# User Guide of Tsview 7

Xintu Photonics Co., Ltd.

Version: 7

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# 1. Introduction to TSView

TSView is a modular software specialized for image acquisition, processing and analysis (hereinafter referred to as “TSV”). It’s mainly comprised of two modules:

Image Acquisition

TSview applies to a great variety of cameras and the cameras output by Xintu’s production line can guarantee the optimal integration effect. With the perfect combination between the camera and TSView, our users can achieve with ease the complicated images and image sequences so as to simplify the camera operation and image preview.

- Sequential Image Acquisition

Image Processing and Labeling

The images acquired will display on the screen immediately and may be processed with various tools:

- Contrast, lightness and color adjusting
- Size changing and rotating of image
- Sharpness increase/detail orientation
- White balance and image graying

Tsview can footnote the images according to your instructions to help you label the images conveniently.

Image Processing

The other major functional module of Tsview is for image processing. The values measured (such as the length, area and angle) will be shown in a worksheet from which such values may be exported. Meanwhile, we have formulated a detailed wizard for the calibration procedure to ensure user-friendly operation. Of course, all kinds of functions can be executed or deleted at will through the menus or toolbars.

Tsview 7 supported by:

CMOS series:

IS1000, IS500, IS300-G, IS130, TCA-10.0C, TCA-9.0C, TCA-8.0C,

TCA-5.0C, TCA-5.0BW, TCA-3.0C, TCA-2.0C, TCA-1.31C,

TCA-1.31CHS；

CCD series:

TCC-3.3ICE, TCC-1.4LICE, TCC-1.4CLICE, TCC-1.4lICE-II, TCC-1.4HICE, TCC-1.4CHICE, TCC-1.4IIHICE, TCC-1.4IICHICE, TCC-3.3ICE-N, TCC-6.0ICE, TCC-2.0ICE, TCC-8.0CICE.

# 2. Basic Operation of TSView

## 2. 1. Introduction to TSView's Main

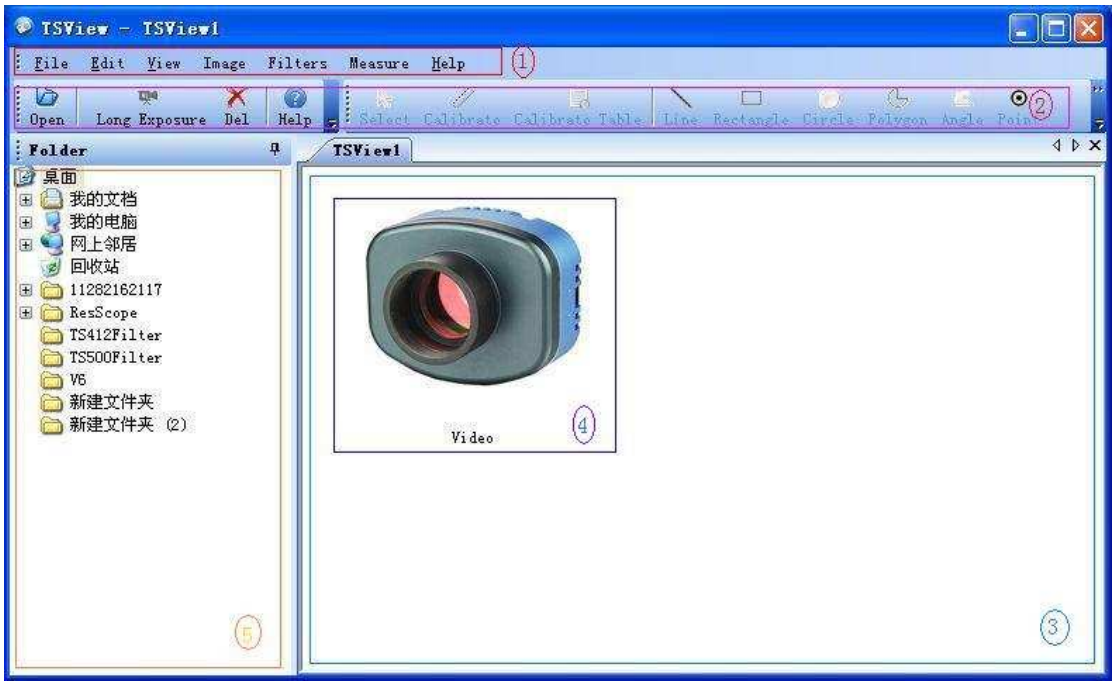



Diagram 1 Introduction to TSView's Main

1) Menu bar, corresponding to the toolbar
2) Toolbar, corresponding to the menu bar, and a click on a certain shortcut button may realize the corresponding menu function.
3) View window, for image editing.
4) Video switch button, a double-click on the "Video" icon will cause the video playing window to pop up.
5) Folder bar, for viewing images in the view window.

## 2. 2. TSView's Photography Interface

A double-click on the video switch button will trigger TSV's digital image

gathering interface, which is shown as follows, and users may use shortcut button F11 to expose or hide the toolbar.

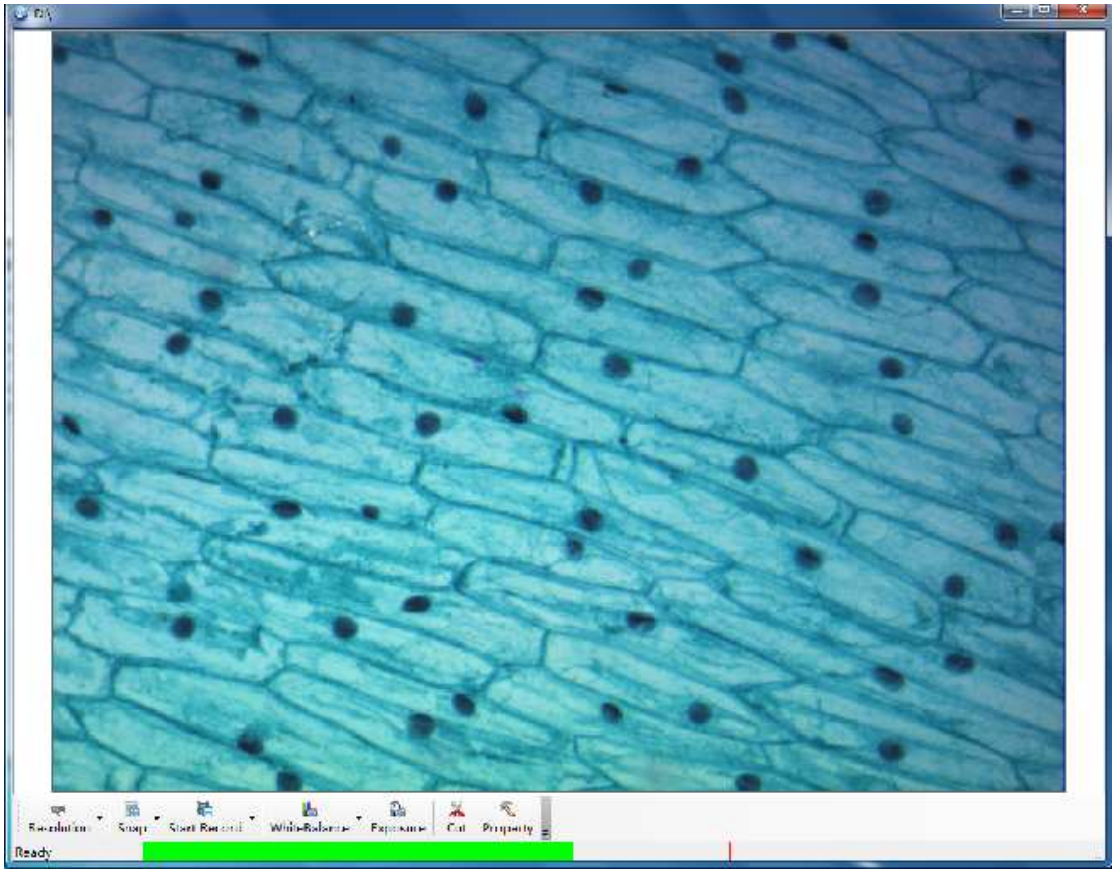



Diagram 2 TSView's Digital Image Gathering Interface

## 2. 3. TSView's Image Processing Interface

Under TSV's photography interface, click on the button "Open" of the toolbar or that on the dropdown list under the button "File" of the menu bar to import an image from a specified source. Then select a desired item out of the tool boxes Standard, Measure, Image and Status Bar contained under the dropdown list of the button "View" of the menu bar.

The result is shown below:

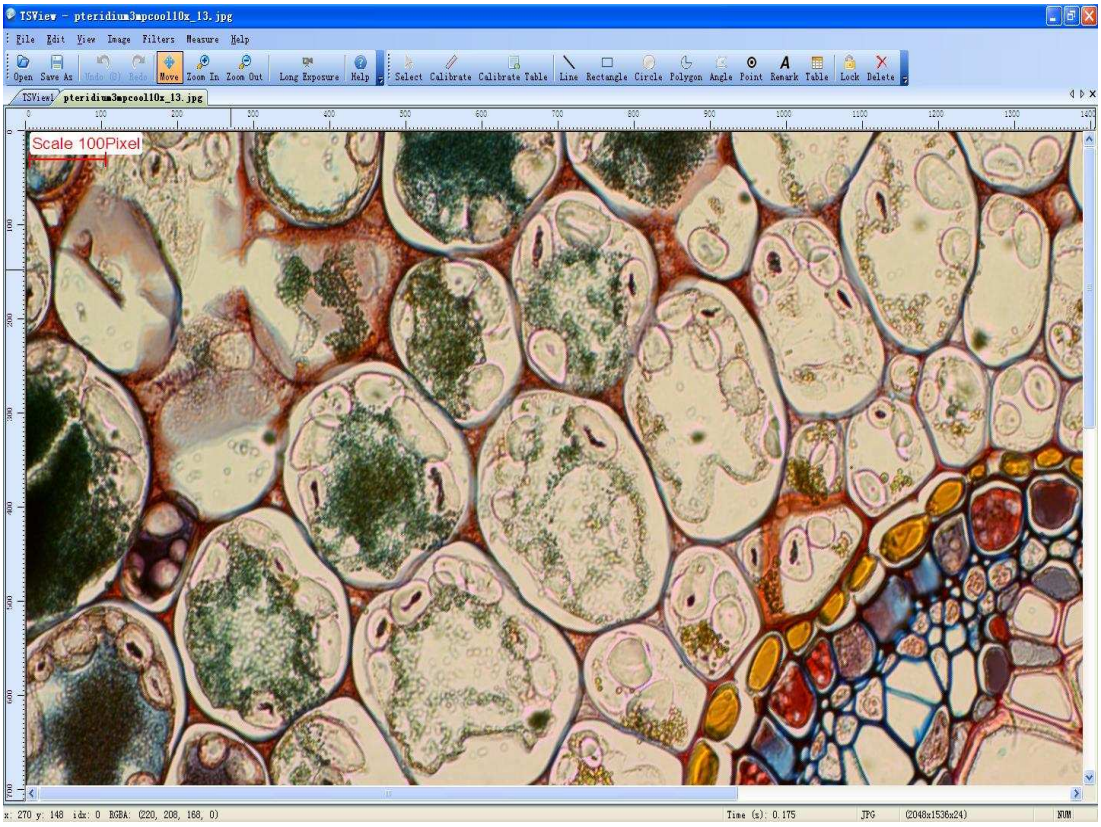
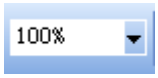



Diagram 3 TSView's Image Processing Interface

## 2. 4. Reference and Explanation for the Buttons and Menus

| Toolbar Button | Corresponding Menu | Function |
|---|---|---|
|   | File→Open | To open an image |
|   | File→Save As | To save an modified image |
|   | Edit→Undo | To undo the previous steps of image processing |
|   | Edit-Redo | To redo the previously-undone steps of image processing |
|   | Edit→Move | To move the display position of the image |

| | | |
|---|---|---|
|  | View→Zoom In | To zoom in the image to be viewed |
|  | View→Zoom Out | To zoom out the image to be viewed |
|  | Zoom List | Zoom the image as the selection. |
|  | Magnifier 400% | Magnify the interested area. |
|  | Help→Help | To exhibit the relevant content of "Help" text. |
|  <br>  | Measure→Line, Rectangle, Circle, Polygon, etc. | To select a desired measuring tool to measure the image being viewed. |
|  | Edit→Measure Table | To display all the measurement-relating information of the current image. |
|  | Edit→Lock | To hold the current measuring mode. |
|  | Edit→Delete | To delete the measuring figure |

# 3. TSView's Functions

## 3. 1. TSview's Photography Function

Under the photography interface of TSView, users can identify the type of the camera from which the picture is imported, the basic settings of the camera at the time of photographing and the post-photographing image preview

### 3.1.1. Start the Camera

Double click the "Video" icon in the viewing area.

The video playing window will then pop up. If the camera is connected to the computer and an applicable drive is detected, it will start playing video automatically.

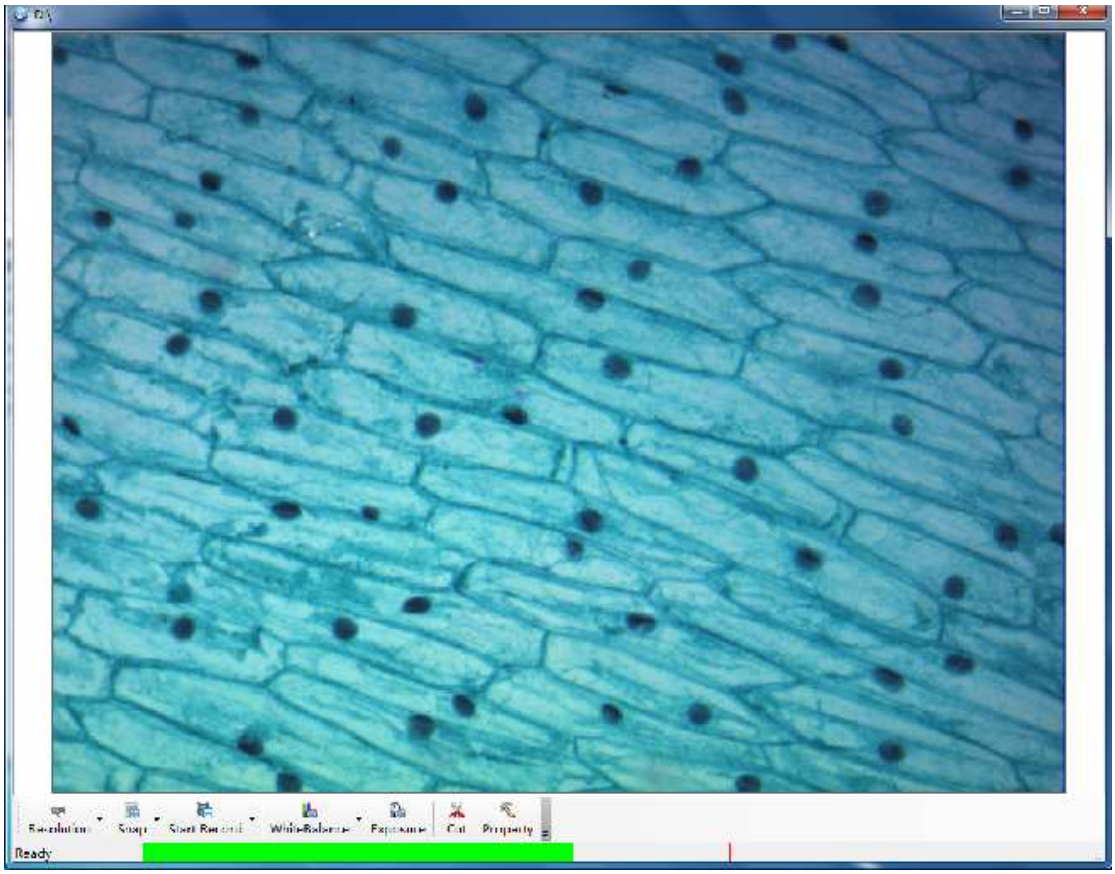



Diagram 4 TSView's Video Playing Interface

If the camera is not connected to the computer or no drive is found although the aforesaid connection is established, the following window will pop up.


Diagram 5 TSView's No Camera Interface

At this point, please make sure whether the drive has been correctly installed or whether the camera's USB spigot has been properly conjoined with the computer.

3.1.2. Resolution setting

**【Function 】**

To set the preview, capture and video resolution.

**【Operating Instructions】**

Click on the downward triangle in the right corner of 

, then it will pop up config…like 

. Select Config…, the resolution setting page will appear like the below picture.

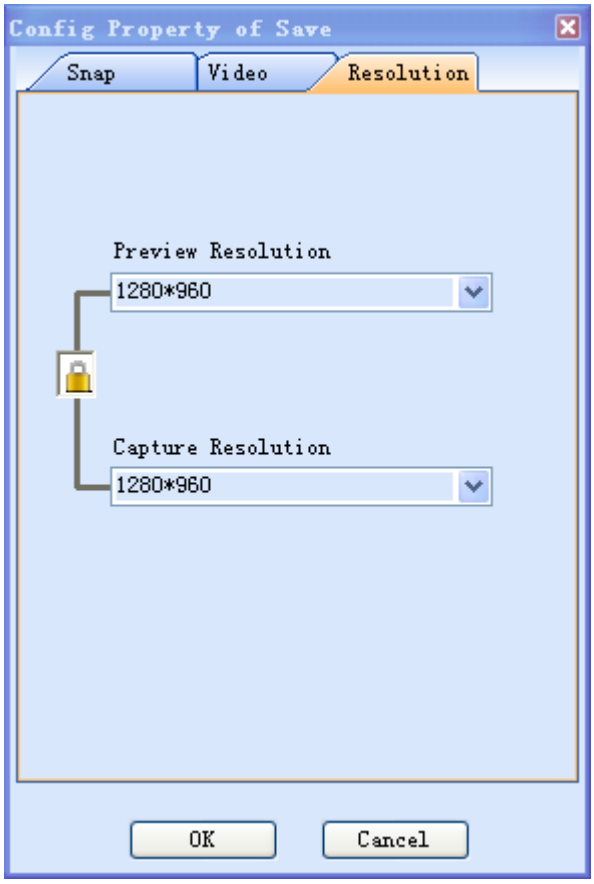



Diagram 6 Resolution setting 1

Some cameras will support the mode that preview resolution could be different from Capture resolution. In this case, user could click the button  to separate them. Take TCA-5.0C as an example, user could get this setting as the following picture.

