

# Python Documentation

version

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# MEASURING EDITION

# BildoSoft

Bildosoft.com

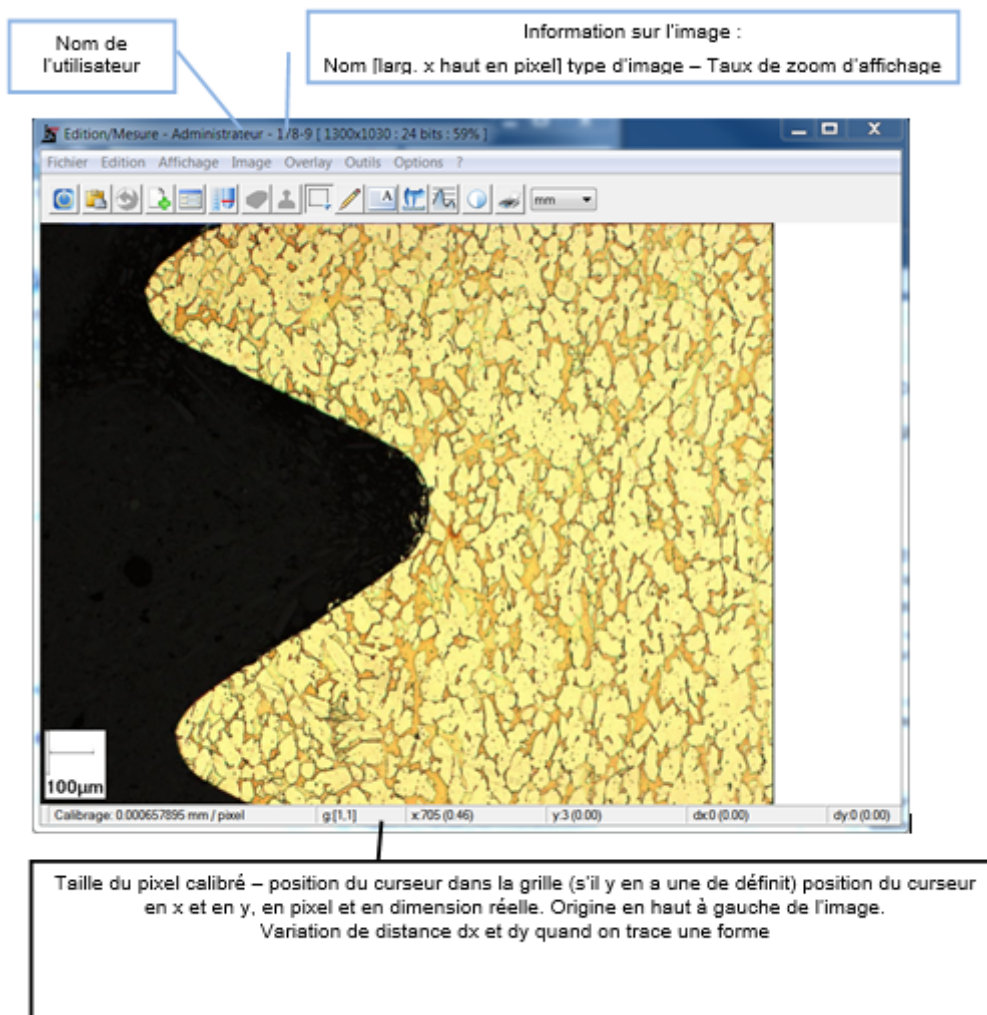
## User's Manual

### 1.1. EDITING/MEASURING WINDOW

Introduction to the editing window :

This window is obtained :

- For an image from the database: by double clicking on a thumbnail selected in the album,
- For a captured image: this is sent from the capture by clicking on "SEND TO EDITION".



### 1.1.1. GENERAL PRINCIPLES AND USE OF THE EDITION-MEASURE

The Measurement-Editor groups together the functions intended to work exclusively on a single image. This module receives an image from the database (section), from the capture, or from a file. The “work plan of the editing module” is not limited in size by Pegase Pro, but by Windows. So the dimension of the images usable with the edition measure varies from one machine to another and from one version of Windows to another.

Attention, the manipulation of images of great dimension requires a machine whose characteristics must agree with the use which one wants to make of it.

The Measuring Edition works only :

- On 8-bit images, 256 colors
- On 24 bits images, one million colors.

Its main functions are :

Image retouching:

- Enlargement and reduction,
- Contrast and luminosity correction,
- Interactive binarization,
- Automatic scaling
- Management of color tables.

Interactive dimensional measurements:

- Direct drawing on the image with the possibility of creating an overlay image,
- Length, surface and angle measurements,
- Export of measurements in a file readable by most of the spreadsheets and databases on the market.

Interactive densitometric measurements:

- Simple binarization
- Phase % on surface, lines, curves, ...
- Density R,G,B
- Density of gray levels

Annotations :

- Drawing and writing text directly in the image.
- Saving images and files in a section of a database.

### 1.1.2. MEANING OF THE ICONS IN THE EDITION WINDOW :



1. Close this document (database or file)
2. Paste by replacing the contents of the clipboard in the image
3. Undo the last operation (does not apply to all operations)
4. Add an image to section
5. Edit the file of the active image
6. Calibration of the image, manually, by an optical system
7. Delete the selection



## 1.2. FILE (MENU) :

- 8 . Stamp the graphic objects in the overlay
- 9 . Define a region of interest
- 10 Draw geometric shapes
- .
- 11 Add text
- .
- 12 Perform geometric measurements
- .
- 13 Densitometric measurements
- .
- 14 Controlling exposure
- .
- 15 Print
- .
- 16 Displays the current unit, i.e. the one currently used for displaying measurements in the “geometric . measurements” table. By clicking on the arrow on the right of the window, the other available units appear. Clicking on one of them changes the unit and from now on the results will be displayed and printed in this new unit.

## 1.2. FILE (MENU) :

Description of the functions of the File menu

### 1.2.1. CLOSE

Closes the editing module.

If the image comes from the database and has been modified, a dialog box asks to save the modifications.

- Yes : the initial image is overwritten and replaced by the modified image, you return to the Album.
- No : the modified image disappears, the initial image is kept.
- Cancel : you stay as you are.

*Note:* if you want to keep the initial image unchanged and the modified image you must use the command “Save as”.

- If the image comes directly from the capture.
- Yes: opens a Windows box to search for a directory to put the image file in after naming it. You return to the Album (in this case, there is no file or information attached to this image).
- No: the image disappears, we return to the Album.

### 1.2.2. SAVE

This menu is only active if the image in the editing module comes from the database. It is used to update the database with the current image and the associated data, overwriting the data that existed before the edition.

