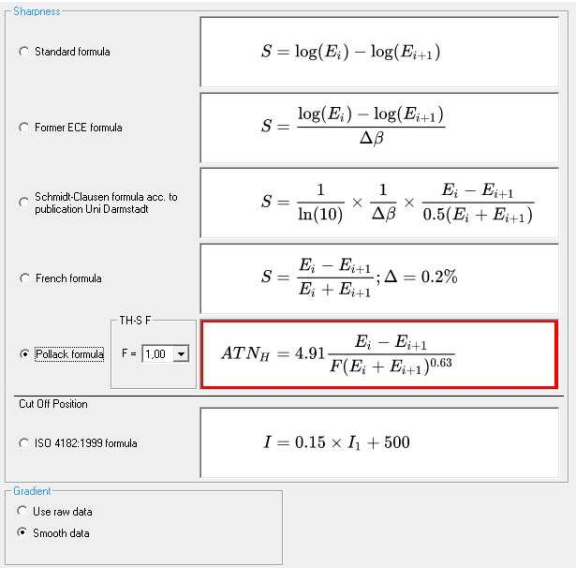
General changes in Limes 2000 with regard to vertical aiming

Instead of displaying the offset as relative value with regard to the former offset from now on the vertical offset of the DUT is always stated using the absolute offset. If for instance the visual aim targets an offset of -0.57°, the report will state that the offset is set at -0.57°. If visual aiming is repeated, the offset is again set to -0.57°. Formerly, it would have shown 0.00°. Offsets assigned to a fixture are not affected by the procedure and remain unchanged.

Zonal aiming procedures always use a resolution of 0.01° to get in all situations correct positions.

Calculation of cut-off position and sharpness

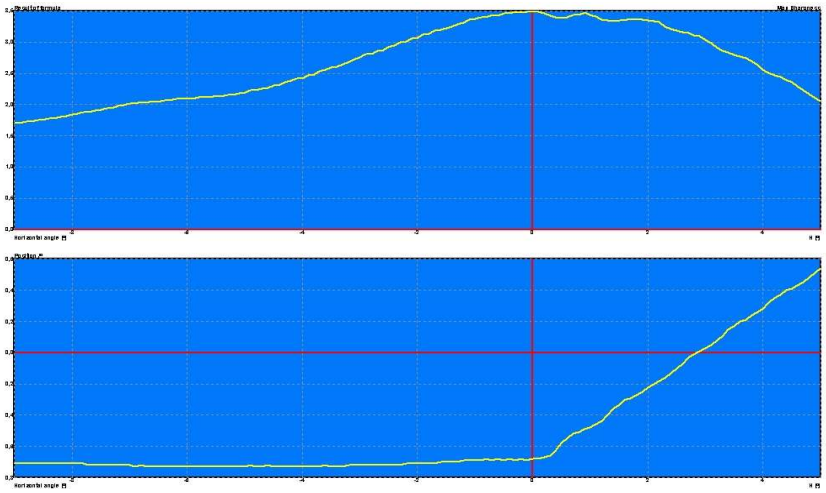
The menu for choosing the aiming algorithm has been re-arranged (see picture on the right). In the upper part of the window algorithms delivering both cut-off position as well as sharpness are available. The ISO 4182 formula giving only cut-off position is separated in the lower part.



An additional formula has been added. It is based on the investigation of Pollack et al (see for instance “Lage und Qualität der Hell-Dunkel-Grenze in der Lichtverteilung”, published in ATZ 01-1998). Instead of sharpness the “apparent threshold number” (ATN) is calculated. The method is positioned in between linear and logarithmic contrast assessment.

The algorithm according to Pollack allows differentiating the absolute value by the introduction of the threshold-slope factor F (see formula above). F may vary between 1.00 and 2.54 and can be chosen via a dropdown menu.

The new formula from Pollack is not only available for aiming but can be as well chosen in the gradient diagram. The plot below shows in the upper part the cut-off sharpness in the range in between H = -9° and H = 5°. In the lower part the position of maximum sharpness (Gradient, ATN, etc.) is shown. In the example it indicates for a standard low beam projection system the course of the cut-off in the scanned area.