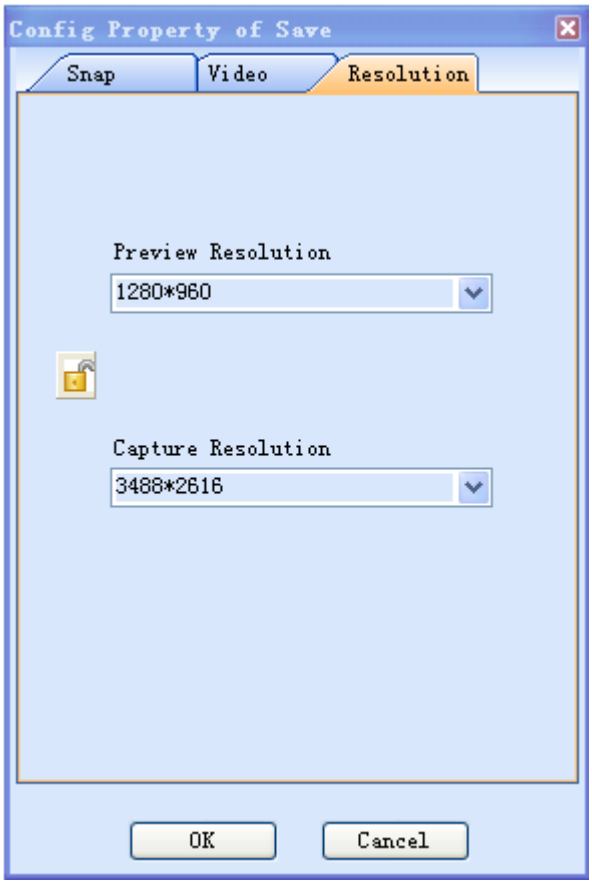



Diagram 7 Resolution setting 2

Attention: The capture resolution is set here by “Capture resolution” setting, and the video resolution is the same as the preview one.

### 3.1.3. Camera’s Photography Setting

**【Function 】**

After the camera or lens has been successfully connected to the computer, start photographing or videotaping and then designate the save path of the images to be saved.

**【Premise】**

The camera or lens connected to the computer can be detected by TSV and can provide normal performance.

**【Operating Instructions】**

**◎ Photographing**

·Click on 

to start photographing, and then acquire the images.

·Click on the downward triangle in the right corner of 

and the dropdown window “Config” will pop up, click on the item “Config” to trigger the dialogue box “Config Property of Save” and follow the setting procedures shown below:

(1) Click on the tab “Snap”, the photography setting window shown below will appear:

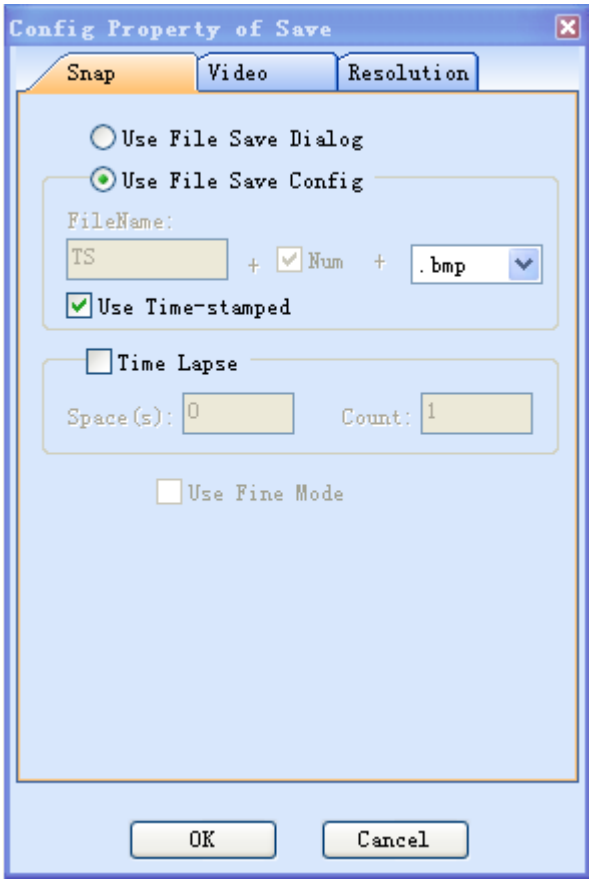
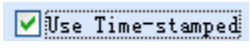
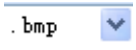



Diagram 8 Photography Setting

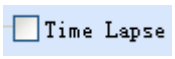
(2) Name the image to be saved

A. 

, this option decides whether the image to be saved will be named with the current time of the system; checking this option will approve the said naming method; if not, users will be required to manually enter the name of the image to be saved in the blank dialogue box on the right of the file name.

B. Use 

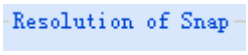
to set the extension of the image to be saved (such as Image1.bmp, Image 1.jpg), options are available in this dropdown list.

C. Use 

to set continuous snap. If it is enable, user could snap the image continuously. 

to set the space time between the two consecutive images. The maximum value of it is 60s. And 

is to set the value of continuous snap, and its maximum value is 1000.

D. 

to set the resolution of image when user want to capture.

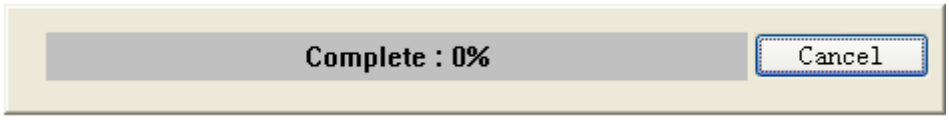
E. 

to set the fine mode. Only a little camera have this mode. When select it, the camera will preview at a high frame speed, and capture an image with a low frame speed.

(3) When the setting is finished, click the button 

to save the settings.

Attention: If you want to stop continuous snap, you can click cancel button in the progress bar as the following picture shows.




### 3.1.4. Videotaping

Click following the sequence of “Snap” on the toolbar-> menu “Config” -> dialogue box “Config Property of Save”, and then designate the save path through tab “Video”.

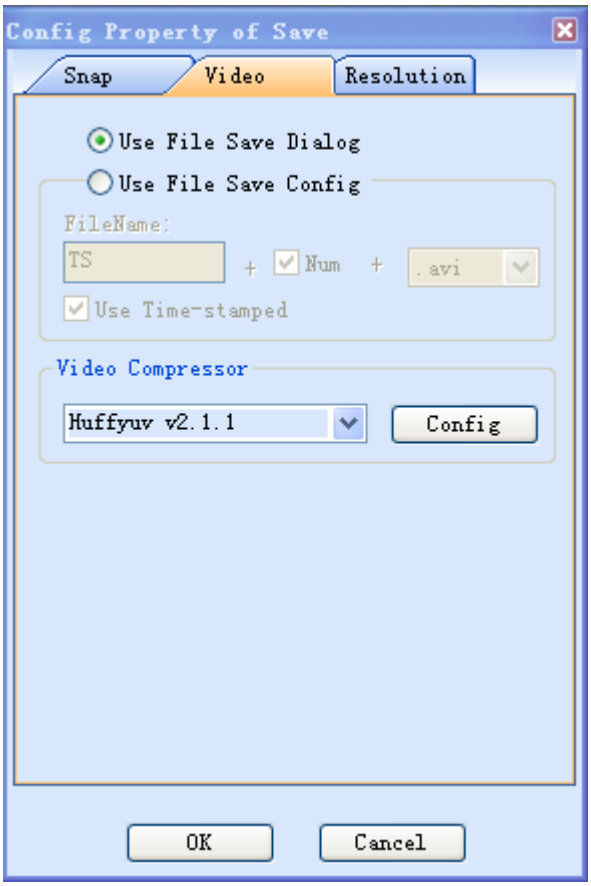



Diagram 9 Videotaping Setting

A click on the button “OK” will turn 

into 

, a click on which will start the videotaping, or stop the videotaping if the videotaping is on.

Explanation: 

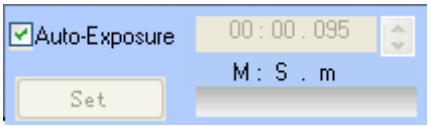
to set the mode of video compressor.

Re-accessing the setting interface and clicking on the tab “Snap” will switch it back to the photography setting interface.

3.1.5. Setting of Videotaped Images

◎ **Exposure Time Setting**

Click on the exposure button  on the toolbar of the video playing window or on the setting button  (in the tab “Main”) to set the exposure time.



Notice：If you want a long exposure, press the long exposure button in the toolbar before the camera starts.


◎ **Automatic White Balance**

Click on the Auto WB button  in the video playing window to set the white balance.

◎ **Preview cut**

Click on the cut button  to set the preview window.

First, click the button  , then select OK if the area is satisfied. At this time windows will enlarge the selected area, and the button  will change to  . Follow the below picture.

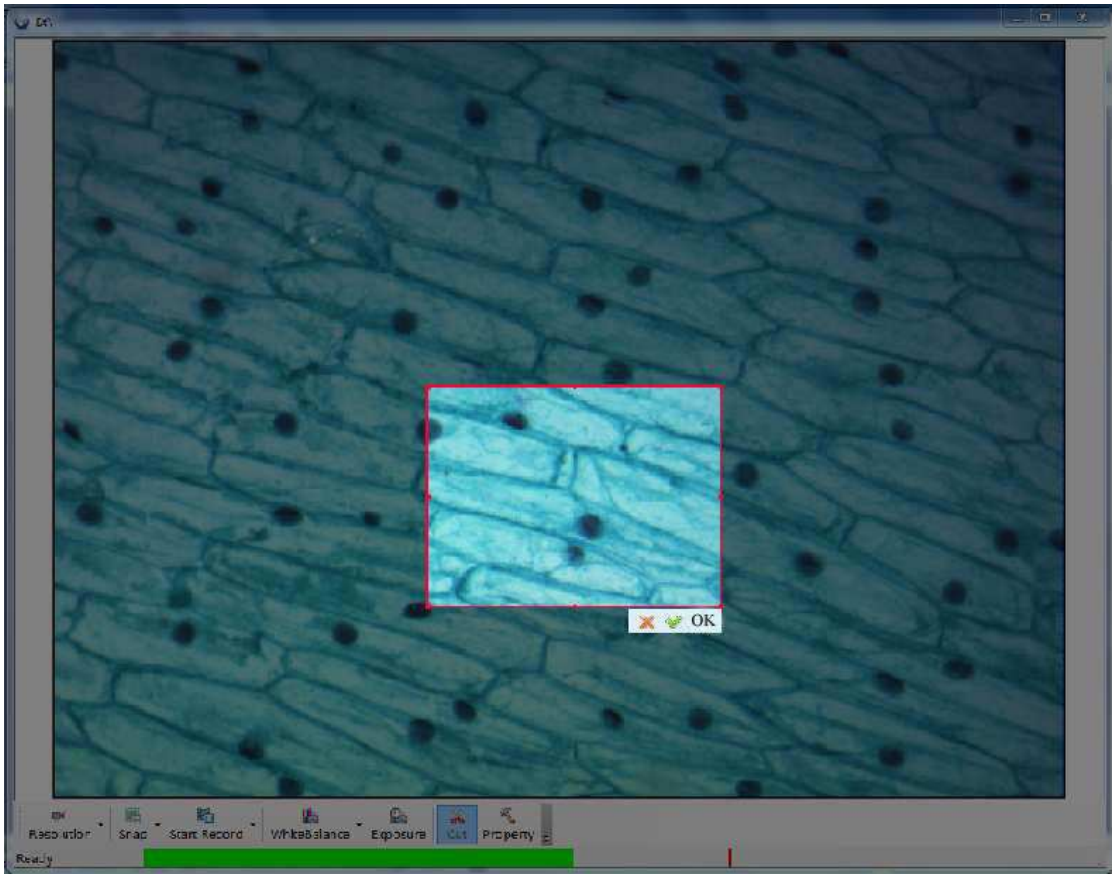



Diagram 10 Cut function

At last, user can click button 

to cancel this mode.

### ◎ Setting of Photographed Images

When it comes to the setting of photographed images, click on the setting button  first, then continue the setting in the two tabs “Image” and “Parameters” of the dialogue box “Digital Camera Setting” .

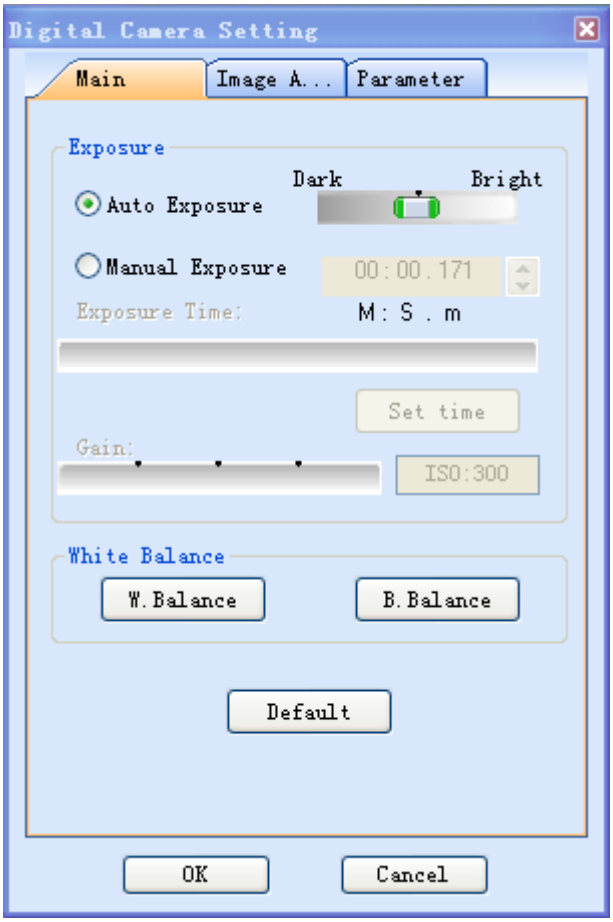
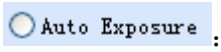
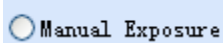



Diagram 11 TSView’s Main Setting Interface

**Main Tab Explanation：**

1、 

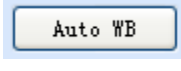
：Auto exposure.

2、 

：Manual exposure.

3、 

：To set the gain.

4、 

：To set white balance

5、 

: To set black balance in fluorescence effect.

6、 

：To set all the parameters to its default value.

Explanation: Use could set the exposure time by adjusting combo box and article slide.

Combo box: fine tuning;

Article slide: coarse tuning

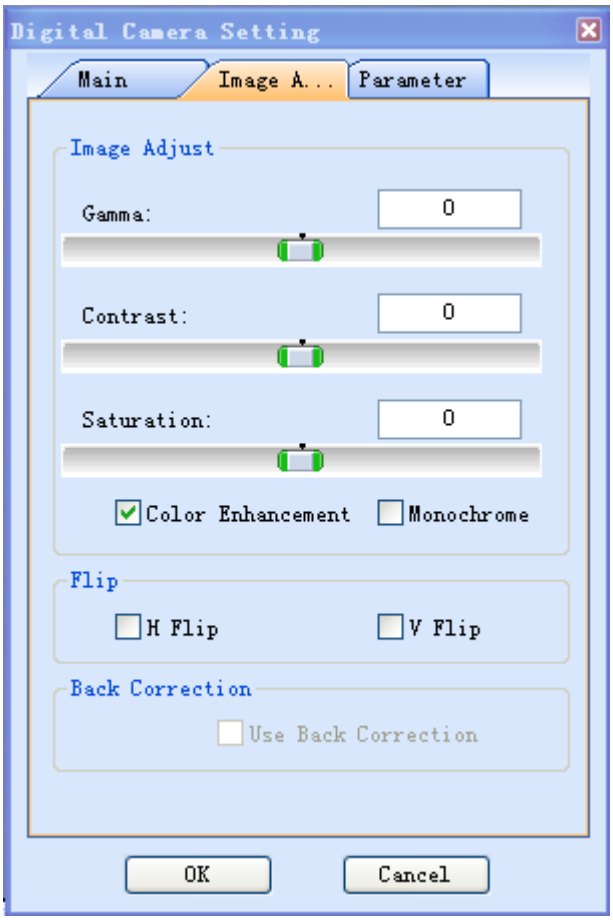



Diagram 12 TSView's Photographed Images Setting Interface

**Image Tab Explanation：**

1、 

：Gamma slide，range from -20 to 20;

2、 

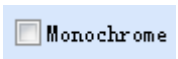
：Contrast slide, range from -20 to 20.

3、 

：Saturation slide, range from -20 to 2o.

4、 

：Color enhancement.

5、 

：It is only used for color camera.

6、 

：Horizontal mirror.

7、 V Flip ： Vertical mirror.