### 1.2.3. SAVE AS

This menu is always active. It is used to save the current image not in the database, but in a directory chosen using the Windows dialog box. Only the image is saved (in BMP, TIF or JPG format).

### 1.2.4. PRINT

This menu is used to choose the print format. Attention, this format is in addition to the printer specifications.

It offers :

## 1.3 EDITION

- 4 predefined image formats: 6x8 cm, 10x13 cm, 13x18 cm, 18x24 cm.
- 1 format defined by the user: enter the values requested in the corresponding boxes
- A format fixed by a “scale factor”. It is used to print the image at a given magnification. The magnification value must be entered in the box provided for this purpose.
- The selection of the correct format is made by clicking on the corresponding checkbox. The printout is launched by clicking on the Ok button.

Role of the check box “Print overlay”: You can make measurements, counting, ... in the measurement edition module. These operations create vector “objects” that cannot be printed as is. They have to be transferred to the “Overlay” plan so that they can be printed. The role of this check box is to mix the “overlay” image with the image to be printed and send it to the printer. This operation does not modify the image or the overlay.

To cancel the print click on the button at the top right of this window.

*Notes:* Whatever PEGASE function is used to print, the proportions of the image (height/width ratio) are never modified.

PEGASE calculates the right reduction or enlargement ratio so that the image fits in the chosen format, without distortion. The printed image will be centered in height and width, alone on the page.

### 1.2.5. PRINT CONFIGURATION

This command is used to access the dialog boxes for configuring the classic Windows printing devices

### 1.2.6. CLOSE

Closes the edition and closes PEGASE.

## 1.3 EDITION

### Description of the Edit menu

### 1.3.1. CANCEL

All operations performed between two records of an image are saved. Therefore, it is possible to undo several operations by clicking on this button in succession.

- When the button is grayed out, it means that there is nothing more to undo.
- It is not possible to cancel an undo operation.

### 1.3.2. CUT

Not used

### 1.3.3. COPY

Copy the current image to the clipboard.

### 1.3.4. PASTE BY REPLACING

Replaces the current image by the one contained in the clipboard. No transparency effect is possible at this level.

### 1.3.5. PASTE BY INSERTING

Inserts the image contained in the clipboard on top of the image being edited. The pasted image appears as a graphic object that can be moved with the mouse within the limits of the Pegase working plane. To move the image, place the mouse cursor on the inserted image, then press the left button and move the mouse without releasing the button. Once the image is in position, release the left button. When you click the “Stamp” button, the inserted image is added to the edited image. The final image may be enlarged to contain both images.

## 1.4. DISPLAY

### 1.3.6. DELETE

This command has the same function as the button



- It deletes the selection **frame** in the case of **cut**,
- It deletes the **graphic object** in the case of **drawing**,
- Deletes the **text** in the case of **text overlay** in an image,
- It deletes the overlay which has been pasted “**by inserting** “, when it has not been stamped.

*Note:* To delete an object, you must select it. To select it, click on the **tracking** button that corresponds to it, then click on it. The **Eraser** button is then activated.

### 1.3.7. DELETE ALL

This command deletes all graphic objects in an image. Graphics that have already been stamped are not affected. Once deleted, it is not possible to make these graphics reappear!

### 1.3.8. SELECT THE ROI

ROI means Region of Interest, i.e. a rectangular area of the image.

The image is cut into a rectangle by holding down the left mouse button, starting from the starting point, and dragging the mouse so as to delimit the interesting part of the image. When you release the mouse, the rectangle appears as a dotted line. After clicking on the command “**select ROI** “, a new image with the same dimensions as the original appears, with only this interesting part, in its original location. The rest of the image is gone, replaced by a white border.

*Note:* If you press the right mouse button beforehand, a rectangle appears with the word “draw from center” and you click on it, the rectangle will expand with the starting point as its center.

### 1.3.9. CUTTING THE ROI

Cuts the image along the rectangle drawn by the user, as shown above, and creates a new image containing only the selected area. The resulting image allows you to

### 1.3.10. INSERT OVERLAY INTO THE IMAGE

The Stamp Overlay in Image command is used to stamp the overlay image permanently into the edited image. If this button is inactive then no overlay is available for the edited image. If this button is active, an overlay is present.

Overlying consists in writing directly on an image. If the overlaid image is saved, it will never be possible to go back to the original image. The portion of the image located under the overlay is permanently destroyed! If the image has not been saved, the button undo is active and you can always return to the original image by pressing this button.

This command is particularly useful if you want to send an image file by email or diskette with information written in it.

### 1.3.11. EDIT FILE

Brings up the data sheet associated with the current image, allowing the user to modify its content (same function as the “Edit File” command in the album’s Edit menu).

## 1.4. DISPLAY

### 1.4.1. REFRESH (COMMAND)

This command is used to force PEGASE and Windows to update the displayed data.

## 1.5 IMAGE

### 1.4.2. ACTUAL SIZE

This command displays the image with the default resolution: 1 screen pixel = 1 image pixel. This command is useful when you are zoomed in and want to return to the default state.

### 1.4.3. FRONT ZOOM

- this command enlarges the image. The zoom mode only works if the image has already been reduced in size and you want to enlarge the image again. If the image is in its default resolution (1 screen pixel = 1 image pixel), this function is inactive
- Any attempt to use any other function than measurement automatically returns the image to its original state.

### 1.4.4. REVERSE ZOOM

- This command decreases the apparent size of the image. An image that would extend beyond the display space of the screen can therefore be seen as a whole. The zoom fully supports the measurement. This means that measurements can be made at any zoom level.
- Any attempt to use another function than measurement automatically returns the image to its original state.

### 1.4.5. OVERLAY

This command functions as a switch to turn on and off the display of the overlay image over the image itself. When the overlay is on, a small “v” appears before the word “overlay”.

### 1.4.6. GRILL

This command is used to display a counting grid over the image according to the parameters set in the option/define grid menu.

### 1.4.7. COUNTER

This command causes the colored dots used for counting objects to appear (a check mark is displayed before the word Count) or disappear from the Edit/Measurement tool menu “**Count**”.

### 1.4.8. TOOLBAR

The floating toolbar can be moved anywhere on the screen. For example it can be moved vertically to the sides, or even off screen... The “Toolbar” command is used to make it reappear horizontally, under the menus.

## 1.5 IMAGE

### 1.5.1. IMAGE

This menu gives access to a number of functions for manipulating and processing images:

### 1.5.2. ADD TO DATABASE

This command has the same action as the icon Undo, it is used to enter an image in the database.