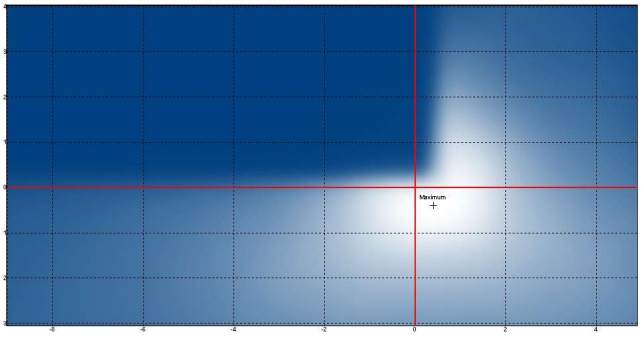


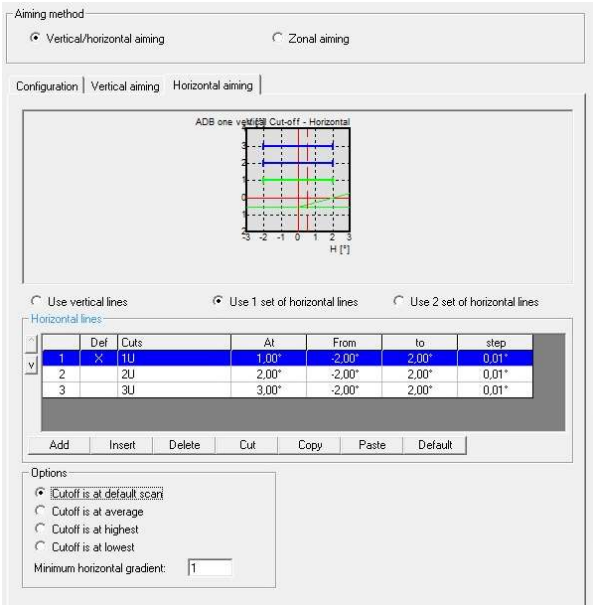
In order to achieve acceptable results LMT recommends for such applications using vertical grid scanning instead of horizontal scanning to allow recording the data in the sequence as they are being used in the evaluation.

Horizontal aiming with one vertical cut-off

The menu for horizontal aiming has been expanded to allow for multiple horizontal lines.

This has been introduced to aim ADB systems with beam patterns similar to the one shown in the plot on the right hand side.





Horizontal aiming with horizontal lines has the same evaluation procedure as vertical aiming.

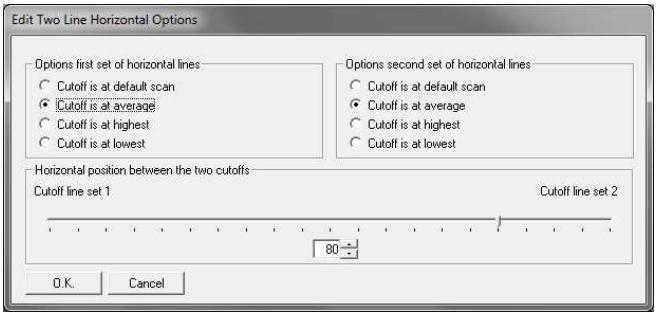
The window on the left hand side displays how such a set of horizontal lines is defined. Similar to the menu for vertical settings the aim can be adjusted to the default line (marked with an “X” and plotted green in the window on the left hand side). Alternatively, it can be set to average, minimum or maximum value.

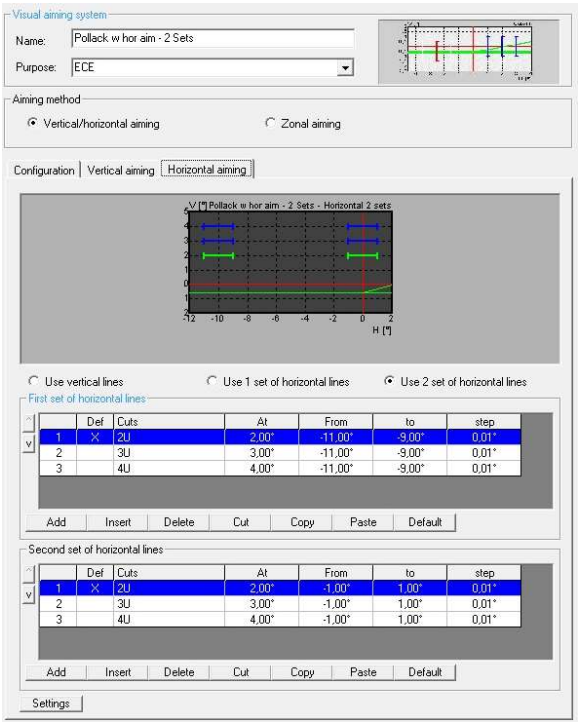
Horizontal aiming in situations with two vertical cut-offs