8、 Use Back Correction ： Back correction

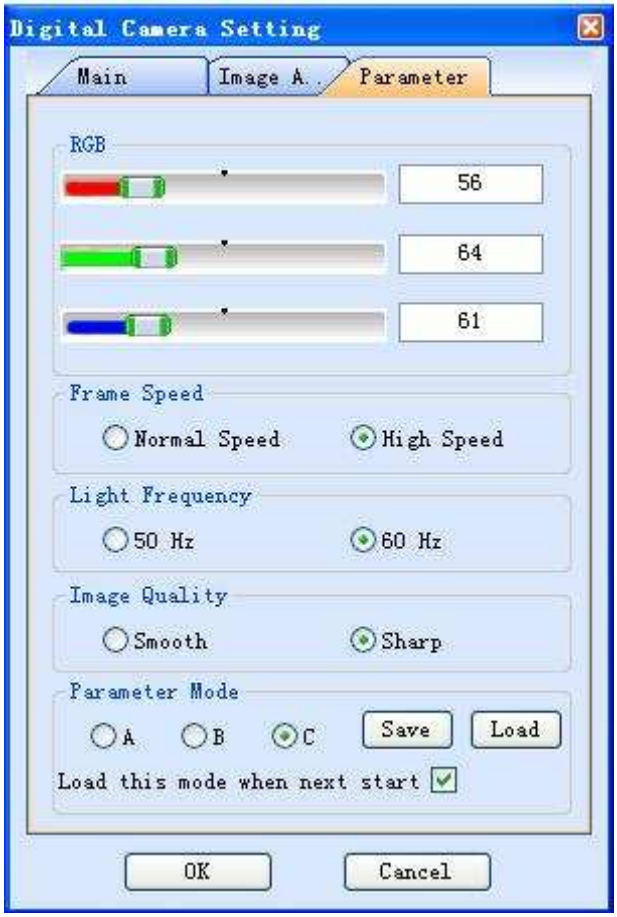



Diagram 13 TSView's Parameters Setting Interface for Photographed Images

## Parameters Tab Explanation

1、 RGB : RGB color chanel.

2、 Frame Speed : Frame rates;

3、 Light Frequency ： Light frequency;

4、 Image Quality ： Image quality;

5、 Parameter Mode ： Parameter mode， user can save the parameter.

6、 Load this mode when next start :When it is enable, it will load the current parameter mode.

Explanation:

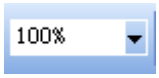
Save: select one as the parameter mode, and click save to save.
Read: select one as the parameter mode, and click load to get.

## 3. 2. TSView's Image Processing Function

This function applies to the processing of acquired images, including without limitation cropping, lightness and color adjustment of acquired images.

### 3.2.1. TSView's Tools

TSV's tools include "Move" and "Zoom".

| Toolbar Button | Corresponding Menu | Function |
|---|---|---|
|  | Edit→Move | To move the image that has been zoomed in. |
|  | View→Zoom In (Out) | Zoom in or zoom out the image to be viewed. |
|  | Zoom List | Zoom the image as the selection. |
|  | Magnifier 400% | Magnify the interested area. |

#### 3.2.1.1. Move Tool

**【Function 】**

If the image is beyond the display area of TSV after zoomed or for its original size, user may use the move tool  (in the dropdown menu under button "Edit" of the toolbar or menu bar) to move the image in four directions to take a full view of it.

#### 3.2.1.2. Zoom Tools

**【Function 】**

Zoom the image to be viewed.

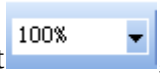
**【Operating Instruction】**

1. Click on the buttons 

to select the zoom tool.

2. Move the mouse on the image and press the mouse left key to zoom the image being viewed.

3.2.1.3. Zoom List

1. Click on the button list 

, and select the interested ratio as the below picture shows.

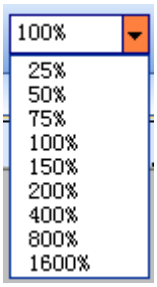



Diagram 14 Zoom list

3.2.1.4. Magnifier

1. Click on the button 

, and move the magnifier on the picture, as the following picture shows.

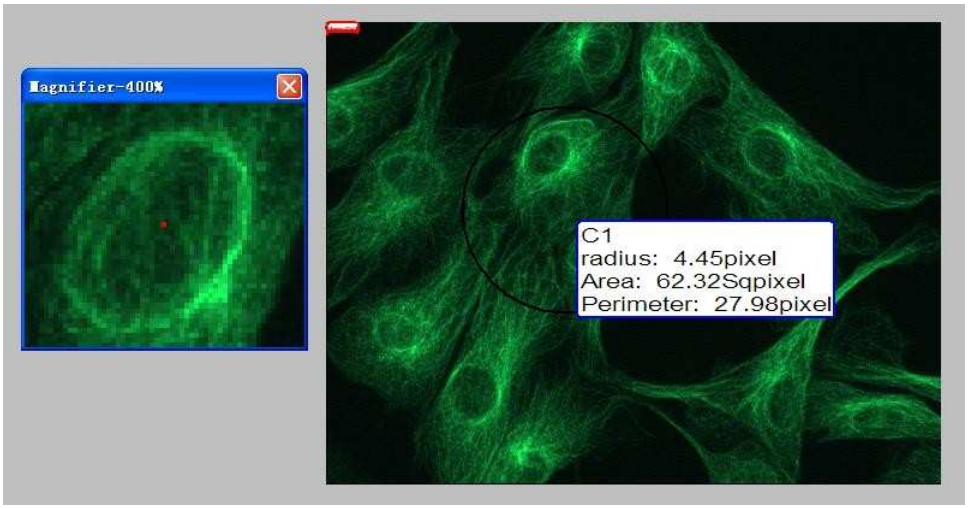



Diagram 15 Magnifier 400%

3.2.2. TSView's Image Processing

This function is for the processing of acquired image, including: adjusting the reversal degree, inclination degree and color of the image.

### 3.2.2.1. Reversal of Image

The reversal of image includes mirror, reversal, left reversal, right reversal, rotation and inclination.

| **Button on the Right Toolbar** | **Corresponding Menu** | **Function** |
|---|---|---|
|  | Image Processing→Horizontal Mirror | To mirror the image being viewed |
|  | Image Processing→Reversal | To horizontally reverse the image for 180 degrees. |
|  | Image Process→Rotation | To rotate the image for a certain angle. |

#### 3.2.2.1.1. Horizontal Mirror

**【Function 】**

A click on the button “Mirror” will enable users to mirror the image being viewed.

**【Operating Instruction】**

1. The image shown below is the pre-mirroring one.

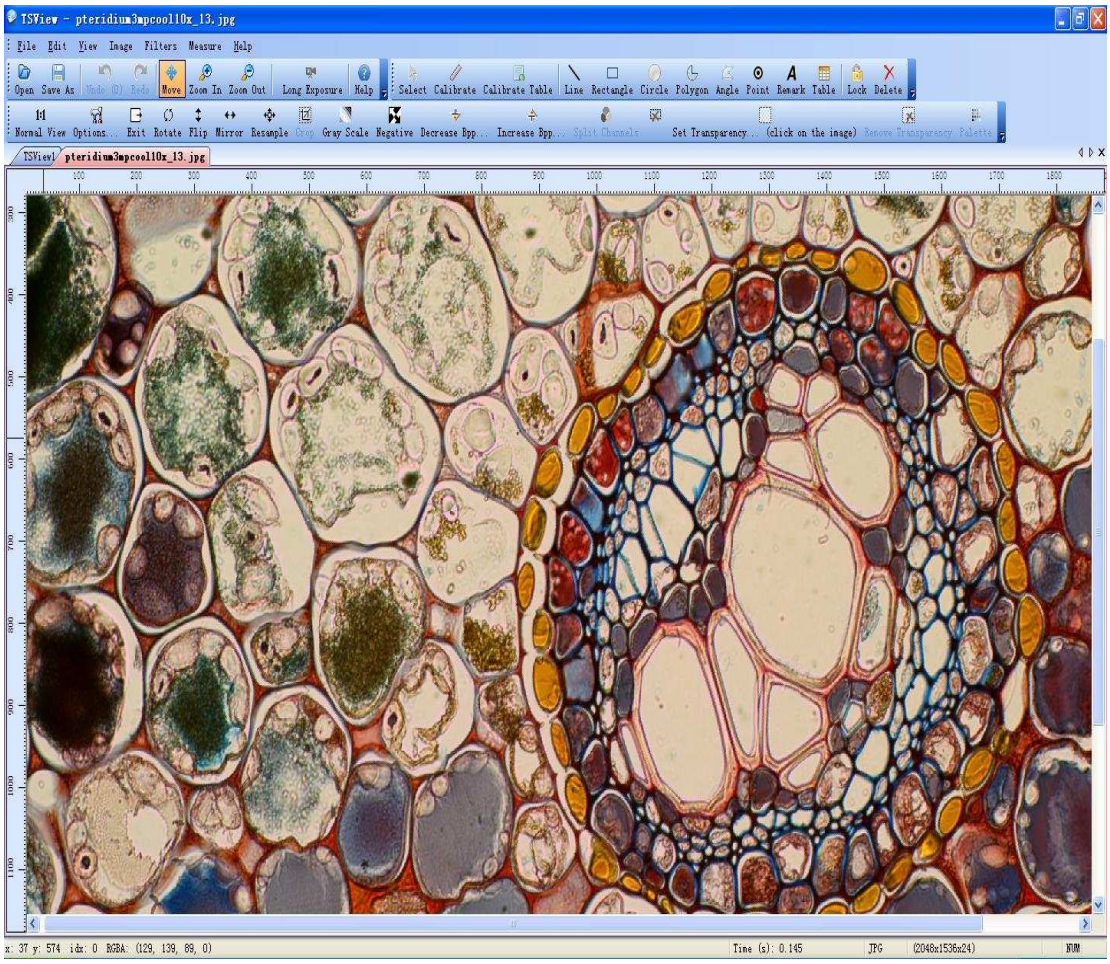



Diagram 16 Pre-Mirroring Image

2. Click on the button  on the right toolbar, the image will be mirrored, as shown below

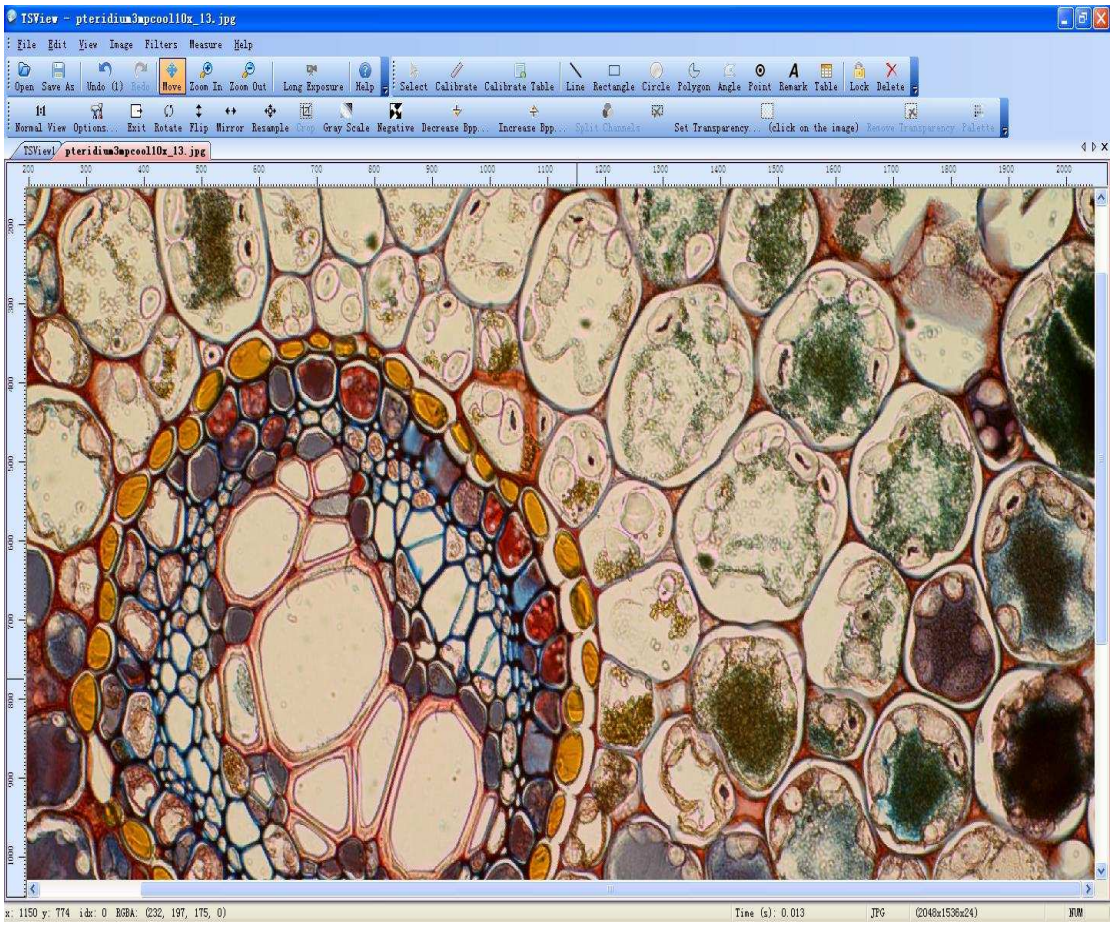



Diagram 17 Post-Mirroring Image

### 3.2.2.1.2. Reversal

After reversed, the image titled Diagram 5 will become the one shown below

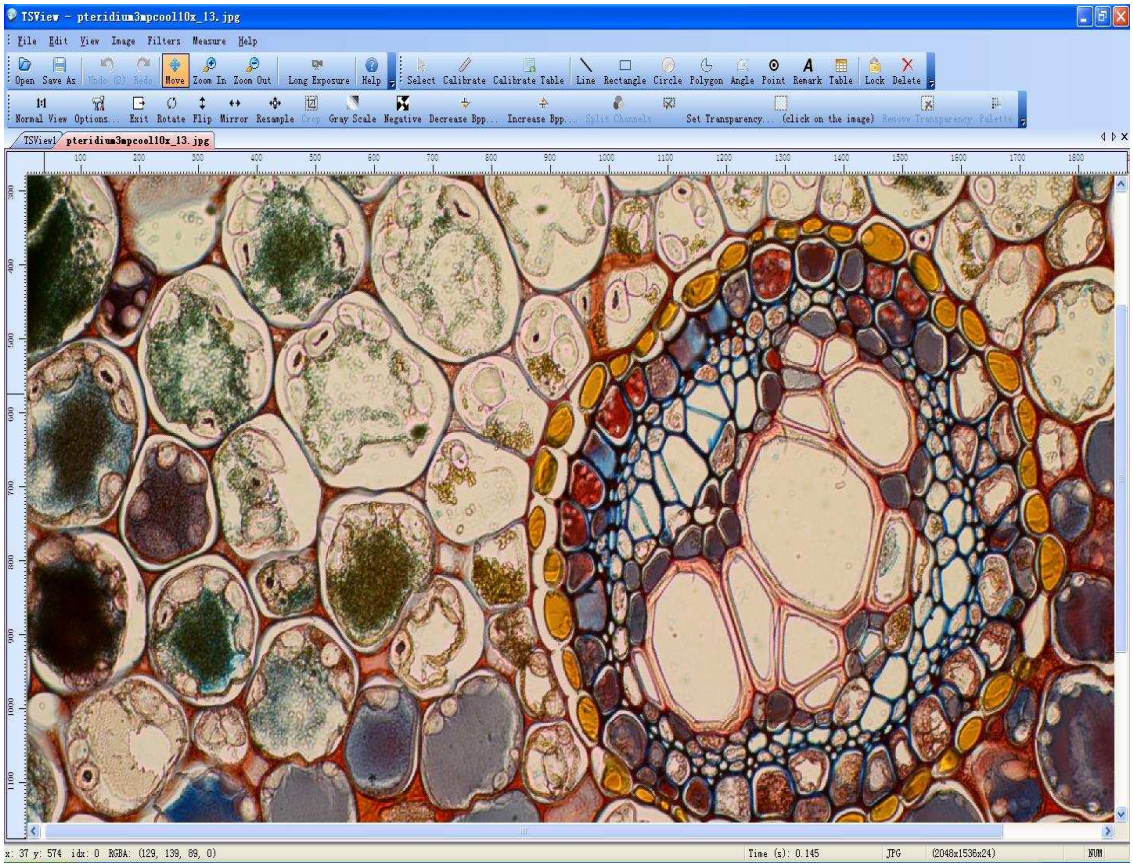



Diagram 18 Post-Reversal Image

3.2.2.1.3. Rotation

**【Function 】**

Click on the button “Rotate” and set a certain rotation angle through the rotation setting window subsequently popping up to rotate the current image.

**【Operating Instruction】**

1. A click on the button “Rotate” will command TSV to pop up the rotation setting window shown below


Diagram 19 Image Rotation Angle Setting Window


Rotation angle setting

Left rotation for 90 degrees.

Right rotation for 90 degrees.

3.2.2.2. Image Transparency

This function is designed for image transparency, after which, the image is still ready for removal, split, stripping and other operations.

3.2.2.2.1. Create from lightness

**【Function 】**

It’s for the image transparency.

**【Operating Instruction】**

1. Click following the sequence of “Image→Alpha Channel→ Create from

lightness", then users may transparentize the image being shown in the image processing interface.

2. If users needs to adjust the image transparency manually, just click following the sequence of "Image→Alpha Channel→Opacity", then the image transparency may be set through the setting window "Opacity"(as shown below).