The new document insertion form appears for :

- Select the catalog,
- Choose the section
- Fill in the form ...

### 1.5.3. MOVE

By selecting this command, the cursor becomes a hand-shaped icon. You can then move the image on the background by pressing the left mouse button while the mouse cursor is on the image. The image "sets" as soon as you release the button.

### 1.5.4. NEGATIVE

This command behaves like a photo negative and works on all image formats.

### 1.5.5. INVERSION G/D

Inverts an image Left/Right.

### 1.5.6. H/B INVERSION

Invert an image Up/Down.

### 1.5.7. ROTATION

This command asks the operator to enter the parameter "**angle**", then rotates the current image by the value of this angle.

To avoid loss of information, the resulting image is larger than the original. The parts not occupied by the previous image are blacked out. **Warning** this function can take a long time to execute, which is not negligible on small machines... **Implementation** (see also example in APPENDIX) :

#### Angle of rotation

This angle is counted from a vertical line oriented from bottom to top, center of rotation located at the lower end, value of the angle counted positively when turning clockwise. Thus, a vector drawn on the image to be rectified will systematically be **drawn vertically**, its origin (the first click) will be at the bottom of the image and its end (the second click) will be at the top of the image. Clicking on the rotation command.

To obtain the rotation you can :

- Either enter the angle corresponding to the definition above and press Ok.
- Or draw a **rotation vector** on the image to be rotated, a vector that we want to see become vertical - origin at the bottom, end at the top - after rotation, and press OK. Illustration below:
- The dialog box displays the angle of rotation.

### 1.5.8. EGALIZATION

### 1.5.9.

This command acts on the balance of light and dark in a grayscale image. Equalization modifies the distribution of gray levels and therefore the image. The purpose of this modification is to have the same number of pixels in the image with a given intensity value (on the brightness for a monochrome image or on each channel for a 24-bit RGB image).

### 1.5.10. NORMALIZATION

This command calculates the blackest pixel and the whitest pixel of the image.

Then it stretches the distribution of the gray levels in a linear way by putting the blackest pixel at the true black ( 0 ) and the whitest pixel at the true white (255).

This function does not change the relative distribution of gray levels.

## 1.5 IMAGE

If gray levels are present for all values from 0 to 255, this function does nothing, unlike equalization which will still have an action

### 1.5.11. LUMINOSITY/CONTRAST

This command acts on an image like the buttons with the same name on a television set.

Two sliders are available to the operator.

Once these sliders are moved, you can see the effect on the image, which is automatically modified. If you press "cancel", the image returns to its previous appearance.

### 1.5.12. SHADE/SATURATION...

This command is used to interactively modify the hue and/or saturation of each pixel, without changing the brightness.

Unlike luminosity/contrast this function works in the T S L (H I S) plane.

### 1.5.13. GAMMA CORRECTION

This command acts on the brightness and contrast of the image according to a predetermined curve.

Enter the requested parameter and press "Ok".

As an indication :

- A "gamma" of 1 is neutral, it does not change the appearance of the image.
- A "gamma" lower than 1 lightens the image and increases the details in the dark parts,
- A "gamma" greater than 1 darkens the image and increases the details in the light parts.
- A value of 1,45 is the correction generally brought to the image by a television screen.

### 1.5.14. ADD A FRAME

This command is used to add a border of a given color to the image being edited. The width of this border is expressed in pixels and with the 4 values corresponding to the 4 sides. The color can be freely chosen by the user.

### 1.5.15. SCALING

- This command is used to change the size of an image that was taken at a given magnification into an image taken at another magnification. Note that the image is actually reduced or enlarged. It can easily exceed the capabilities of the computer if you are not careful.
- It works like re-calibration by an optical system, except that in this case the calibration is not changed, but only the size of the image. With this function, an image will behave as if it were under a zoom. It can be used as a zoom in magnification.

Of course, the calibrations are automatically adjusted so that accurate measurements can be made.

**Note:** the measurements must all be made at the same magnification.

### 1.5.16. ZOOM

As its name suggests, this command is used to modify the dimensions of an image. The most common formats have been predefined.

- To select a format, simply click on the corresponding button. If you choose "Custom Size", you can freely choose the final size of the image in pixels.
- If you want to keep the aspect ratio of the image, you should check the box "Keep aspect ratio".
- If image pixels are created, which is the case when the image is enlarged, in one or both directions, the new pixels are a copy of the original pixels.

## 1.5 IMAGE

If the enlargement is significant, the effect of "pixelization" is quickly seen, i.e. the image appears to be made up of many "blocks". Be careful, the memory available under Windows is not unlimited. If the image occupies more than 5% to 10% of the available RAM the operation may be very slow.

### 1.5.17. ZOOM INTERPOLE

This command does the same job as the zoom command, but with a pixel creation algorithm that takes into account the intensity of the neighbors of each pixel. Thus the effect of pixelation is greatly reduced, regardless of the magnification.

Note: the interpolated zoom function does not create any information.

Attention, same remark as before concerning the available memory...!

### 1.5.18. % OF PHASE

The measurement of the phase proportion is the calculation of the ratio of the measurement of the areas saturated in white (pixel value 255 for a monochrome image or (255;255,255 ) for a color image) in relation to the rest of the image

This command calculates the number of pixels of value 255 in the edited image.

If the image is RGB - 24 bits, this calculation is done for each channel independently and the result is presented on three lines

- RedSaturation Sum of the gray levels % of the red phase / totality of the image
- GreenSaturation Sum of the gray levels % of the red phase / totality of the image
- BlueSaturation Sum of the gray levels % of the red phase / totality of the image

**Example:**

RedSaturation 17011 pixels 3. 85%. GreenSaturation 12628 pixels 2. 85%. BlueSaturation 14514 pixels 3. 28%.

### 1.5.19. FILTERING

This menu gives access to the commands:

- - Net: Brings out the details of the image
  - ++ Net: Same action as above, but more accentuated.
- - Blur: Reduces the details of the image
  - ++ Blur: Same action as above, but more accentuated

**Note** : these commands exist in the form of macro

### 1.5.20. CONVERSION

An image can be computer coded with more or less colors.

PEGASE can perform the following coding conversions:

From the current image:

- To a grayscale image, (black and white image)
- To an image with 256 colors, (8 bits)
- To an image with 16 million colors. (24 bits)

**Warning:** the passage of an image 16 million colors to an image 256 colors or levels of gray, will involve modifications of the aspect of the image!

The conversion of 256 colors or levels of gray towards 16 million colors can cause a dithering on the screen. This does not mean that the image is altered, only the display is altered.