In analogy to above mentioned situation, ADB systems with two vertical cut-offs can be adjusted with two sets of horizontal lines (see right).

For both set of lines the horizontal offset is determined and subsequently, the user can decide the relative horizontal offset position via the settings menu.

In the example below the horizontal offset is set to 80% in between line set 1 and 2.



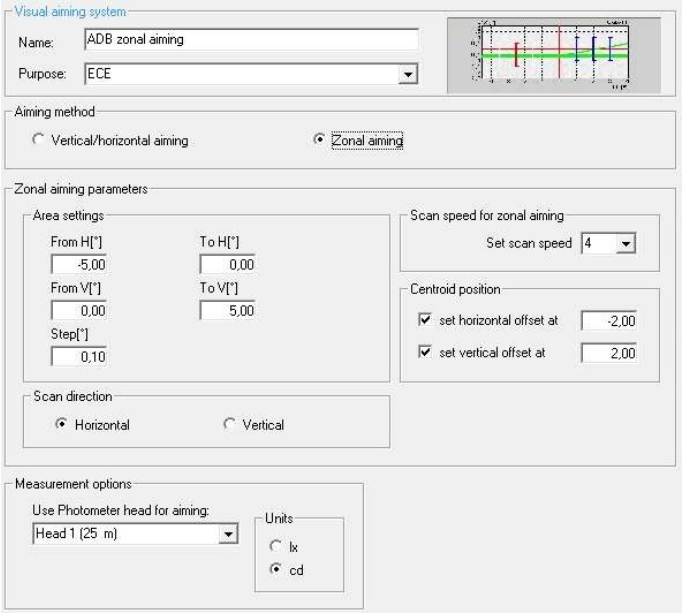


Zonal Aiming

In addition to gradient evaluation the visual aiming menu has been expanded with the option of zonal aiming (see right hand side).

Zonal aiming accounts for applications like marking light and provides the centroid of the region which is being evaluated.

The luminous flux centroid calculation is similar to the centre of mass concept; however, instead of mass the luminous flux within a certain solid angle is used for the calculation.



$$\vec{X} = \frac{\sum_{i=1}^{n} \Phi_i \vec{x}_i}{\sum_{i=1}^{n} \Phi_i}$$

The user can further choose whether either the vertical or the horizontal or both offsets shall be set (see above). The position which has been found will be visible in the result table and

can be adjusted with an additional relative offset. The distribution which has been recorded for determination of the centroid is available via the table view for intensity or illuminance values and can be saved in csv data format for further evaluation.

The progress of zonal aiming is visualized with a blue coloured line showing the position of the actual line scan within the chosen grid. It may be either vertical or horizontal depending on the scan direction.

The scan speed for zonal aiming can be set independently from the standard scan speed for visual aiming, but not higher than speed 4.

Miscellaneous

- Formerly, after measurement offset position was not saved. After saving and re-opening the offset position was chosen either to be -0.57° or -0.40°. The bug was fixed and the intended position for vertical cut-off will now be saved in the aiming result. However, old data may still show this erroneous behaviour.
- Auto-scale for X- and Y-axis in aiming diagrams will now work correctly as well for horizontal aiming using set(s) of horizontal lines.
- A runtime error sometimes occurred during roadway simulation due to grid solution not fitting to the test data. The bug was fixed.
- In case roadway simulation was activated, toggling between table and graphics view did not work. The bug was fixed.
- In case of highly saturated colours tristimulus values (X, Y, Z) read from a colorimeter device sometimes appeared outside the colour gamut. This behaviour has been corrected.
- Version (0.4) of TeleControl firmware control sometimes caused a timing issue in the communication. The bug was fixed.