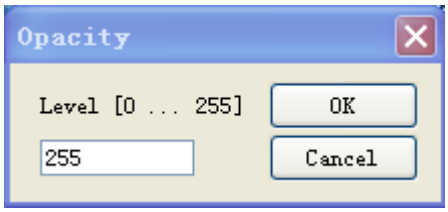



Diagram 20 Opacity Setting Window

·Note: The opacity setting window also applies to those images that have been treated by the function "Create from lightness" for a modification on image transparency for the second time.

3. After treated by the function "Create from lightness", the image will become the one shown below

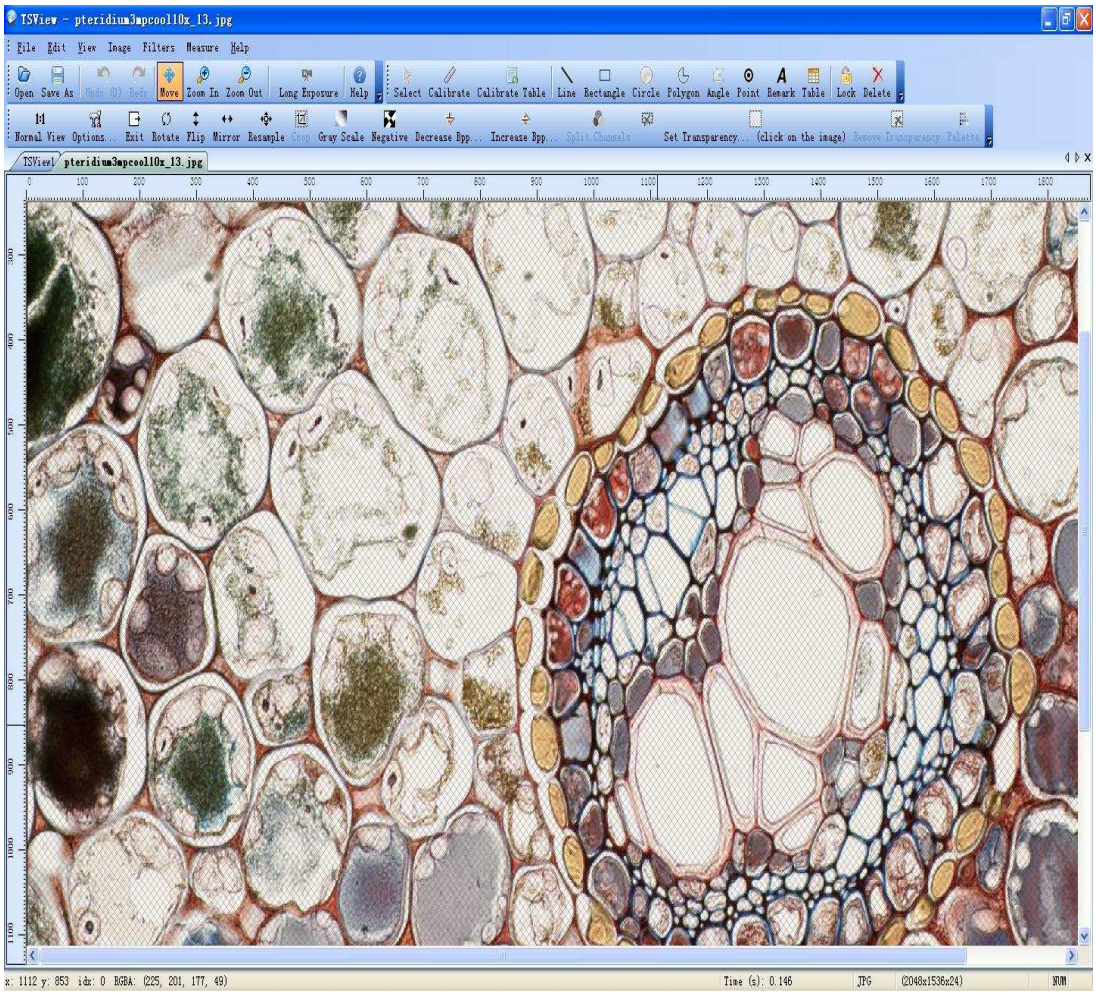



Diagram 21 Image Transparentized by the Function “Create from lightness”

3.2.2.2.2. Remove

**【Function 】**

This function is for removing the transparency effect existing on the current image.

**【Premise】**

The current image has been transparentized.

**【Operating Instruction】**

Click following the sequence of “Image→Alpha Channel→Remove” to remove the transparency effect existing on the current image and restore it to its original state.

3.2.2.2.3. Split

**【Function 】**

It’s for creating a new black-and-white image out of the current image which has been transparentized.

**【Premise】**

The current image has been transparentized.

**【Operating Instruction】**

1. Click following the sequence of “Image→Alpha Channel→ Create from lightness” to transparentize the current image.
2. Click following the sequence of “Image→Alpha Channel→Split”, and then TSV will automatically generate a new black-and-white image, which is shown below

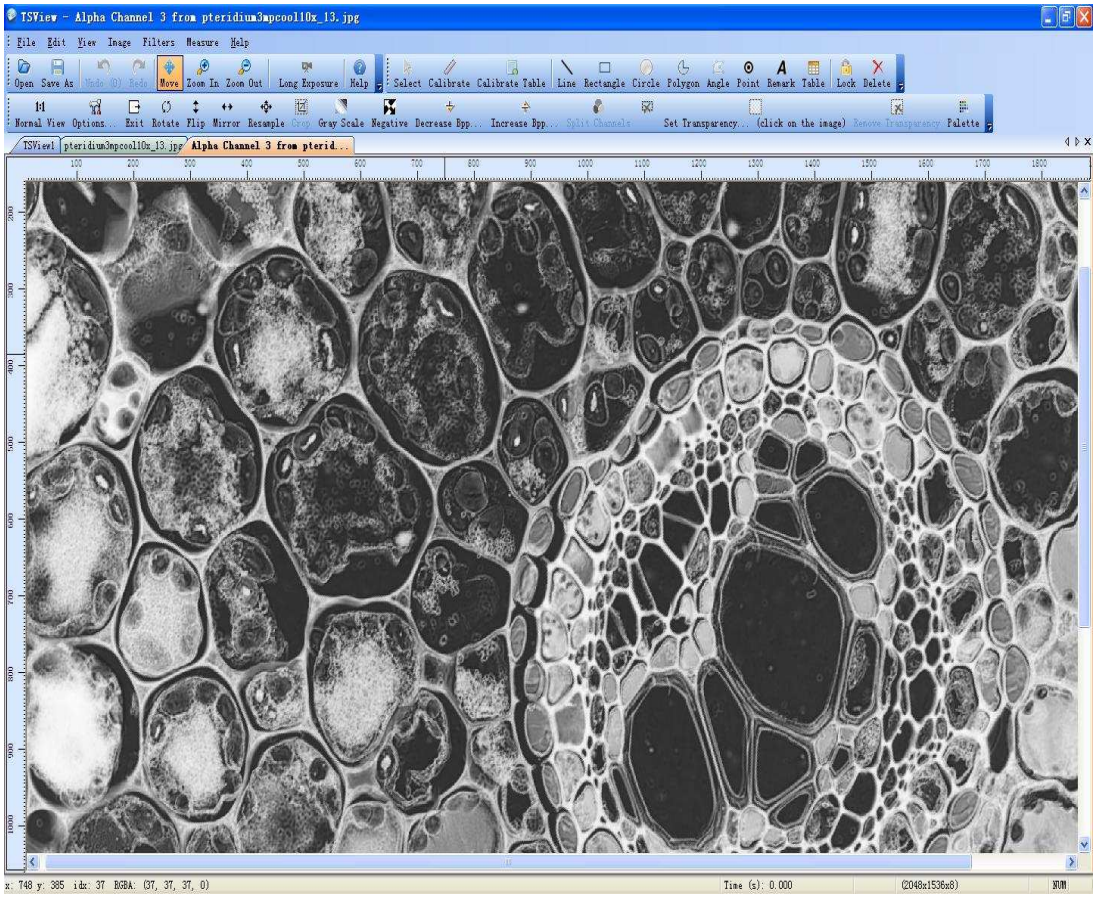



Diagram 22 Image Generated by Split

3.2.2.2.4. Strip

**【Function 】**

This function can strip the image that has been transparentized and then generate a new stripped image.

**【Premise】**

The current image has been transparentized.

**【Operating Instruction】**

1. Click following the sequence of “Image→Alpha Channel→ Create from lightness” to transparentize the current image.

2. Click following the sequence of “Image→Alpha Channel→Strip”, then TSV will automatically generate a new stripped image, which is shown below

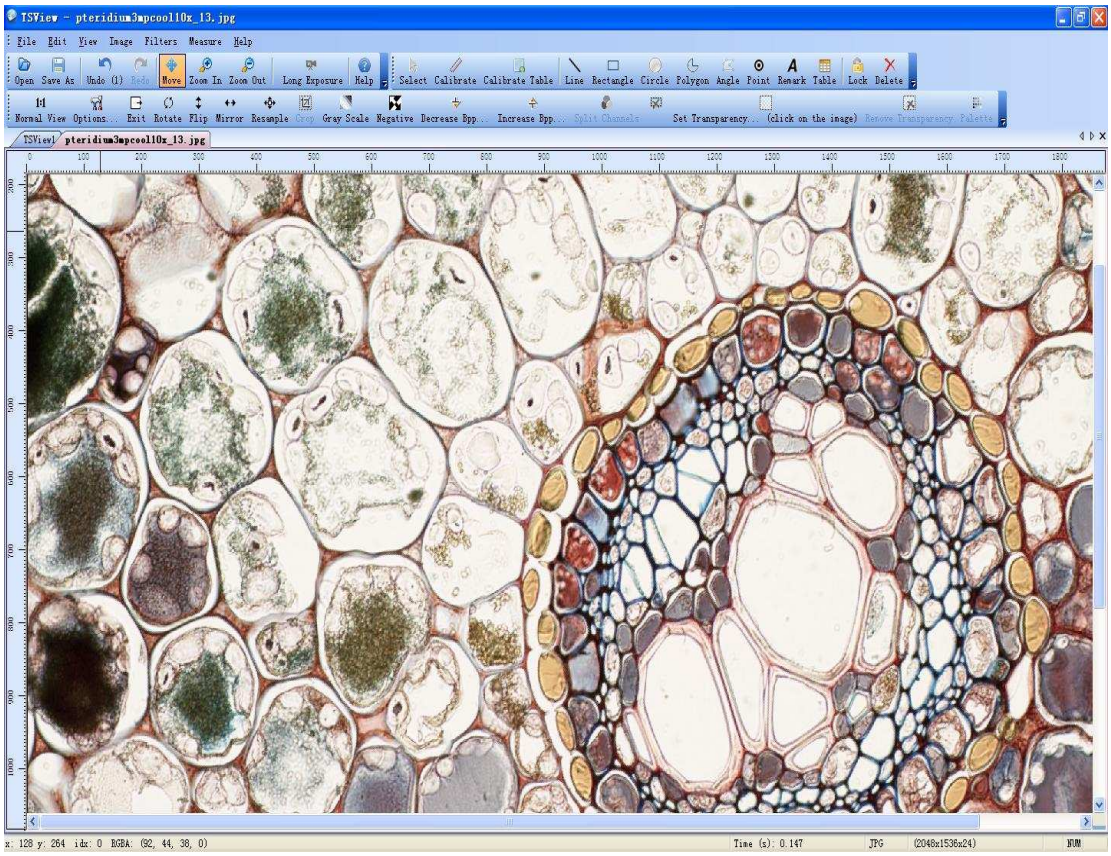



Diagram 23 Post-Stripping Image

### 3.2.2.3. Color of Image

This function is used to treat the color of images, including grayscale and dither.

#### 3.2.2.3.1. Grayscale

**【Function】**

It applies to giving grayscale treatment to the image being opened.

**【Operating Instruction】**

Click following the sequence of “Image→Gray Scale”, then TSV will automatically initiate the grayscale treatment, and the result is shown as follows

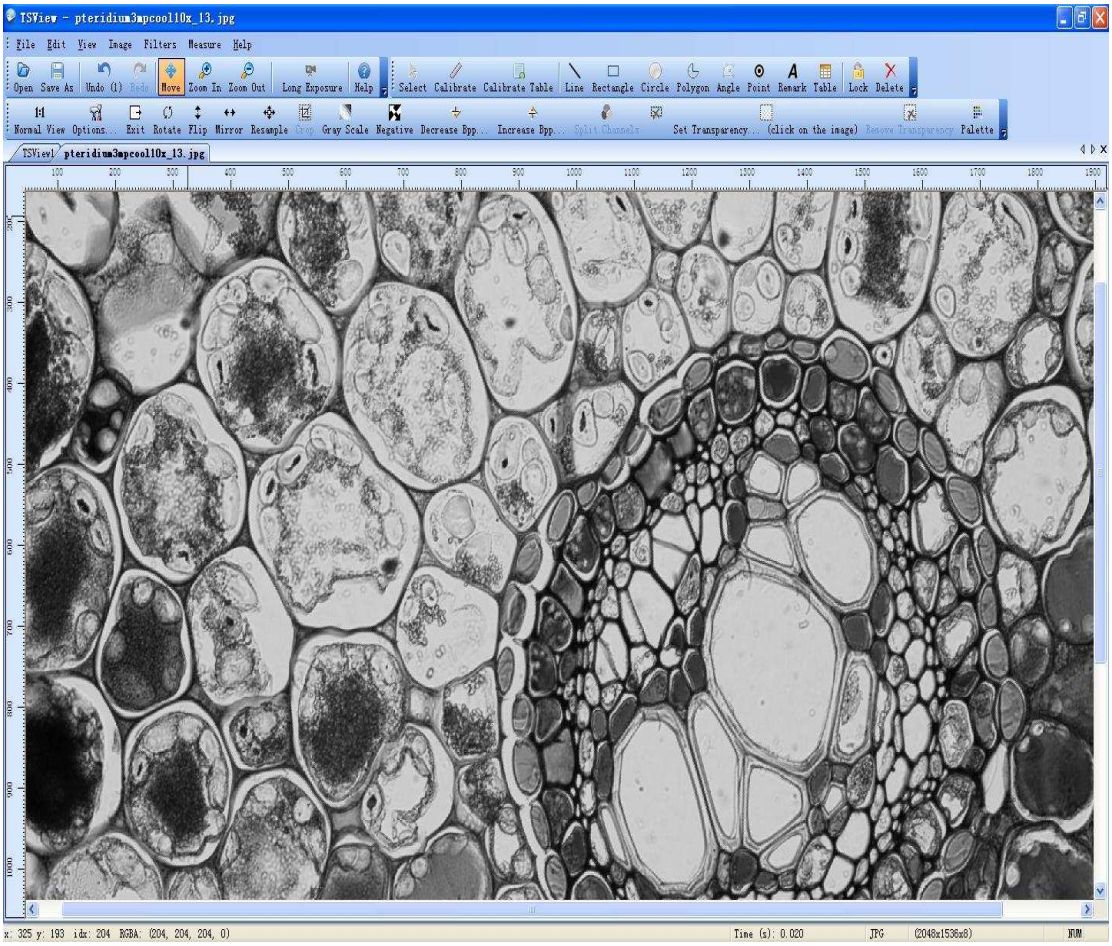



Diagram 24 Image Given with Grayscale Treatment

### 3.2.2.3.2. Dither

**【Function】**

It’s used to give dither treatment to the image being opened.