### 1.5.21. PSEUDO-COLOR

To make a color image, we break down each elementary point of the image into three elementary points: Red, Green, Blue. An image is said to be True Color (or 24 bits) when each channel can freely take a value between 255 and 0.

To represent 255 different values it is necessary to use 8 bits in machine language. Hence  $3 \times 8 = 24$  bits is the computer space needed to code a pixel in true color.

As 8 bits represent a byte, it takes 3 bytes for a pixel. To save space, a solution is to use color tables. A table of color makes correspond a set of triplets RVB to a set of values, in general 256. It is thus enough to store the table of coding for all the image and the coded image on 1 byte for each pixel. The image is reduced by a factor of almost 3, but at the cost of a restriction of possible colors. This transcoding table is also called palette.

Nine predefined palettes are available in the menu.

The inverse command affects the color table and not the pixel value (it is the Negative command which inverts the pixel value without worrying about the color table).

This is the command that should be used to invert an image in 256 colors. The Export and Import commands are used respectively to write and read files containing a color palette.

These files must have the .PAL extension and can be read or created by any text editor capable of working in MSDOS text mode (Microsoft Word Txt format, Notepad or Wordpad Txt format,)

An extract of a .PAL file is given below.

Color number Red Green Blue

0 16 8 8

1 32 16 16

2 123 8 8

3 40 0 0

### 1.5.22. BINARIZATION

The Binarization is the action which consists in passing from an image A towards an image B which will contain only two colors: the black and the white. One says that the image is "binary". Everything that is white will be considered an object. All that will be black will be considered as the background (i.e. nothing!).

This definition is simplified but corresponds to the command of the measurement edition.

**Implementation:** The dialog box presented below allows you to choose :

- The high threshold, from which everything that is lighter is WHITE,
- The low threshold, below which everything darker is BLACK.

There are other more sophisticated binarization functions and even programming tools in the pegase modules. In fact, once the image is in binary form, it is possible to use measurement functions that automatically calculate characteristics, such as area, perimeter, .... on objects.

### 1.5.23. INSERT

Presents a sub-menu that gives access to functions that are used to insert a certain amount of graphic information into the image.

#### 1.5.23.1. Date/Time

This command inserts the current date and time into the edited image file. This insertion is destructive. To insert the date in the overlay (thus without destroying the image), you must use the text insertion command and select the "date" field of the file.

The positioning, font, size and color of the characters as well as the existence of a background and its color are in accordance with the parameters selected in the menu option/Date/Time.



### 1.5.23.2 Scale

This command inserts a scale into the current image file.

The position, the colors, the dimensions, ... are in accordance with the settings made in the Tools/Scale menu of the Edition. The scale of the image depends on the calibration of the image.

In fact, this data is used to calculate the ratio between a length of a certain number of pixels on the screen and the equivalent real length in user units. If the value (in user units) displayed by the scale seems abnormal, check that the image calibration is correct or that the choice of lens and optical system made by the user before capturing the image corresponds to reality. If this is not the case, choose the correct current system and redo the image capture or manually recalibrate the image with the correct optical system.

#### **Accuracy:**

The accuracy of the scale display depends solely on the Windows properties. These settings can be found in the Control Panel, Regional Options.

### 1.5.23.3. Graphic Object

- This command is used to retrieve an image from a file of type "BMP" and to overlay it on the edited image. The image is then considered as a graphic object that can be moved or overlaid in the image and not in the overlay. This overlay is therefore destructive.
- This command can be used, for example, to insert a logo into the image.
- It is also possible to position the pasted image outside the image itself, in the white part of the screen. In this case, PEGASE considers that the image is made up of a rectangular area containing the two images and saves it that way.
- By clicking on the command, "graphic object" a standard file selection dialog box appears. All you have to do is select the file corresponding to the image you are looking for.
- Once the file is selected, click on the OK button and the graphic object will appear superimposed on the image being edited.
- By positioning the mouse cursor on the graphic object and pressing the left mouse button, it is possible to move this object freely on the image.
- When the position is suitable, stamp to obtain the final result.

**Note :** the object is inserted into the overlay and then eventually into the image (the two commands are separate). However, the overlay is a 256 color image plane, so if the graphic object is coded in more colors, a modification of the colors may occur during insertion into the overlay.

## 1.5.24. CALIBRATE IMAGE

A detailed description is available in a separate Pegase Pro help document.

It can also be accessed by clicking on the "help" button.

## 1.6. OVERLAY

- The overlay is an image located on top of the original image.
- When you stamp the objects, it is not in the image but in the overlay. Thus, the original image is not altered.
- When you stamp the objects in the overlay, the list of objects in the measurement dialog box is not modified.
- This image can be retrieved from the clipboard, using the "copy" command in the overlay menu.
- The overlay image is an 8-bit image, monochrome or color, the overlay is an image automatically recorded by PEGASE in addition to the user's image, independent of the latter and identical as long as the measurements have not been stamped in it.
- This image contains the graphics when they have been stamped, and is superimposed exactly on the image being processed.

## 1.6. OVERLAY

- When editing an image you can choose to display this overlay so that the graphic symbols are superimposed on the image.
- The overlay is also used for printing to obtain the image and the overlaid symbols.
- It is not possible to print the graphic symbols of the measurement directly without stamping them in the overlay of the image in question.
- If the overlay can be recovered via the clipboard by selecting “copy” in the “Overlay” menu, this is the only possible access to this image which is entirely managed by PEGASE.

### 1.6.1. LIMITATIONS OF THE OVERLAY PLANE

Images can be cut and pasted into the overlay. However, the overlay can only display 256 colors. Any image with more colors will be transformed into a 256-color image. This can have consequences on the appearance of the image. Especially if this image contains solids or small variations.

### 1.6.2. PASTE BY REPLACING

This command replaces the content of the overlay with that of the clipboard.

### 1.6.3. PASTE BY INSERTING INTO THE OVERLAY.

- Inserts the image contained in the clipboard over the current image in the overlay.
- This image is an object that can be moved with the mouse. The edge of the inserted image is underlined by a dotted line.
- To move the image, place the mouse cursor on the inserted image, then press the left mouse button and move the mouse without releasing the button.
- Once the image is in position, release the left button.
- The inserted image may be larger or smaller than the edited image.
- Be careful, when you paste an image into the overlay, this image must be a 256 color image.

### 1.6.4. PASTE FROM

- This command is used to paste an image contained in a file directly into the overlay.
- You just have to look for its location, then select the file and click on its name.
- Be careful, when you paste an image into the overlay, this image must be a 256 color image.