**【Operating Instruction】**

1. Click following the sequence of “Image→Dither”, then TSV will automatically cause the dither setting window to pop up as shown below

Diagram 25 Dither Effect Setting Window

2. In the said window, after selecting the desired dither treatment effect, click the button “OK” to return to the image processing interface, TSV will then automatically initiate the dither treatment; the image shown below is a result of selecting the option “ Ordered dithe ”

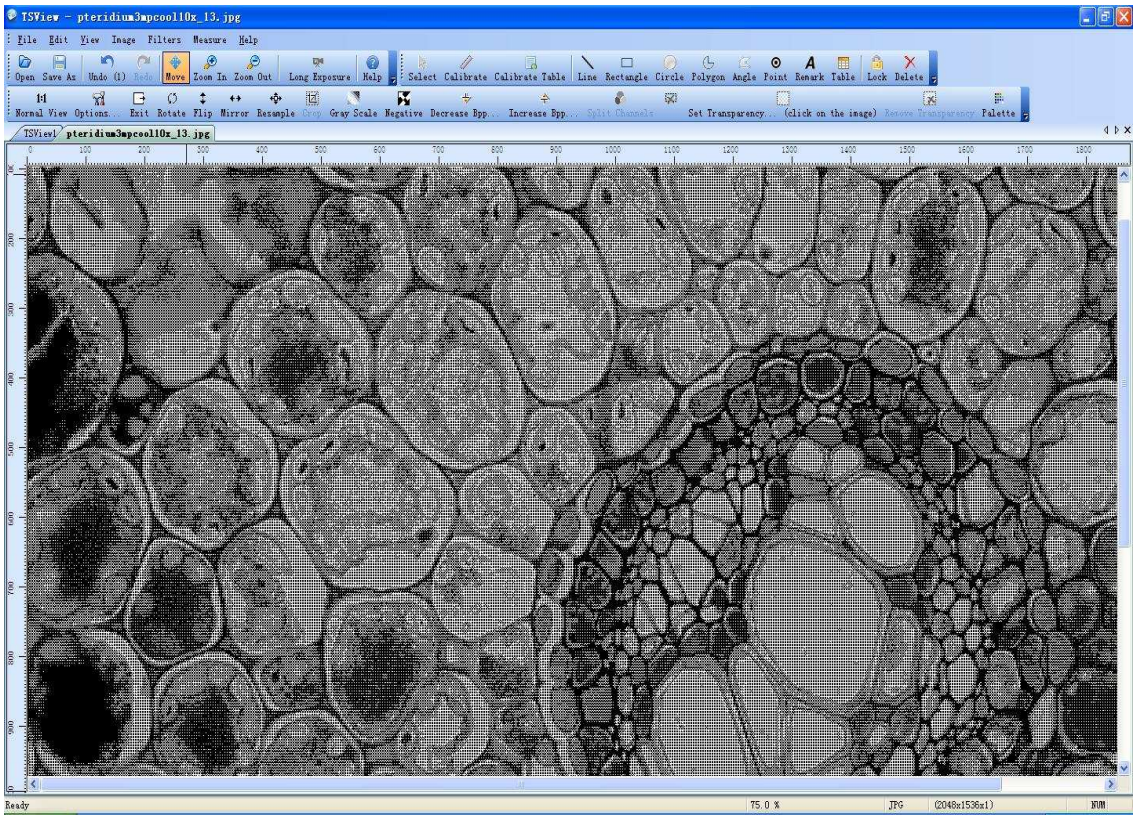


Diagram 26 Image Given with User-defined Dither Treatment

### 3.2.3. TSView’s Filters

Image adjustments may be realized by applying filters, including the lightening and darkening of image, the increase in contrast and the application of Linear filter, Non-linear filter and Deform filter.

| **Corresponding Menu** | **Function** |
|---|---|
| Filters→Repair | To set the repair parameters to repair the image |
| Filters→Linear→Sharpen | To sharpen the image |
| Filters→Linear→Blur | To blue the image |

| | |
|---|---|
| Filters→Linear→Light/Contrast/Gamma | To allow users to manually adjust the lightness and darkness of the image |
| Filters→Linear→Light/Contrast/Gamma | To allow users to manually adjust the contrast of the image |

3.2.3.1. Threshold

**【Function】**

To convert a gray or color image into a high-contrast black-and-white image.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Threshold”, then TSV will cause the threshold setting window to pop up as shown below


Diagram 27 Threshold Setting Window

2. Set the threshold at “118” in the dialogue box of threshold setting window.

3. Upon the click on the button “OK”, TSV will automatically starting the conversion of the current image according to the set threshold, and the result is shown below.

   (All the pixels brighter than the threshold “118” are converted into white, while those darker than the threshold are converted into black)

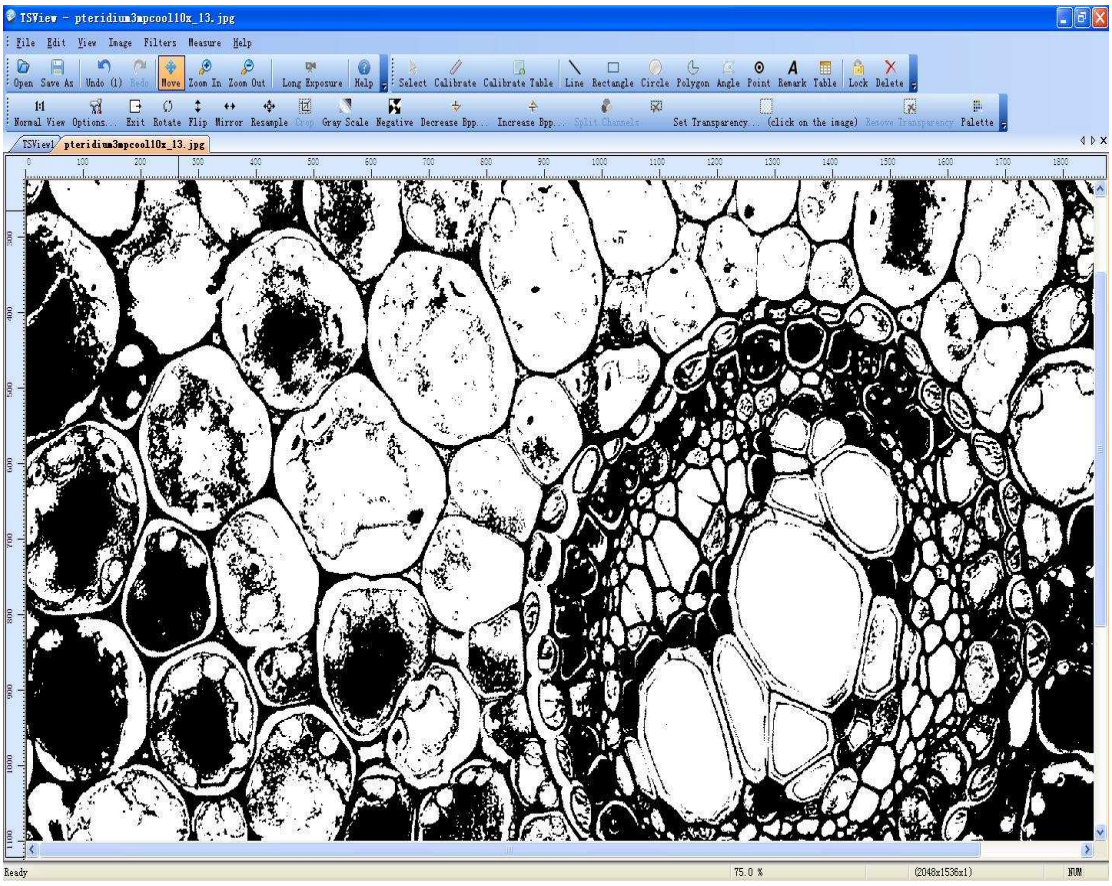



Diagram 28 Image Converted with the Threshold “118”

### 3.2.3.2. Colorize

**【Function】**

It’s mainly used to adjust the values in connection with the RGB color and HSL space and to calculate the specific RGB value of an image.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Colorize”, then TSV will cause the colorization setting window to pop up as shown below

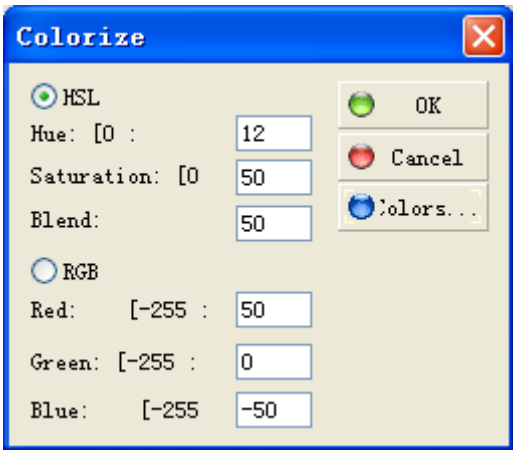



Diagram 29 Colorization Setting Window

2. Select HSL or RGB color mode in the colorization setting window. If HSL mode is chosen, users may vary the hue, saturation and blend; if RGB mode is chosen, users may vary the values of red, green and blue.

3. When the setting is finished, click on the button “OK”, and then TSV will automatically initiate the image adjustment.

3.2.3.3. User-defined Lightening/Contrast/Gamma

**【Function】**

Users may define the lightness, darkness, contrast, gamma correction value and other parameters of the current image at will.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Light/Contrast/Gamma”, TSV will then cause the lightness setting window to appear as shown below


Diagram 30 Lightness Setting Window

2. Set the lightness value in the lightness setting window (the default lightness value of TSV is “0”, which is increased to “50” now for a more obvious lightening effect)

3. Click on the button “OK” to return to the image processing interface, TSV will then automatically start the image lightening, whose result is shown below.

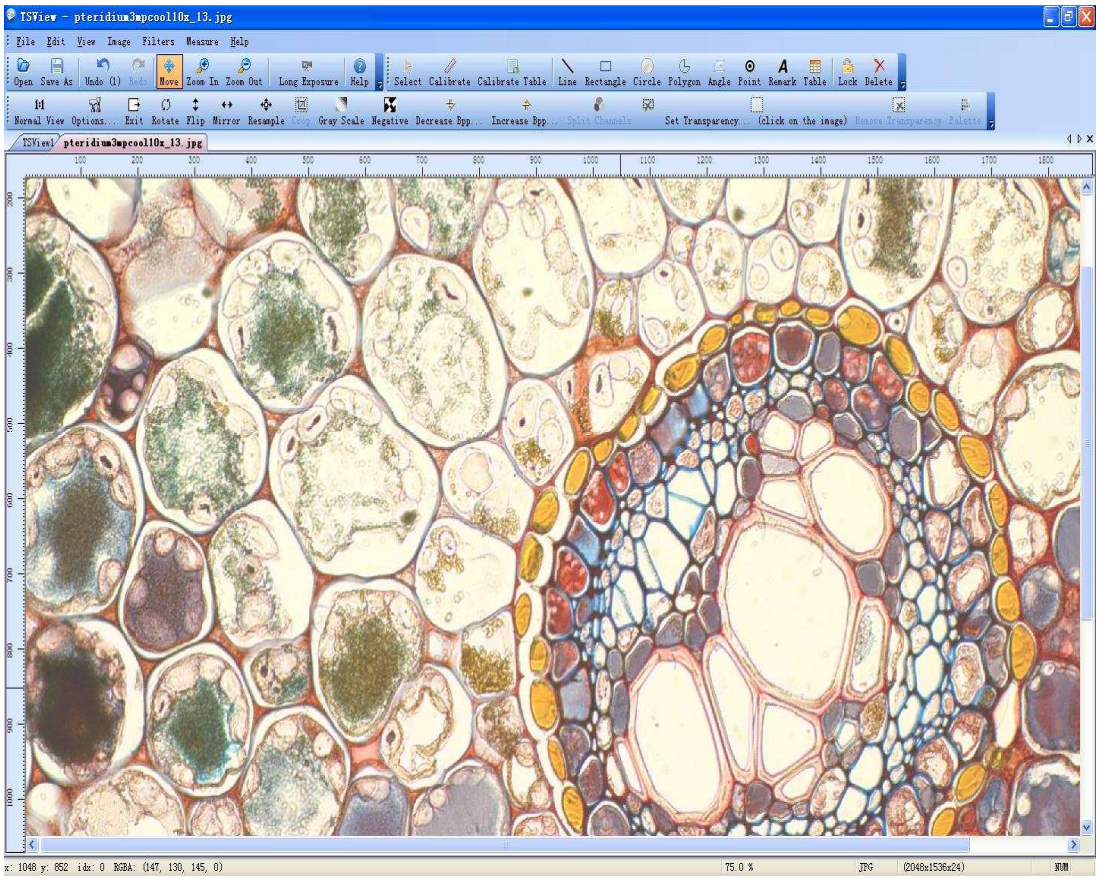



Diagram 31 Image with a Lightness of 50

4. Set the contrast value at “50” in the contrast setting window (TSV’s default contrast value is “0”).

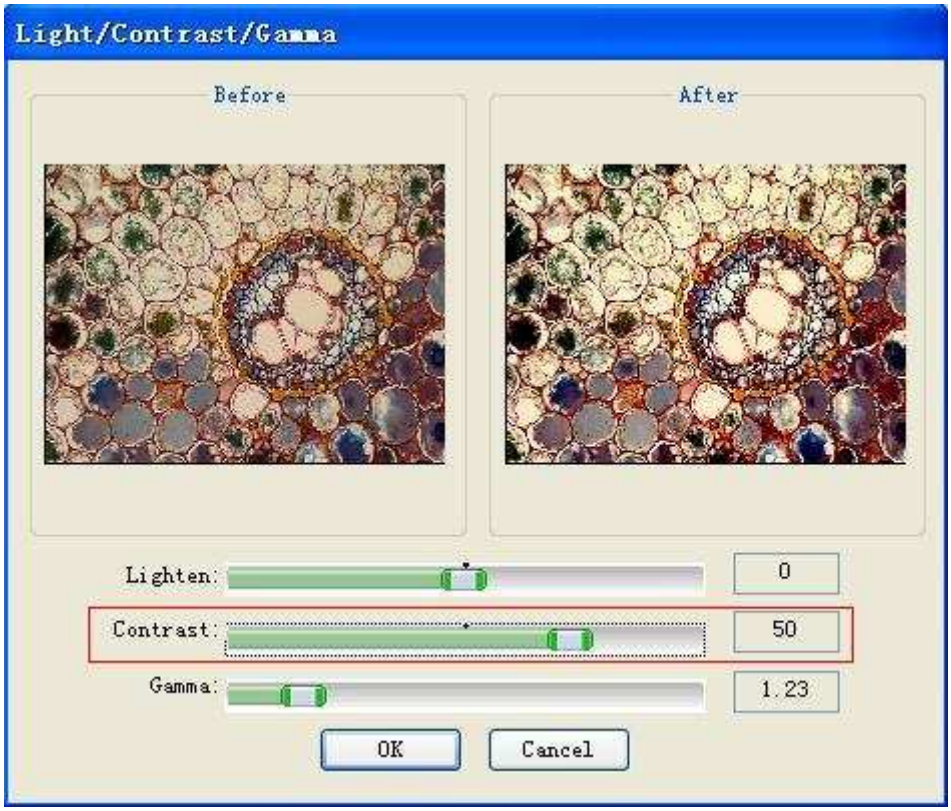



Diagram 32 Contrast Setting Window

5. Click on the button “OK” to return to the image processing interface, TSV will then automatically start the adjustment, with the result as shown below

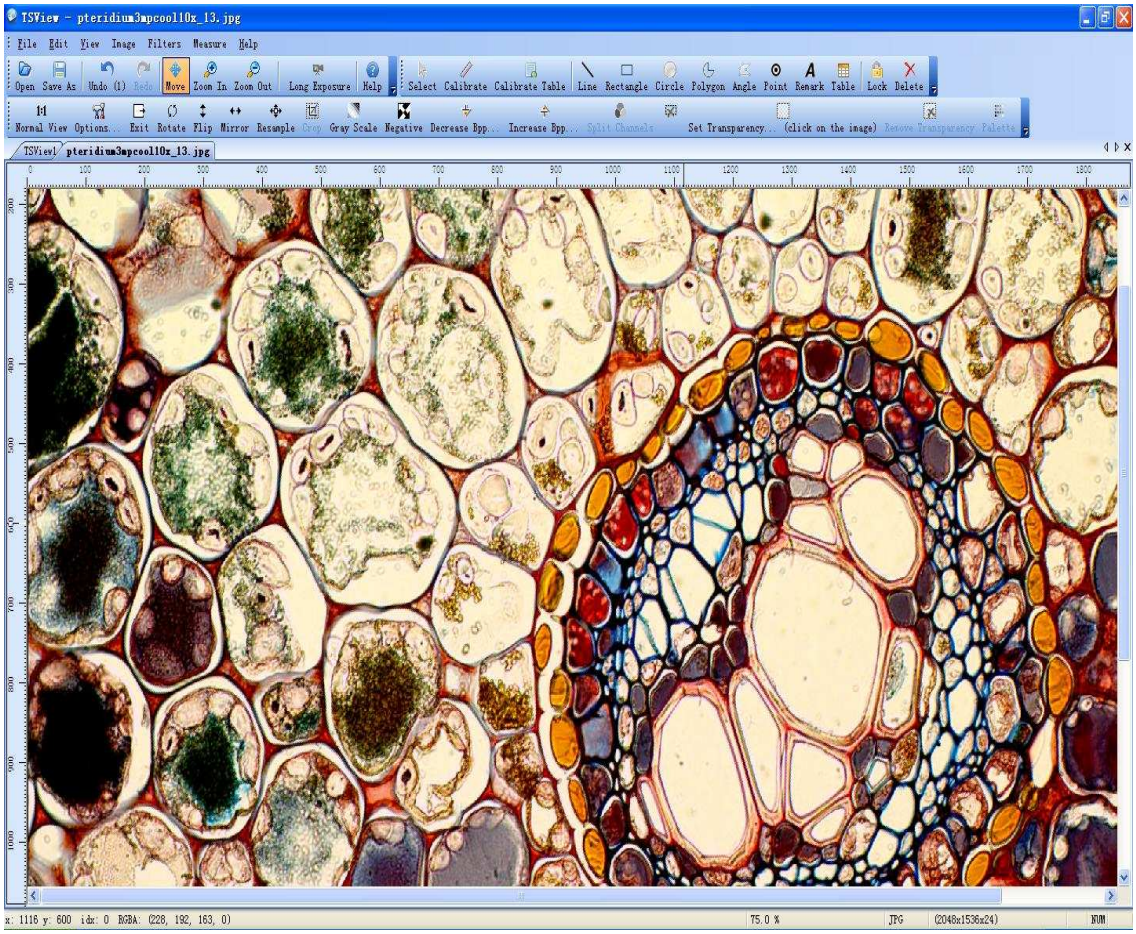



Diagram 33 Image with a Contrast of “50”

6. Draw the icon along the bar “Gamma” of the setting window to preview different image display effects acquired with different gamma values.