### 1.6.5. MOVE THE OVERLAY

- By clicking on this image you can move the overlay image in the same way as you move the image itself using the command “move” in the Image menu.
- As soon as you click on this command the mouse arrow turns into a small hand attached to the overlay image which you can then move wherever you want (the edges of the overlay are symbolized by a light black line), as soon as you release the mouse button the image freezes.

### 1.6.6. TRANSPARENCY

- This function is applied to the overlay image only.
- You can define a transparent color for the overlay: all the pixels of this color become transparent, thus revealing the corresponding parts of the underlying image. It is essential that the part you want to be transparent is of a single color, otherwise some pixels remain opaque.
- To choose this color, position the mouse cursor on a part of the inserted image whose color should become transparent.

## 1.7 TOOLS

Then click on the right mouse button and the following dialog box appears: It shows the color that was under the cursor. A check box is used to activate the transparency of this color.

Check the box and press Ok to activate the transparency.

### 1.6.7. DELETE

Deletes the overlay image on the screen and all the objects it contains. This command is irreversible.

### 1.6.8. STAMP OBJECTS

This command is used to permanently insert the current graphic objects into the image overlay. Stamping the image in the overlay deletes the current objects

## 1.7 TOOLS

### 1.7.1. SELECTION (COMMAND)

It is used to put the cursor in a mode where it will be able to designate a rectangular area in the image. Two modes of defining the rectangle are available:

- The normal mode
- the draw from the center mode.

To switch from one mode to the other, click on selection then on the right button of the mouse. A floating menu appears: Clicking validates the mode “draw from the center”. In this case a small visible “v” appears before this menu.

### 1.7.2. DRAW

This command is used to define the elements necessary for the automatic drawing of a scale in the current image.

- The dimension of the scale is expressed in current units. PEGASE takes care of the conversion into pixels from the image calibration.
- The zone dimension in pixel gives the pixel equivalent of the requested dimension for information purposes.
- Number of decimal places: number of decimal places displayed in the scale insertion window.
- The position of this scale is determined in the “positioning” part of the dialog box.
- Four predetermined positions are possible.

The scale can be added to the image with or without a background.

- If “Transparent background” is not selected, PEGASE first draws a rectangle slightly larger than the scale drawing and then draws the scale itself inside. This is the best way to ensure that the scale is readable regardless of the image.
- You can also choose “Transparent background”. The scale then appears drawn on the image. This solution preserves the image as much as possible but may lead to difficulties in reading the scale for some images.

The number of significant digits displayed by the scale is determined by a parameter located in the scale insertion window.

Insert scale in title block

This command automatically positions the scale in an area outside the image. It automatically adds this area according to the layout chosen for the scale. The color of the title block is set by the parameter “background color”.

### 1.7.3. MEASURES

- The measurements are made in a plane distinct from the plane containing the image and the plane containing the layer.

- Each measurement corresponds to a graphic object which has a name or “label”.
- The results of the measurement depend on the calibration of the image. This calibration is done automatically when the image is inserted in Pegase Pro. The calibration corresponding to the current optical system is automatically associated with the new image. Of course, one can return to this calibration at any time.
- The correct operation of the measurement tool is thus entirely dependent on the quality of the calibration of the image.

Several methods are available for the exploitation of the measurements: direct reading, sending the results in the memo of the image on which one works, exporting in a file in dbf format or macro-commands. These various possibilities are explained in the relevant menus.

### 1.7.3.1. Presentation

By clicking on the measurement command you access the measurement functions.

- The measurements carried out by PEGASE concern essentially :
  - Lengths
  - Surfaces,
  - Angles

These measurements are available in the following dialog box:

- The selection of the measurement tool is done by checking the box corresponding to the desired measurement. You can then go directly to measure the image.
- PEGASE takes into account all the factors involved in each measurement to give the result in real size.
- Closing the measurement dialog box does not delete the measurement data. To save them permanently, simply save the image.
- When you reopen the image, the measurements will automatically reappear where they were.

By clicking on the button one reaches the densitometric measurements. These measurements, which are fewer in number than the geometric measurements, work on the content of the image and give access to various information such as the % of phase located in or under the measurement objects, the density of color : in a zone, ...

### 1.7.3.2. The different types of measurements

On the dialog box eight buttons allow the choice of the measurement tool to be used. Each measurement results in the appearance of one or more lines in the table with the display of the results To select a type of drawing, click on the name of the desired type.

- **The areas** are surfaces delimited by hand, as in drawing. The corresponding lines are named **Axx**.
- **Angles** are used to generate two lines whose angle is automatically measured and inserted in the measurement dialog box.
- The 3-point circle\*\* calculates the circle defined by three points.
- **The Palm** generates a measurement segment with a perpendicular line at each end, the length of which is set in the “Define measurement symbol properties” dialog box, in the “Options” menu.
- **Points** are marked with squares labeled **Mxx**.
- **Polygons** generate a single line regardless of the number of sides. The corresponding line is called **Pxx**.
- **Segments** are marked by lines named **Lxx**.
- **Polysegments** generate as many lines as there are segments drawn. Each line is named **Sxx**. For example a polysegment with four parts will give 4 result lines with the names **Sxx, Sxx+1, Sxx+2, Sxx+3**.
- **Legend**: allows you to move the marker of a measurement by entering it with the end of the mouse cursor.

*Note:*

All measurements are accessible via automation. Information on these macros can be found in the Pegase Pro automation help file. New macros are added regularly. If the necessary information is not available in your version of

## 1.7 TOOLS

the help file, contact your reseller or 2 I System to obtain a more recent or complementary version. Meaning of the table showing the results of the “geometrical measurements” dialog box:

**REMINDER:** If PEGASE has been previously calibrated, the distance and area measurements are automatically displayed in the unit chosen by the user. The values Cx and Cy represent the coordinates of the geometric center of the figure in question.

For example, for a point it will be the position of the point itself, for a circle it will be the center of the circle, for a rectangle it will be the center of the rectangle, ... The column “angle” on the left gives the angle in relation to the horizontal. The reference of the angles is the trigonometric direction.

The column “angle” the most on the right gives the angle compared to the last traced segment. The reference of the angles is the trigonometric direction.

Note that the lines are oriented positively with the following convention: the origin is the point of origin drawn with the mouse and the end is the last point.

### 1.7.3.3. Deleting a measure (see below)

The “Delete object(s)” button is used to delete one or more lines from a previously created table of measurements. Deleting a line results in the deletion of the graphic representation of the segment or polygon or area to which it corresponds. This is why it is called “deleting objects”.

To delete a measurement object present in an image:

- Select the left-hand column in the corresponding row of the table (the gray column containing the label of the measurement objects),
- Click on it,
- Click on the highlighted “delete object(s)” button,

You can delete several objects by pressing the shift key before making the selection (like in the Windows file manager).

Button “delete all”: deletes all measurements.

**Warning** It is not possible to go back for these deletions.

It is not possible to delete graphical measurement objects on an image that has already been buffered with these objects.

### 1.7.3.4. Implementing measurement by segment :

- To measure a length, simply position the mouse pointer on one end of the object to be measured and, keeping the left mouse button pressed, position the mouse cursor on the other end of the object to be measured, then release the left mouse button.
- The origin of the vector should be pointed at first and the end of the vector at second.
- If you hold down the Shift key (shift) you get a *vertical vector* .
- If you hold down the ctrl key, you get a *horizontal vector*.
- Angle measurement: two angles are displayed. The first angle (\*) is the angle that the vector makes with the horizontal. The second is the angle that this vector makes with respect to the previous vector drawn (if there is one).
- The positive direction of rotation is the trigonometric direction (counterclockwise).
- The origin of the angles is on the horizontal towards the left of the image.

### 1.7.3.5. Implementation of the measurement with a polysegment :

### 1.7.3.6.

## 1.7 TOOLS

- Position the mouse pointer where you want to start, then by clicking once, you anchor the first segment of the polysegment.
- After releasing the left mouse button, you can see that the line follows the mouse. To anchor the end of the first polysegment, click the left mouse button.
- Continue in this way until the last segment is reached, then click the right mouse button to abandon the drawing of the polysegment.

### 1.7.3.7. Measurement with Palmer

- This function allows you to draw a measurement line limited at the ends by two perpendicular lines.
- The length of the ends can be set, before drawing, in the “Define measurement symbols” box of the **Options** menu, with the “**Size of palmer (x10)**” parameter: the dimension is **10 times the displayed value**.
- This makes it possible to draw a line perpendicular to a line at a specific point in the image.
- There are two measurement objects: the Palmer II is used to draw a series of parallels to the original line. To activate this option, hold down the “Ctrl” key while making the measurement. The Palmer I does not have this function

### 1.7.3.8. Measuring with a polygon:

- Do like a polysegment, except that at the end, PEGASE **closes the geometrical figure automatically** .

### 1.7.3.9. Measurement of any surface:

- Position the cursor where the measurement should start.
- Press the left mouse button and without releasing it, move the mouse so as to follow the contour of the object to be measured.
- If the contour does not appear completely in the screen, release the left mouse button and move the window with the Windows ” sliders “.
- Move back as close as possible to the point where you left your trace and then press the left mouse button again.

Pegase eventually completes the path and the user can continue his path again.

When the path is complete, click on the right mouse button to close the contour.

*Note 1:* With this mechanism it is possible to make measurements on images larger than the screen.

*Note 2:* As long as the objects have not been buffered in the overlay, they occupy almost no space in memory. If we buffer the objects, the overlay image will take the necessary size to accommodate these objects.

*Note 3:* It is possible to make measurements in “Zoom” mode. In this mode the image appears smaller than the original image. You can return to the real size of the image at any time. The measurements automatically follow this change of scale.

### 1.7.3.10. Measuring an angle

- The principle of this measurement is to draw a “V” corresponding to the angle that you want to measure.
- The first click anchors the center at the origin of the angle, the next two clicks fix the ends of the two sides of the angle.
- The resulting trace remains on the screen and may have a label.

### 1.7.3.11. Measurements on a circle from 3 points

- This function draws the circle corresponding to the three points clicked. It calculates the diameter and area of the drawn circle.

### 1.7.3.12. Distance

- This button displays the list of measured objects. Select two of these objects with the mouse and press Ok,
- A vector representing the distance between the two selected objects is automatically displayed on the image and the distance “D” is entered in the dialog box.
- The measured distances can also be used as a support for later measurements

**Note:** in principle, the reference point of a circle is its center; for other figures, this point is the geometric center.

### 1.7.3.13. User labels for a measurement

By default, PEGASE automatically assigns reference points to all measurements by applying a convention to differentiate surfaces from vectors:

Area **A** xx

Angle **An** xx

3-point circle **C** xx

Palmer **T** xx

Point **M** xx

Polygon **P** xx

Polysegment **S** xx

Segment **L** xx

For example, if you want to see “wear” displayed instead of L12 when you make a length measurement, you must have a file containing a label with the word wear.

The above labels can therefore be modified by the user:

- It is necessary to create with the menu command **Options/Measurement labels management** (see this command) a file named “**labels**” containing the list of new labels.
- Locate this file as a Glossary file
- In the “Geometric Measurements” dialog box, select a measurement line that has already been executed,
- Right-click on the gray box to the left of this line (which already contains the original label) where you want to enter the new label,
- The list of new names appears, click on the replacement name to transfer it.
- Repeat for each measurement line,
- Close the box to take into account the new labels,
- Open it again with the Geometric Measurements command to display the final labels.

### 1.7.3.14. Transfer to Memo (see below)

- By clicking on this button, PEGASE sends the data present in the measurement table directly to the memo field of the database. For this transfer to be possible, the image must be accessible in read/write mode.

### 1.7.3.15. Name the measures

- If you place the mouse cursor on a measurement label and click on the right mouse button, a window called “labels” appears. In this window you can insert names that can be assigned to the selected measurement to replace its automatic label.

- The content of this window is managed by the “Measurement labels glossary” command.

### 1.7.3.16. Print Measurements

- The measurements cannot be printed directly. You have to transfer them to the layer and then select the “print overlay” box in the print format dialog box. The image is then mixed with its layer to be printed

### 1.7.3.17. Pointing

A pointing assistance tool is available for creating measurement points.

- If you select a measurement point and then *hold down the ctrl key* while clicking the left mouse button, a line appears and disappears when you release the left mouse button.
- This line symbolizes the zone where pegasus must look for a transition\*. If it finds a sufficiently marked transition, it then positions the measurement point in this place.
- The front detection is done from dark to light\*. The longer the segment, the more potential error there is. To obtain a good operation, it is necessary to have a sufficient contrast and a low noise image.

### 1.7.3.18. Densitometric measurements

This tool corresponds to the button :

- It works in the same way as the geometric measurements tool, with the following differences: The graphic tools available are: Segments, areas, circles, polygons.
- For each measured value the following parameters are calculated:
- $Dens X^{**}$ : Displays the optical density of the pixels included in the corresponding area. The optical density is the sum of the intensities of each pixel of the selected area.
- $\mu X^{**}$ : Value of the average pixel in the selected area
- **SatX** : Number of pixels with a value of 255 in the selected area
- **%X** : Percentage of saturated pixels in relation to the number of pixels in the area measured (and not in relation to the area of the image)

Where X can take the values R, V, B.