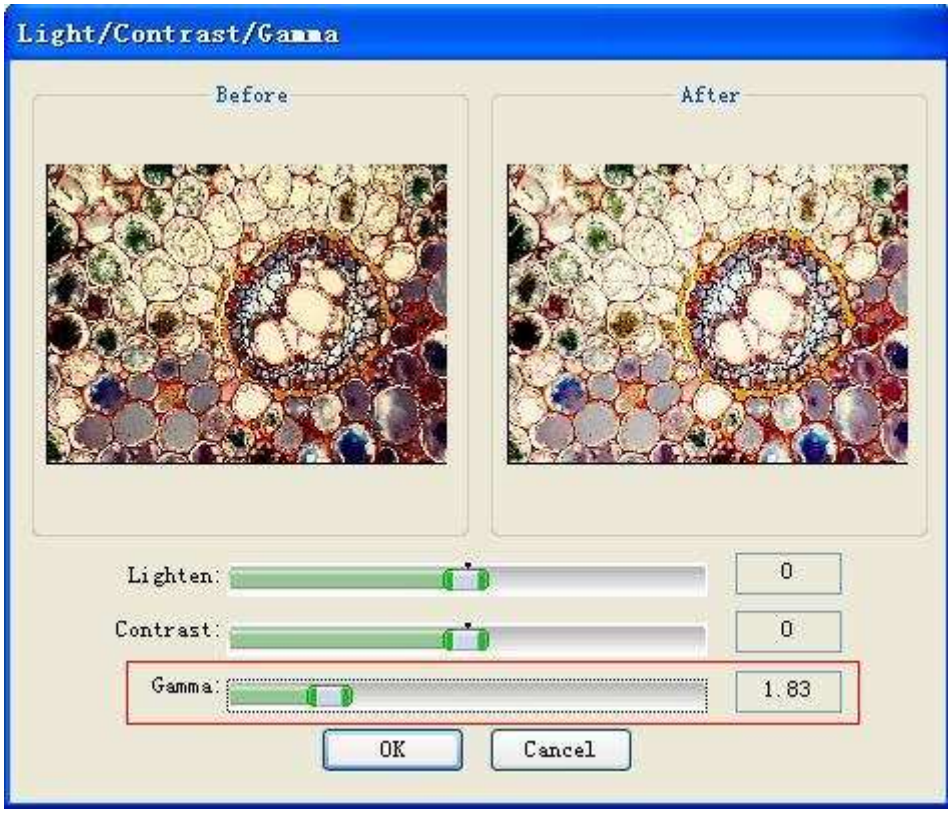



Diagram 34 Gamma Setting Window

7. When the setting is finished, click on the button “OK”, TSV will then automatically start the image adjustment.

3.2.3.4. Linear

User may apply tools including “Blur”, “Soften”, “Gaussian Blur”, “Sharpen”, “Edge” and “Emboss” to the treatment of image.

·Blur It smoothes the image by weakening the color contrast between neighboring pixels with a slight effect, so as to softly soften any obvious edge or prominent shape.

·Soften It softens a smooth edge or an area excessively sharp or of an excessively high contrast through producing a blur effect thereon

·Gaussian Blur It generates an obliterate thick blur effect on the image by adjusting the color values of pixels and controlling the blur extent according to the curves of Gaussian Algorithm.

·Sharpen It sharpens the image through increasing the contrast between neighboring pixels.

·Edge It underlines the edges of an image to make the boundary line prominent.

·Emboss It generates embossment and dent of various extents by drawing the outline of an image and decreasing the color values of the neighboring area.

3.2.3.4.1. Blur

**【Function】**

It uses blur filter to blur the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Blur” on the menu bar, then TSV will automatically start to blur the current image.

3.2.3.4.2. Soften

**【Function】**

It uses softening filter to soften the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Soften” on the menu bar, then TSV will automatically start to soften the current image.

3.2.3.4.3. Gaussian Blur

**【Function】**

It applies Gaussian blur filter to treat the image with Gaussian blur effect.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Gaussian 3*3 (Gaussian 5*5)” on the menu bar, then TSV will automatically start to treat the current image with Gaussian blur effect.

3.2.3.4.4. Sharpen

**【Function】**

It applies sharpening filter to sharpen the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Sharpen” on the menu bar, then TSV will automatically start to sharpen the current image.

3.2.3.4.5. Edge

**【Function】**

It applies edging filter to edge the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Edge” on the menu bar, then TSV will automatically start to edge the current image.

3.2.3.4.6. Emboss

**【Function】**

It uses embossment filter to emboss the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Linear→Emboss”, then TSV will automatically start to emboss the current image.

3.2.3.5. Non-linear

Users may apply filters including “Noise”, “Medium Value”, “Erode”, “Swell”, “Contour line”, “Edge” and “Undulate” to the image. Please refer to “3.2.3.8.Linear” for the application of such non-linear filters.

·Noise The application of this tool will create some random interfering particles on the image, namely the assorted colors.

·Medium Value It can adjust and make medium the intensity of each pixel in the image.

·Erode It can produce an erosive effect on the image’s colors.

·Swell It can swell the image.

·Contour Line It can draw fine lines along the edges of different colors in the image and identify the contour lines of each color channel.

·Edge It can make prominent the edge of the image to underline the boundary line.

·Undulate It can create undulation effect to the image.

3.2.3.6. Deform filter

User may apply filters including “Contract”, “Expand Aperture Row”, “Spiral”, “Tubbulate” and “Overlap” to deform the image. Please refer to “3.2.3.8.Linear” for the application of the aforesaid filters.

·Contract It contracts the image around the image’s center to produce a contract effect.

·Expand Aperture Row It embosses forward the center of the image to expand the aperture row.

·Spiral It causes the image to have a distortion effect that peaks at the image’s center and decreases as it reaches the edge to spiral the image.

·Tubbulate It deforms the image as it were in a tubbulate item.

·Overlap It deforms the image as it were a pile of overlapping images.

3.2.3.7. Pseudo Colors

**【Function】**

It applies the filter “Pseudo Colors” to the image.

**【Operating Instruction】**

Click following the sequence of “Filters→Pseudo Colors”, then TSV will automatically initiate the relevant treatment on the current image.

3.2.3.8. Split

**【Function】**

It splits the color image on the basis of the different colors, hues, saturations, Lums and XYZ spaces. The “split of RGB” will be taken as an example here to explain this function.

·RGB RGB color mode is a color standard prevailing in the industry and represents the channels of Red, Green and Blue.

·HSL HSL color mode is a color standard prevailing in the industry and represents Hue, Saturation and Lum.

·YUV YUV is a color coding method adopted by European TV system, these three characters, Y,U and V don’t form an English combined word, instead, Y represents Lum, UV represents color difference.

·YIQ YIQ color space generally prevails in the TV system of North America, Y represents the grayscale value of the image, I and Q respectively represent the color and saturation.

·XYZ XYZ is a “Split” method that’s based on the region-growing approach of XYZ space.

·CMYK CMYK is a color standard adopted by the printing industry, C,M, Y and K respectively represent Cyan, Magenta, Yellow and Black.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Split→Split to RGB”, then TSV will spit the image into Red channel, Green Channel and Blue channel according to different RGB colors in the current image, the results will be displayed in the image processing interface, users may click on the tabs to view the post-split image.

2. The result of split is shown below

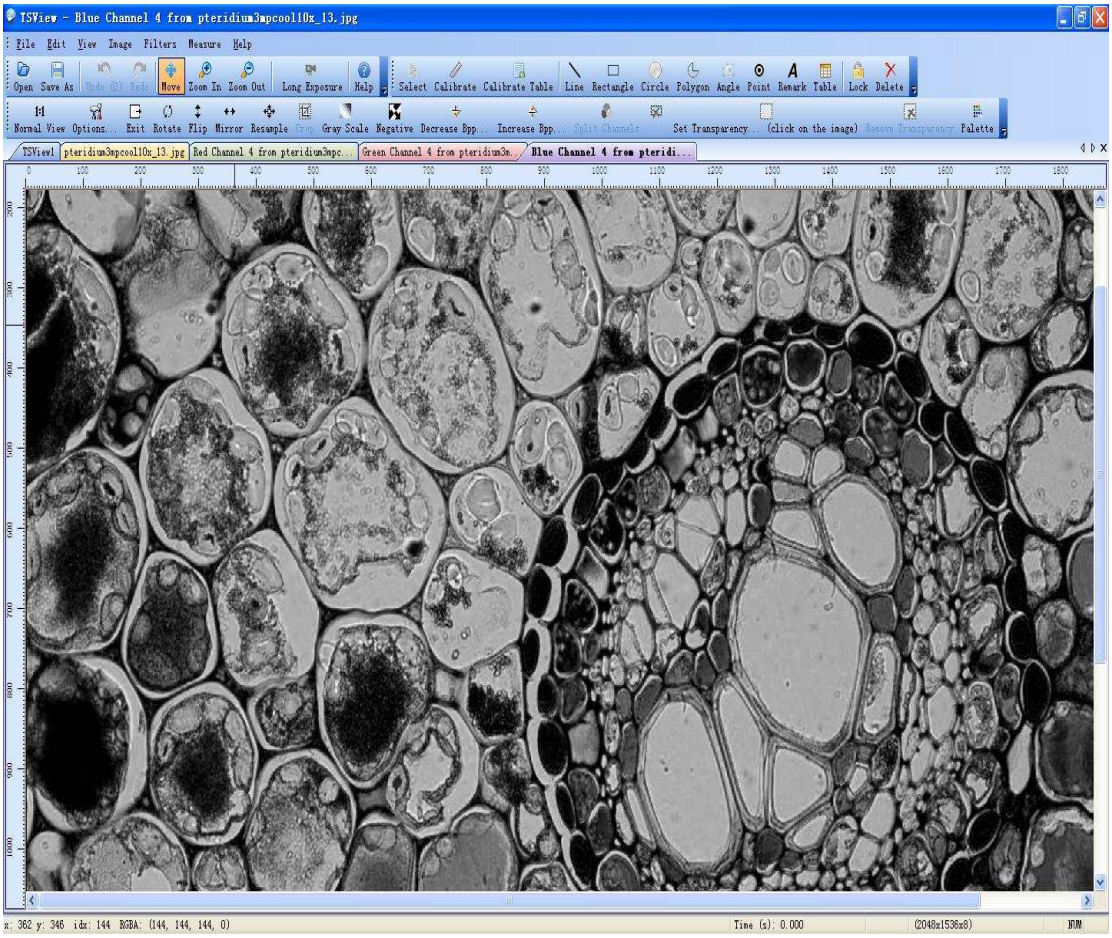



Diagram 35 Result of RGB Split

### 3.2.3.9. Combine the Images

**【Function】**

It combines different images photographed by a black-and-white lens with the R filter, G filter and B filter to form color images.

**【Premise】**

Two or more images must be opened in the environment of TSV.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Combine”, then TSV will cause the image combination window to pop up as shown below

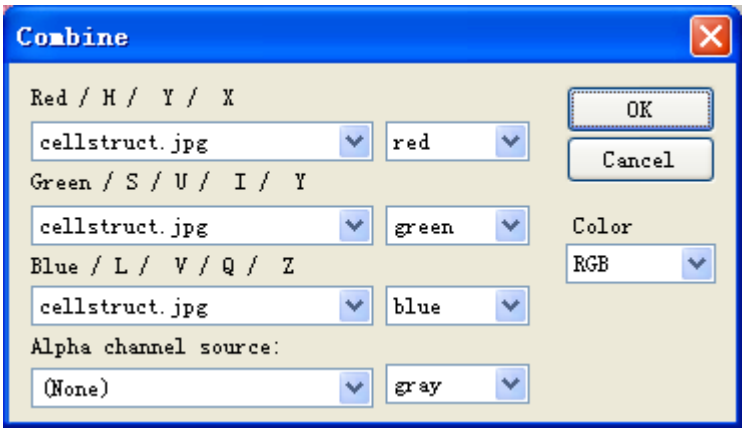



Diagram 36 Image Combination Window

2. Pick the desired color space for the images to be combined out pf the dropdown list of item “Color” in the image combination window, then choose the channel to be used for combination and decide whether to use Alpha channel.

3. When the setting is finished, click on the button “OK”, then TSV will initiate the image combination.

3.2.3.10.FFT (Fast Fourier Transformation)

**【Function】**

It can apply FFT to the part satisfying certain conditions in the current image.

·Fourier Transformation　It can represent a function that satisfies certain conditions with a trigonometric function (sine and/or cosine function) or the linear combination of their integral.

**【Operating Instruction】**

1. Click following the sequence of “Filters→FFT”, then TSV will cause the FFT setting window to pop up as shown below.

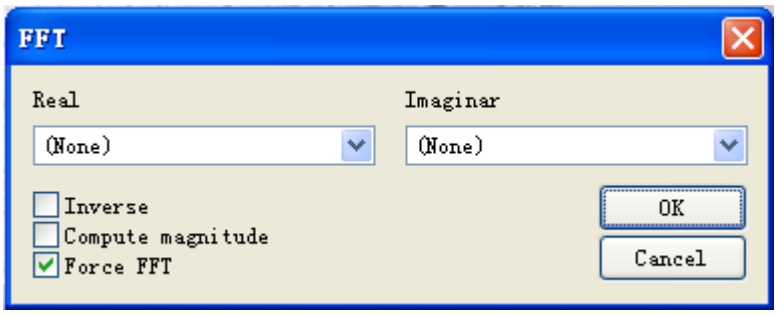



Diagram 37 FFT Setting Window

2. Set the transformation parameters in the window above

· Real: Select the image to be transformed in the dropdown option list.

·Imaginar: Select the image towards which the transformation is oriented in the dropdown option list.

·Inverse: Checking this option represents the approval to the inversing during the transformation.

·Compute magnitude: Checking this option represents the approval to the calculating of absolute value during the transformation.

·Force FFT: Checking this option represents the approval to the occurrence of Force FFT during the transformation.

3. When the setting is completed, click on the button “OK”, TSV will then automatically initiate the transformation.

3.2.3.11.Repair

**【Function】**

It repairs the color image according to the different colors, hues, saturation, lums and XYZ spaces.

**【Operating Instruction】**

1. Click following the sequence of “Filters→Repair”, TSV will cause the repair setting window to pop up as shown below.

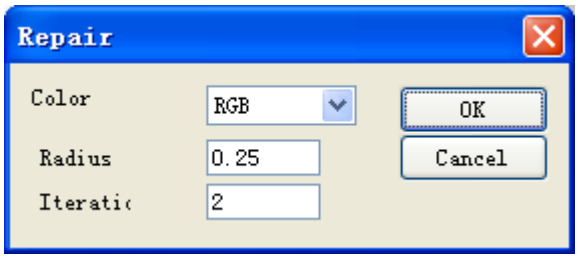



Diagram 38 Repair Setting Window

2. Set the color, radius, iteration of the image after repaired.

·Color: Select the colors to be changed to in the dropdown option list, such as RGB or HSL.

·Radius: Set the radius to be changed to manually.

·Iteration: Set the iteration to be repaired to manually.

3. When the setting is completed, click on the button “OK”, TSV will then automatically initiate the image repair.

3.2.3.12. Image Mix

**【Function】**

It can mix multiple images into a new one.

· Note: Different from image combination, image mix doesn't involve the image's color space and requires no setting of RGB, HSL and other channels.

**【Premise】**

Two or more images must be opened in the environment of TSV.

**【Operating Instruction】**

1. Click following the sequence of "Filters→Mix", TSV will cause the image mix setting window to pop up as shown below.

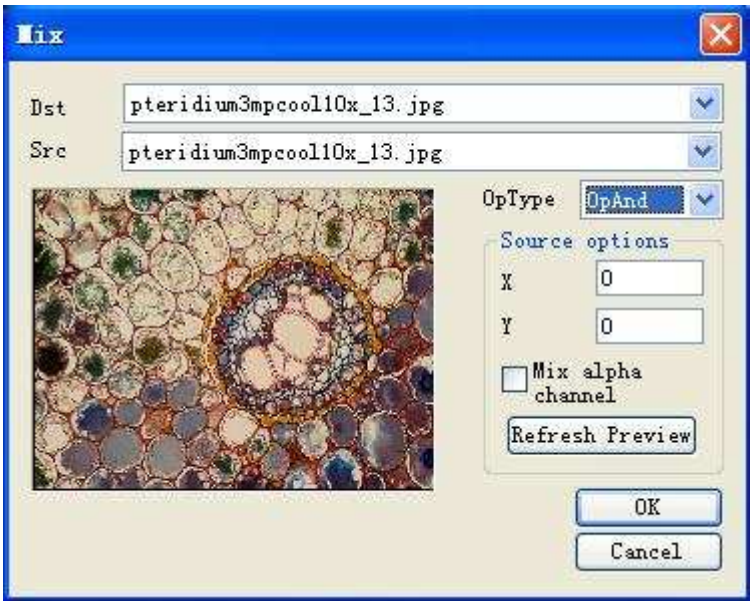



Diagram 39 Image Mix Setting Window

2. Designate the target image and original image in the above setting window, set the mix mode and the values of X and Y, then click on the button "Refresh Preview" to preview the post-mix effect of the image in the preview area on the left.

3. When the setting is completed, click on the button "OK", TSV will then automatically initiate the image mix.

3.2.4. TSView's Measurement Function

It can measure the image being opened and display the results in the "Measure Table"; the measurement covers the distance between counts and between two points, the angle formed by two intersecting lines and the area of the designated area.

3.2.4.1. Calibrate

**【Function】**

Calibration is carried out to confirm the pixel value in a unit length under the current microscope.