For a monochrome image, the measurements will be the same on the three channels

*Reminder:* We recall that a pixel is coded on three bytes, a red, a green and a blue. Each color can have an intensity ranging between 0 and 255.

### 1.7.3.19. Complements

3 additional commands are available:

- Area, circle, distance, diameter
- These commands are used to make measurements from the points previously positioned by the operator. By clicking on one of these buttons, the operator is invited to choose a number of points corresponding to the measurement to be made in the list presented.

## 1.7.4. DRAWING

Once you have selected this command or pressed the button, you can draw on an image :

- Circles,
- Rectangles,
- Lines with or without arrows

Flat figures can be drawn with or without filling.



### 1.7.4.1. To draw a solid rectangle :

- Position the cursor arrow on the image, then click on the right mouse button
- Select a hatched rectangle,
- Use the left mouse button to draw by placing the mouse arrow where the upper left corner of the rectangle should be, then dragging the mouse, keeping the left button pressed.
- To change the color, select the rectangle by clicking the left button, then by clicking the right button select "color".

### 1.7.4.2. Move Objects

All objects created in this way and not stamped can be moved.

To move an object :

- Place the mouse cursor on the object and click to select and pick it up,
- Move the mouse while holding down the left button.
- When the object is well placed, release the mouse button.

### 1.7.4.3. Change the properties of a graphic object

The thickness of a line or its color can be changed after it has been drawn.

- To do this, position yourself on the line and click, the object should then appear dotted.
- Click on the right mouse button.
- The properties dialog box appears in which you can directly modify the characteristics of the object.

Notes : Arrow endings :

A stroke can be terminated by one or two arrows. This characteristic is shared with the length measurements and the associated dialog box:

Option/Define symbols measures/ - no tip - one tip - two tips.

If only one point is desired, **this appears on the first click.**

For the other properties, select the arrow and click on the right mouse button.

## 1.7.5. HISTOGRAM

This command displays the histogram of a color or black and white image.

Check boxes are used to select the channel or channels that you wish to view.

*Reminder:* The histogram of an image is a graph that shows the number of pixels with a given value depending on the value in question (256 possible values on an 8-bit image). The 256 values are distributed on the horizontal axis and the number of pixels for each value on the vertical axis.

## 1.7.6. CONTROL THE EXPOSURE

This function is used to graphically visualize the overexposed and underexposed pixels on the image. - A pixel is said to be overexposed if its value is higher than a given threshold. - A pixel is said to be under exposed if its value is lower than a given threshold. These values and the corresponding colors are set by the user using the following dialog box:

Check boxes:

- Independent " channels " : forces Pegase to calculate on each channel, then to make a logical " or ". If the box is not checked, the three channels must simultaneously meet the criteria.
- If the box is not checked, the three channels must simultaneously meet the criteria "**visualize in gray level** " converts the image into gray levels before displaying the result.

### 1.7.7. MODIFY LUMINANCE

This command is used to lighten or darken the image while respecting the colorimetry of the image.

The parameter " **white level** " brings back to 255 all the pixels whose luminance is higher than the one displayed (here 250).

The parameter " **black level** " reduces to 0 all the pixels whose luminance is lower than that displayed (here 70).

Unlike the contrast and luminosity correction, these operations are only done on the luminance, which preserves the hue and saturation of each pixel.

### 1.7.8. CORRECTION BY PLANE

This function is used to correct any luminous non-uniformities between the edges of an image.

The principle of use of this function is : • Designate with the mouse the point in the image that has a "normal" color or brightness. This point will be the "pivot".

- Then designate a series of other points that the software will consider as "corrected".

A perfect correction leads to all the points having the same value as the reference point (the first point designated with the mouse).

Overall, the luminous plane of the image is straightened, as if the illumination of the observed object had been corrected.

- To designate a point, simply click on the image with the left mouse button.
- The first point is always the reference point
- The number of points to be corrected is random.

In the general case of a light brighter on one side of the image than on the other, click on a point in the bright area and then click on three points distributed on the three opposite sides (as far as possible from the reference point for greater precision).

This command is also very useful for correcting the shading of an image.

### 1.7.9. GRAY SCALE

This command replaces the image in the MEASURE EDITOR with a "grayscale test pattern". This test pattern can be used for testing printers or for viewing on the screen.

The gradient is done by horizontal band, starting from white (level 255) at the top left, alternating the decrease left right, then right left, until the suppression level (level 0) at the bottom left.

### 1.7.10. COUNTING

- This command is used to "put" counting points on an image. There are 12 possible colors. Each point can have a name. You select the counter to use by clicking on its line.

In the counting dialog box we can :

- To change the name click on the existing name, the text box goes into edit mode.
- By clicking on the right mouse button on the counting dialog box, the floating menu appears. You can then :
- Copy the data of the selected counters to the clipboard
- Reset all counters to zero
- Reset only the selected counters to zero
- Closing the counting dialog box does not cause any loss of information.
- To keep all the counter values, simply save the changes made to the image by quitting the measurement edition.

## 1.8. OPTIONS

### Counting (command)

This command is used to count the number of clicks made on an image, to find out, for example, how many given objects it contains.

There are 12 counters. Each counter is defined by a color, a name and a value. The count points marked on the image have the color that corresponds to their counter (the name of each counter is directly modifiable).

You can change the counter at any time during the count. By clicking on the right mouse button when the cursor is in the counting window, a floating menu appears:

- The “Copy” command sends all the count data of the selected counters to the clipboard
- The “reset” command sets the selected counter to zero.
- The “reset all” command sets all counters to zero.

The count data is automatically stored with the image when you close the Edit/Measure. All these data are accessible via automation commands.

Counting results: hold down the control button and click on the counters of the color you want to count. Click with the right mouse button to access the floating menu, select “Copy” (to the clipboard).

Example of displaying the results of counting objects:

Pasting the contents of the clipboard into Word or Exel gives:

Product 1 16 Product 2 18 Product 3 25

1. x (2) y (3) x (4) y (5) mx (6) my

Product 1 188 81 5.8157 2.5057 2 3 101 101 3.12439 3.12439 2 2 159 192 4.91859 5.93943 4 3 ... ..

Product 2 227 222 7.02214 6.86747 4 4 229 306 7.08401 9.46597 5 4 137 316 4.23803 9.77532 5 3 ... ..

Product 3 264 275 8.16672 8.507 5 5 156 287 4.82579 8.87822 5 3 145 217 4.48551 6.7128 4 3 ... ..