**【Operating Instruction】**

1. Open the micrometer image photographed by the current microscope.

2. Click following the sequence of “Measure→Calibrate”, and the measurement of the full-screen image is shown as follows

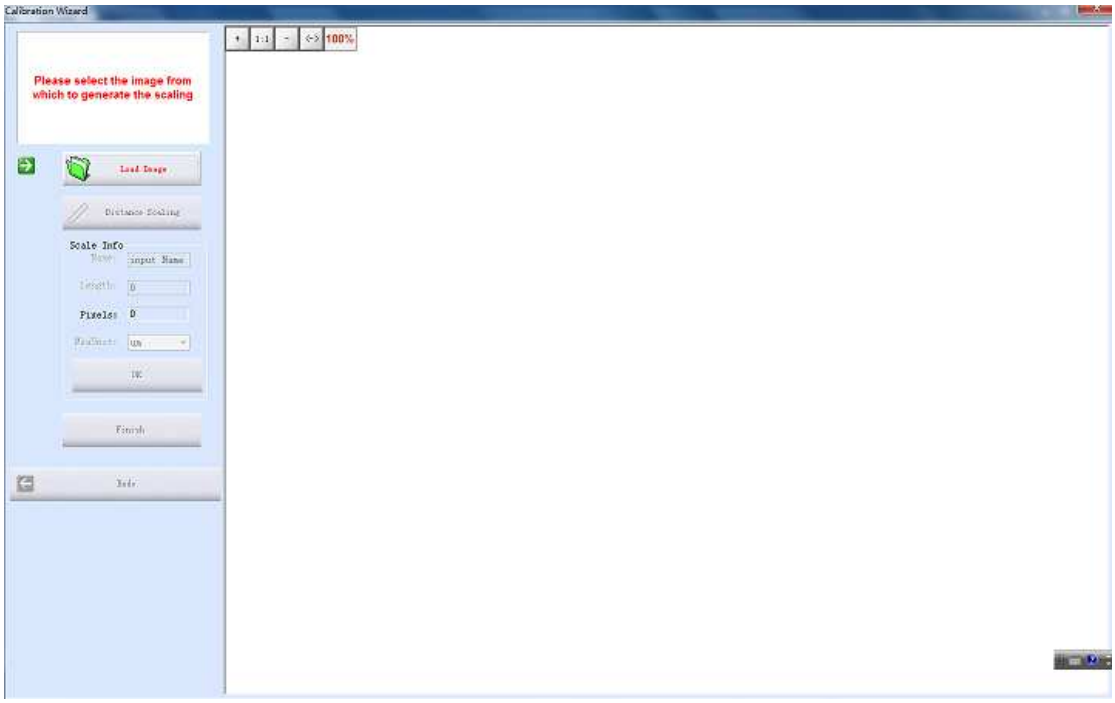
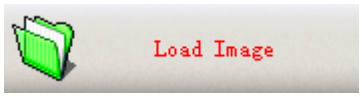



Diagram 40 Image Measurement Setting Window

3. Click on the icon 

to load the image.

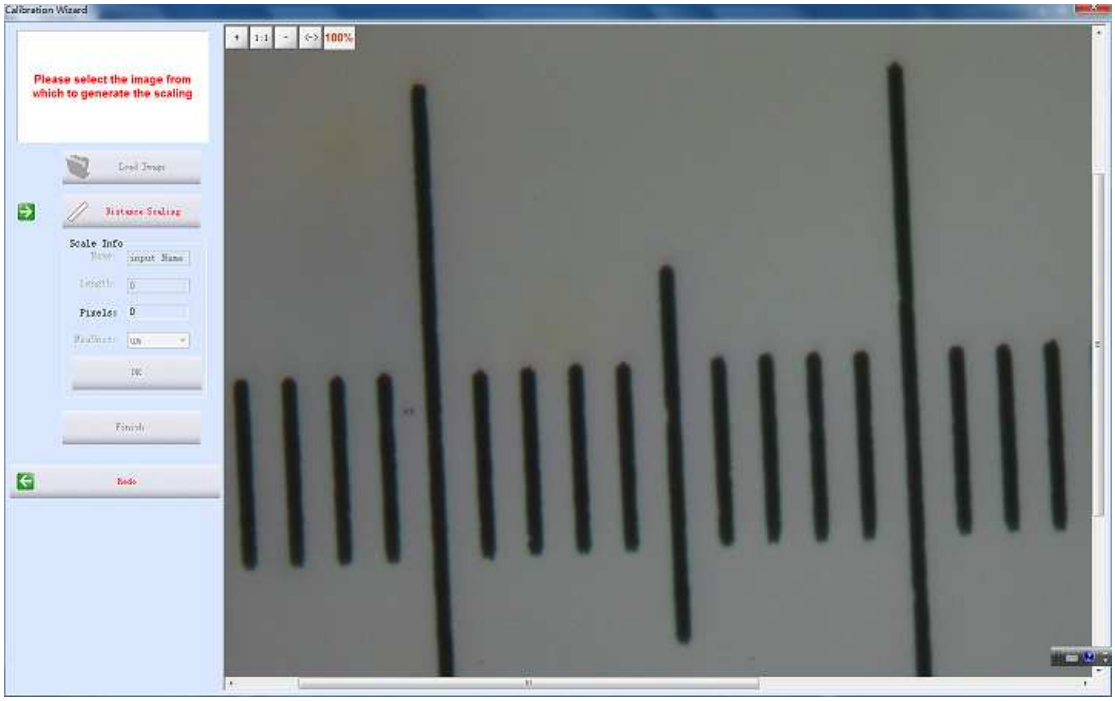



Diagram 41 Load the scale image

4. Move the mouse to the image, where the cursor will be in the shape of a small cross, then draw a line as shown below

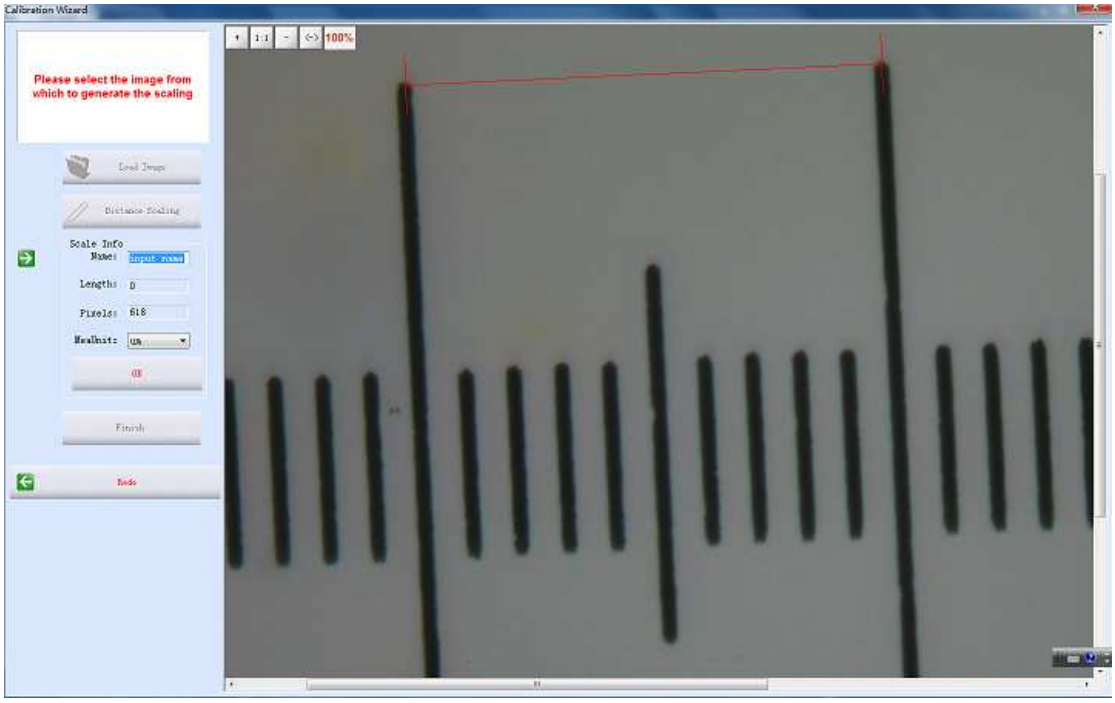



Diagram 42 Calibrate

Vary the calibration distance of the image in the left column as shown below

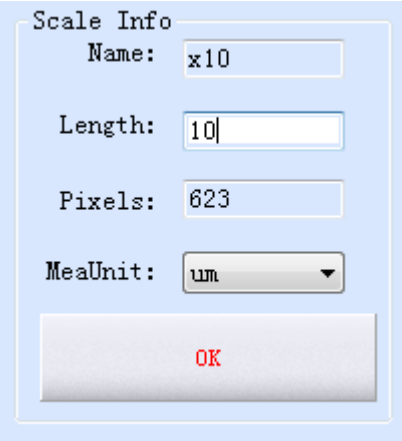



Diagram 43 Input the distance

5. Click on the button “OK” to exit from the calibration adding window and confirm the calibration results.

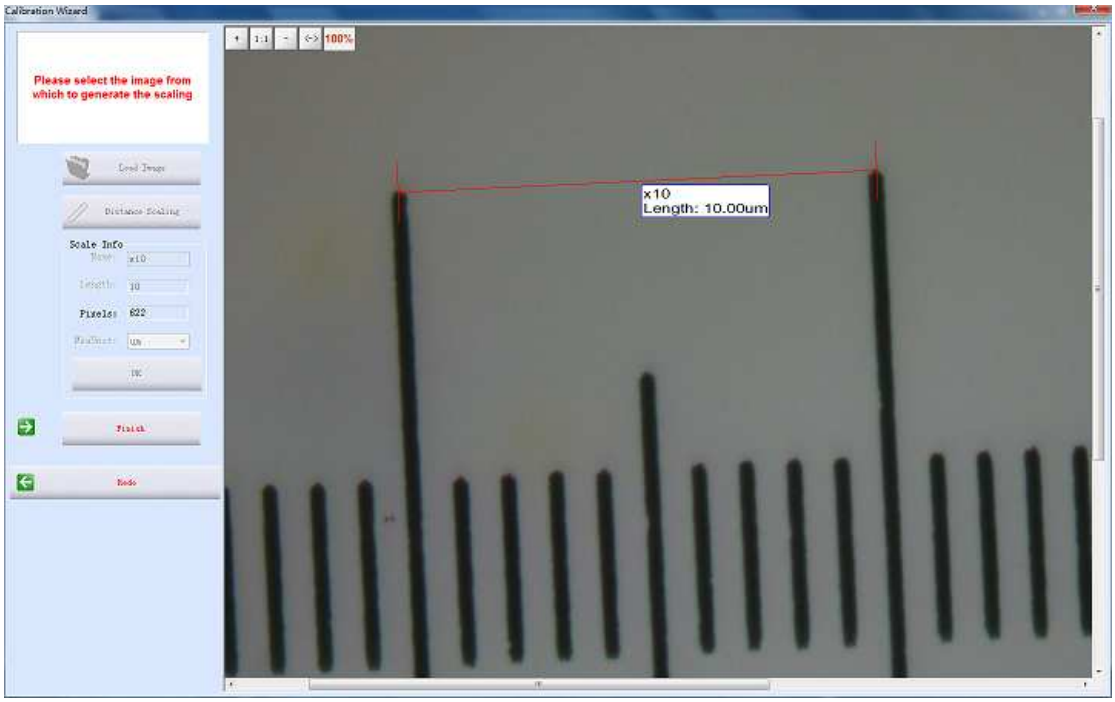



Diagram 44 Finish the calibration

### 3.2.4.2. Calibrate Table

**【Function】**

1. For the viewing and varying of the calibration results

2. For the varying by users on the existing calibration results

3. For the adding and deleting of calibration results by users in the “Calibrate Table”

**【Operating Instruction】**

### ◎ View Calibration Result

1. Click following the sequence of “Measure→Calibrate Table”, TSV will then cause the calibrate table window to pop up.

2., A click on the name of a calibration result under the item Name: (such as L1) in the left blank of the calibrate table will cause the corresponding result to appear on the right column as shown below

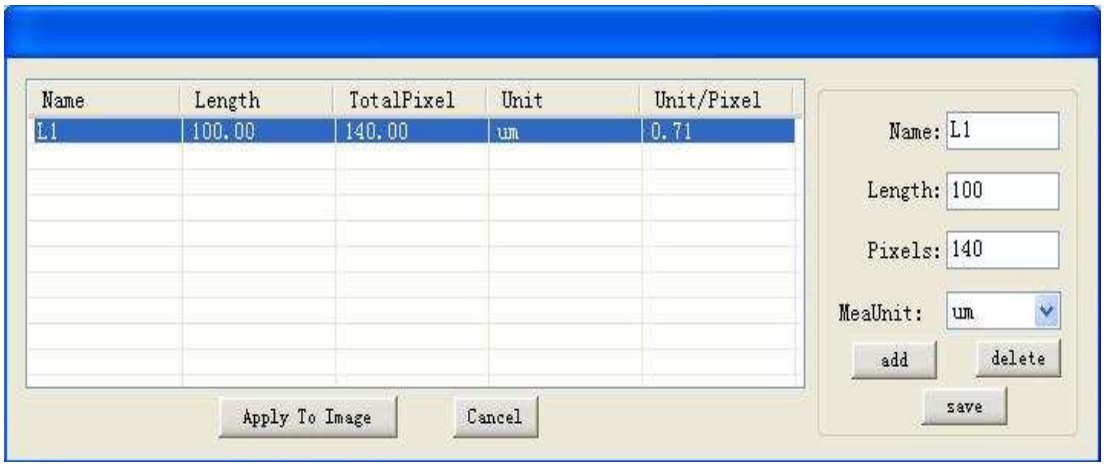



Diagram 45 Operation Window of Calibrate Table

### ◎ Vary Calibration Result

1. Click on the calibration result to be varied in the calibrate window.
2. Vary the data including “Name”, “Length”, “Pixels”, “MeaUnit” and unit of the said calibration result in the right column.
3. When the varying is finished, click on the button “save” to save the varying.

### ◎ Add Calibration Result

1. Click on the button “add” in the calibrate table window, then add a new calibration result titled “UnNamed” to the left blank as shown below

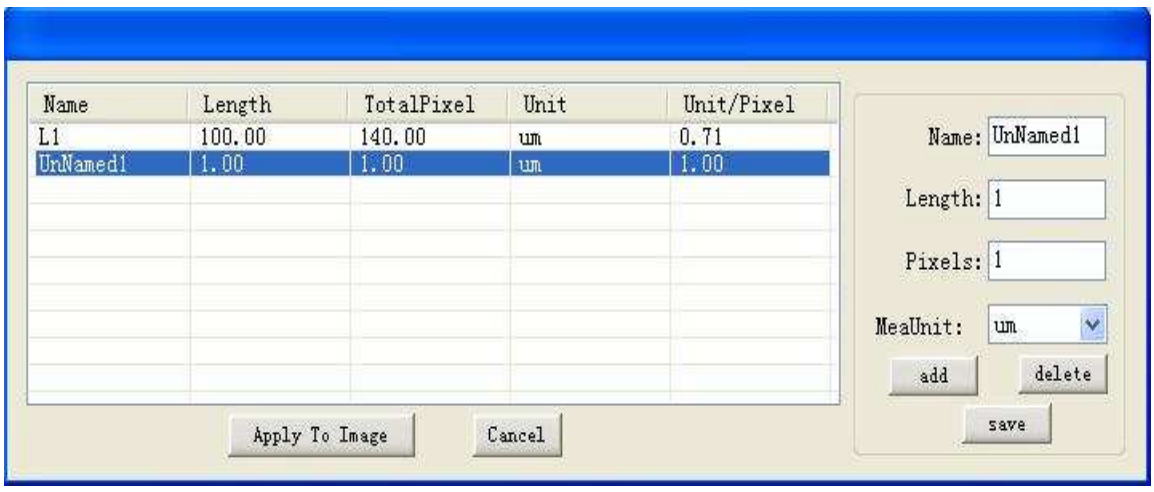


Diagram 46 Additional Calibration Result

2. Click on the additional calibration result under the item Name , then rename it as “L2” and change its “Pixels” to “101” in the right column; after the varying is saved, the additional result becomes what’s shown below

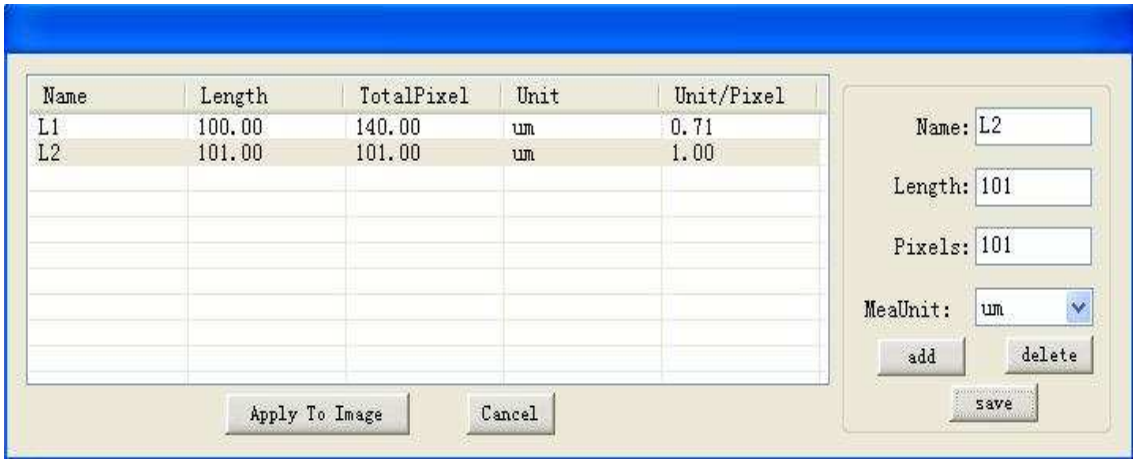



Diagram 47 Additional Calibration Result after Varied

### ◎ Delete Calibration Result

1. Click on the calibration result to be deleted in the calibrate table window.
2. Click on the button “delete”, then the deleting of the designated result is finished.