- The first table gives the sum of the counting points for each color (or counter), here three: product 1, product 2, product 3.
- Then for each product we have the following information:
- First and second columns: x, y positions of the counting point in pixels
- Third and fourth columns: x, y positions of the point in user units
- Fifth and sixth columns: coordinates of the grid cell to which the counting point belongs.

*All these data are available by automation to automate the production of reports , for example.*

### 1.7.11. TEXT

It is used to write text on an image. By clicking on this icon a dialog box appears to enter the text to be put in the image.

The window under the word **Text** behaves like a micro word processor and supports extended characters.

The **Police** button brings up a dialog box for determining, for the chosen text : - The **font**, - The **style** of the font, - The **size** of the text font to be displayed. - By clicking on the button “**color**”, a dialog box allows you to **choose** the color of the text. - The button “**insert a field**” of the form allows to choose the field to use

Select the field whose content you want to insert and press Ok.

*Note:* all fields are available, even the “user” fields.

## 1.8. OPTIONS

### 1.8.1. POINTING

Enter topic text here.

### 1.8.2. SET DATE/TIME

- This dialog box sets the parameters for the automatic overlay of the time in an image from the 2ISystem video capture module.

The “user label” zone is used to systematically add a free text in addition to the date and time.

- Four predefined positions are possible, which are the 4 corners of the edited image.

The distance to the edge of the image is automatically calculated by PEGASE according to the font chosen by the user.

- The button “change font and text color” is used to call up the standard dialog box for choosing font and color.

The legibility of a text written in an image is much better if it is written on a uniform zone.

- PEGASE PRO can, if the user checks the box “use a transparent background”, write a uniform zone in the image before writing the date.
- The button “change the background color” is used to determine the color of this rectangle inside which the time will be written by PEGASE.
- By checking the “Automatic insertion after capture” box, PEGASE will insert the date, time and user label in each image captured and transferred to the database (this depends on the capture module used).
- The user label is a text box limited to a length of 60 characters displayed after the date.
- The content of this field is automatically displayed after the date and time.

All changes are active as soon as they are validated, even if the dialog box is not closed.

### 1.8.3. DEFINE MEASUREMENT SYMBOLS

The following dialog box appears:

- *Font*: This command gives access to the dialog box used to define the characteristics of the font that will be used to write the measurement information.

- *Color*: The color of the font will also be the color of the measurement objects (arrows, segments, ...) drawn from the measurement tool.

- *Background color*:

This command defines the color of the arrow shading\*\* and the color of the rectangular area under the text (background).

- *Arrow termination*:

- No arrow,
- One arrow
- Two arrows.

Symbol properties: the check boxes:

- Use transparent background” check box.

If you do not select “**use a transparent background**”, the background will appear in the requested color, otherwise, the image will appear around the text.

- Shade “**arrows box**”

When this option is selected, the arrows are surrounded by a border whose color is defined by the “Background color” menu.

- Replace label with “**measure box**”

If this box is checked, PEGASE will write the value of the measurement instead of the label automatically created when a measurement is made.

- Do not use a “**legend box**”

If this box is checked, PEGASE will not write any text, neither label, nor measure.

## 1.8. OPTIONS

You can therefore freely add the information associated with a measurement wherever and however you want.

- "Palmer size"

Defines the length of the lines that will appear at each end of the "palmer" measurement line. **The length of the line in pixels is equal to 10 times the number displayed.**

- "Thickness" parameter

The number displayed corresponds to the thickness in pixels of the lines drawn with the graphics tool, and to the thickness of the arrows.

Notes:

- Arrows surrounded by a white area are called "**shaded**". They are visible regardless of the contrast of the image over which they are displayed.
- Labels may or may not be written over a rectangular area called the "**background**".
- If the background is not visible, it is said to be "transparent", which corresponds to checking the "transparent background" box in the measurement options dialog box.

### 1.8.4. DEFINE THE MEASUREMENT GRID

This dialog box is used to interactively set the parameters of the grid. To display the grid according to these parameters, use the command : **Display/Grid** in the Edit window.

*Grid pitch:*

Enter the desired grid pitch, in height and width, **expressed in mm**, dimension related to the image. PEGASE PRO displays the grid according to the calibration of the current optical system.

Therefore, make sure that the grid is always expressed in mm, even if the image represents 1 micron x 1 micron.

*Thickness:* Expressed in pixels.

### 1.8.5. MEASUREMENT LABEL GLOSSARY (ORDER)

- This command is used to create a file containing the names that you want to use for measurements.
- This file consists of a first line containing: [label]
- The text on each line following this label will be considered as a potential name for a measurement.

For example:

[labels] **label1**

**crib2**

- To use this glossary, you just have to make a measure and then place the mouse cursor on the label of the measure (L5 or C3) then click on the right button of the mouse. The list of words available in the label file appears. You just have to select the word you are looking for and then click on Ok, the label of the measure is instantly replaced by this word.
- As it is possible to export the measurements and even to automate their exploitation, an external program will then be able to easily find the sought measurements to use them.

In the labels dialog box :

- You can have as many glossaries of measurement labels as you wish.
- Click on the "**Browse**" command to locate the desired label file.
- The "**New**" command asks the user to enter a file name for the new glossary and automatically creates an empty glossary file.
- The "**Edit**" command opens the glossary whose name is displayed in the windows notepad.

### 1.8.6. AUTOMATION OF THE EXPORT OF MEASUREMENTS

## 1.8. OPTIONS

- All the measurements made with Pegase Pro are accessible by the automation. It is thus possible to establish an exchange of data between pegase and external modules made by the user. A spreadsheet can make calculations from measurements and then reinsert the result of these measurements in a field of the form associated with the image.
- These automation commands are included in the programming complement of Pegase Pro.

## 1.9. MANAGEMENT AND CALIBRATION OF OPTICAL SYSTEMS

The calibration is explained in a separate document of the documentation accessible by the help buttons of the calibration dialog boxes.

### 1.9.1. NOTES ON MEASUREMENTS ON DIGITAL IMAGES

#### 1.9.2.

PEGASE always works in pixels...since it handles digital images composed of elementary points called pixels.

It is during the calibration that the user fixes the ratio which, for an image, links a pixel to a user distance.

This calibration can be defined for a single system. If a system is composed of several lenses producing different magnifications, a mechanism is provided to assign to any new image the calibration that suits the magnification.

Thus any image captured with this system will be automatically calibrated. When you change systems, the calibration of the new system is automatically assigned to the new images. In this context, the definition of the unit of measurement is used to determine the ratio between two units.

For example, 1 inch = 2.54 means that 1 inch is worth 2.54 base units (millimeter)

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