3.2.4.3. Measurement Tool

They are for the measurement of the distance between two points, the angle formed by two intersecting lines and the area of the designated area in the current image

| **Toolbar Button** | **Corresponding Menu** | **Function** |
|---|---|---|
| | Measure→Select | To select and move the calibration result displayed on the current image and to vary the boarder thickness of such result |
| | Measure→Line | To measure the distance between two random points in the current image |
| | Measure→Rectangle | To measure the height and width of the designated area as well as the pixels and perimeter of such area (measuring unit: pixel) |

| | | |
|---|---|---|
|  | Measure→Circle | To measure the radius of the designated circular area as well as the pixels and perimeter of such area (measuring unit: pixel) |
|  | Measure→Polygon | To measure the pixels and perimeter of the designated polygonal area (measuring unit: pixel) |
|  | Measure→Angle | To calculate the angle formed by two intersecting lines in the current image |
|  | Measure→Point | To mark points in the image for measurement |
|  | Measure→Remark | To add remarks in the image |
|  | Edit→Backward | To revoke the results of the last 20 measurement operations displayed on the current image |
|  | Edit→Forward | To restore the results of the last 20 measurement operations displayed on the current image |

3.2.4.3.1. Line

**【Function】**

It's used to calculate the distance between two random points in the current image, and when the calibrate table is chosen, its unit shall be consistent with that of the calibrate table.

**【Operating Instruction】**

1. Click on the button  of the toolbar or click following the sequence of "Measure→Line" on the menu bar.
2. Move the mouse onto the image, press the mouse's left key and drag the mouse to a proper position, then press the mouse's left key again to release the measurement tool "Line".
3. As shown below, the length of cells indicated in the image is the result measured by the measurement tool "Line".

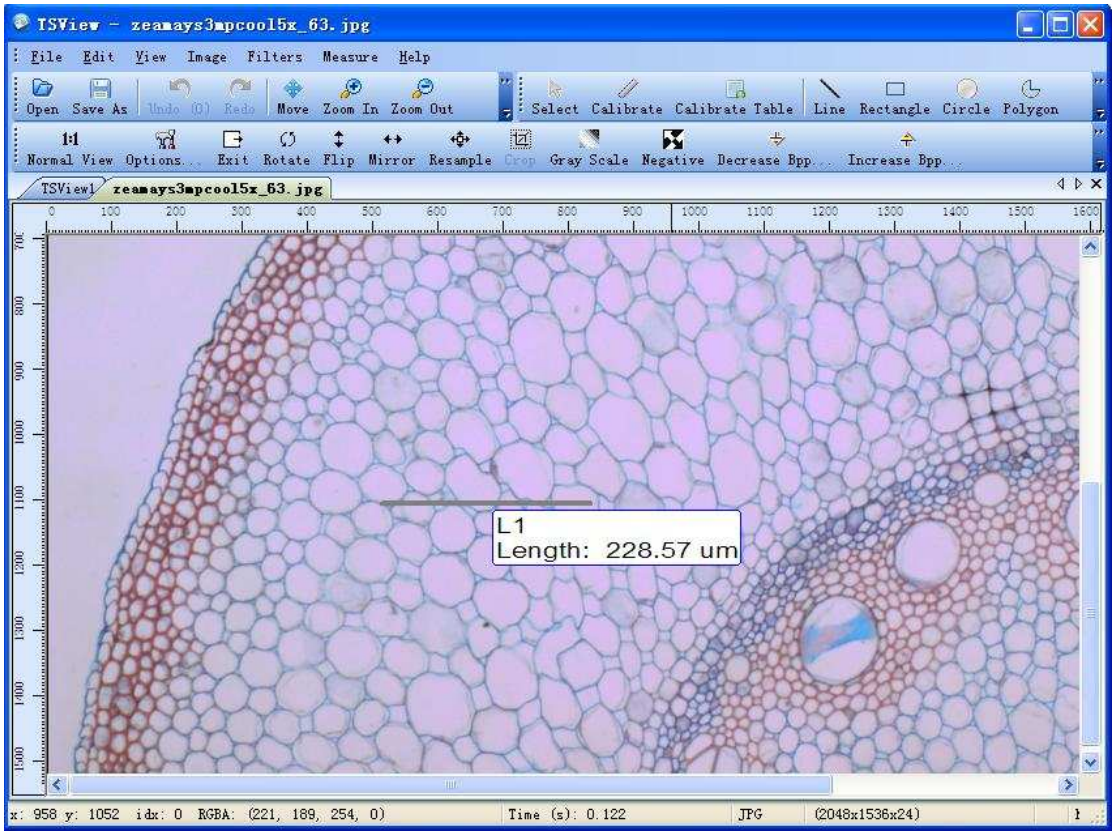



Diagram 48 Result Measured by “Line”

3.2.4.3.2. Rectangle

**【Function】**

It’s used to measure the height and width of the designated rectangular area as well as the pixels and perimeter of such area, and the measuring unit is pixel.

**【Operating Instruction】**

1. Click on the button of the toolbar or click following the sequence of “Measure→Rectangle” on the menu bar.
2. Move the mouse onto the image, press the mouse’s left key and drag the mouse to a proper position, then press the mouse’s left key again to release the measurement tool “Rectangle”.
3. As shown below, the measurement result in connection with the designated area is achieved by the measurement tool “Rectangle”.

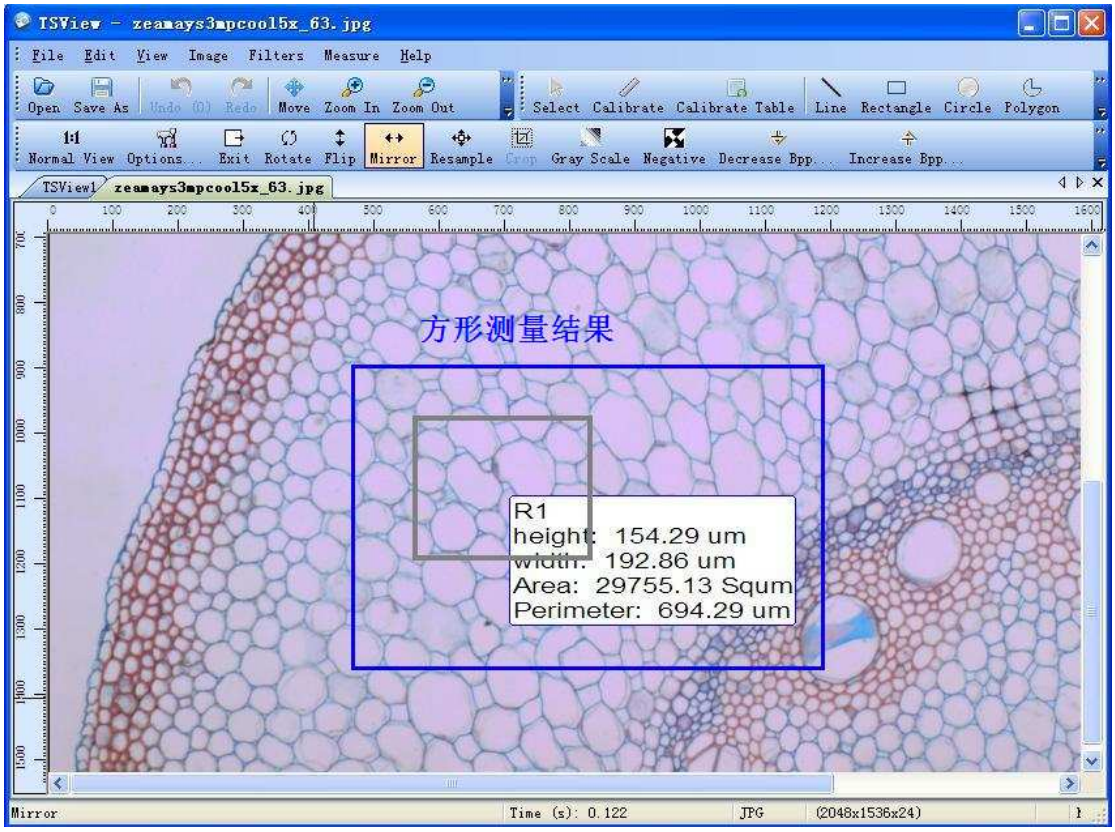



Diagram 49 Result Measured by “Rectangle”

· Note: please refer to the instruction given above for the application of other measurement tools such as “Circle”, “Polygon”, “Angle” and “Point”.

3.2.4.3.3. Select

**【Function】**

It’s used to select and move the calibration result displayed on the current image and to vary the boarder thickness of such result.

**【Operating Instruction】**

1. Click on the button of the toolbar or click following the sequence of “Measure→Select” on the menu bar.
2. Move the mouse onto the already-existing content of the measurement result concluded by the “Rectangle” in the image or onto the boarder of the “Rectangle”, at this point the mouse will be in the shape of a palm.
3. When the mouse is on the boarder of the “Rectangle” or the said measurement result, a press on the mouse’s left key will enable the movement of the said measurement result to any position of the image.

·Note: when users move the boarder, the content of the said measurement result

will move along; but the boarder will remain still when the said content moves.

4. Double click on the boarder or the said content, TSV will then cause the properties window to pop up as shown below

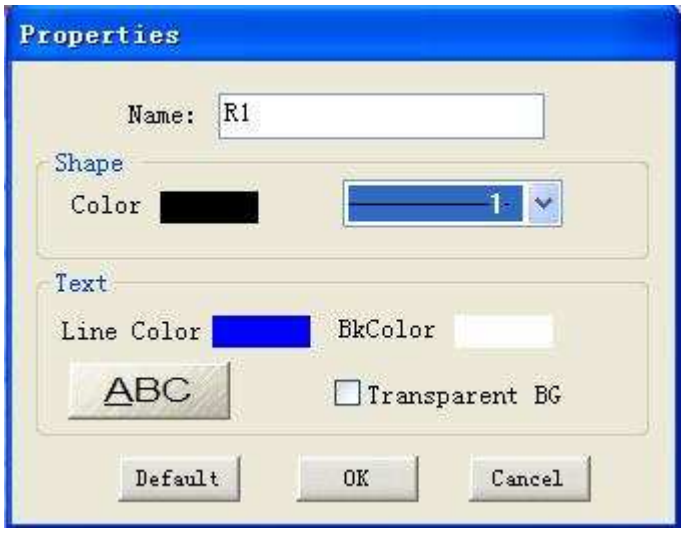



Diagram 50 Properties of the Result Measured by “Rectangle”

5. In the properties window, users may rename the result measured by the “Rectangle” and the boarder thickness of the “Rectangle”. For example, as shown below, the measurement result has been renamed as “Result Measured by the Rectangle” and the boarder thickness of the “Rectangle” has been changed to “4”.

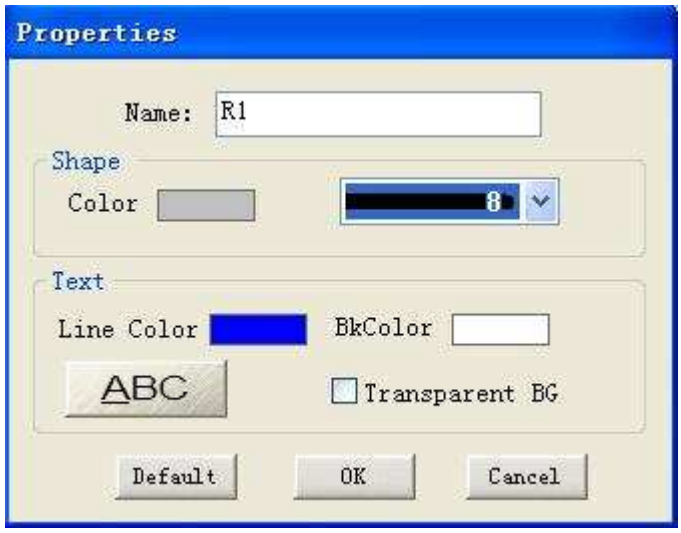



Diagram 51 Properties of the Result Measured by “Rectangle” after Varied

6. Click on the button “OK” to return to the image processing interface. As shown below, the name of the measurement result has been changed from “R1” to “Result Measured by the Rectangle”; the boarder thickness of the

"Rectangle" has been increased.

·Note: the boarder thickness of all measurement tools shall fall between "1"and "4"without hitting the both ends.

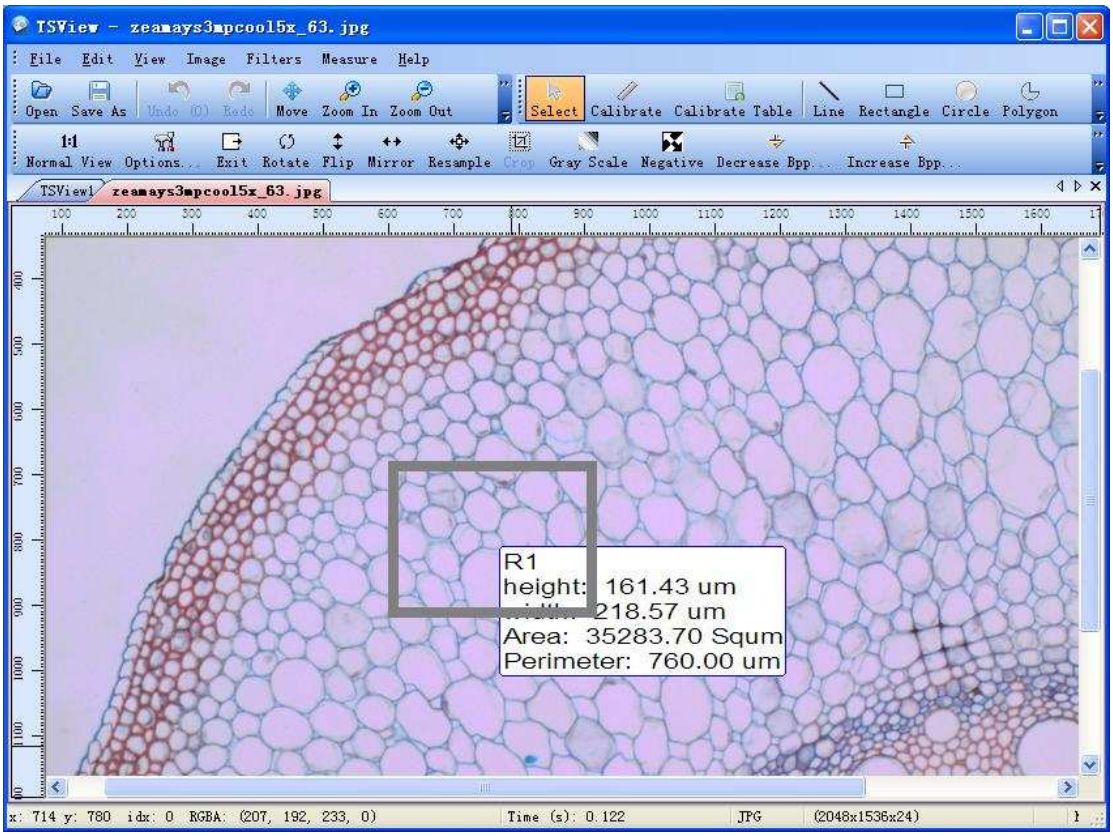



Diagram 52 Result Measured by the "Rectangle" after Varied in Properties

3.2.4.3.4. Remark

**【Function】**

It's used to add marks and remarks to the image for viewing image information.

**【Operating Instruction】**

1. Click on the button A of the toolbar or click following the sequence of "Measure→Remark" on the menu bar.
2. Move the mouse onto the position where the remarks is needed in the image, press the mouse's left key, TSV will then cause the remarks editing window to pop up as shown below

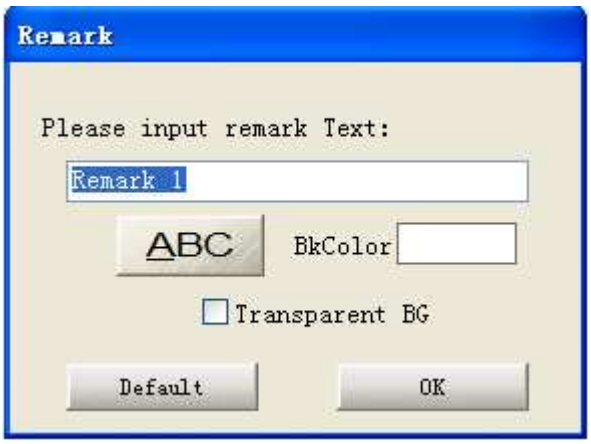
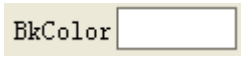
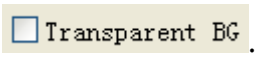



Diagram 53 Remarks Editing Window

3. In the window above, users can edit the name of remarks to appear on the image, change the typeface through  , change the color through  and make the background of the remarks transparent or not through  .

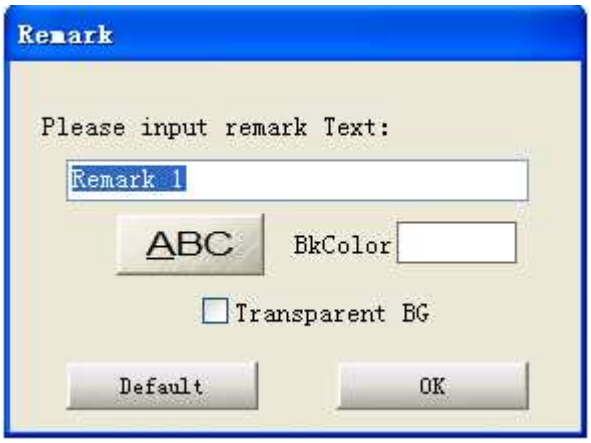



Diagram 54 Post-editing Remarks

4. Click on the button “OK” to add the post-editing remarks to the image; The follow image demonstrates the status where a remarks is successfully added to the image.

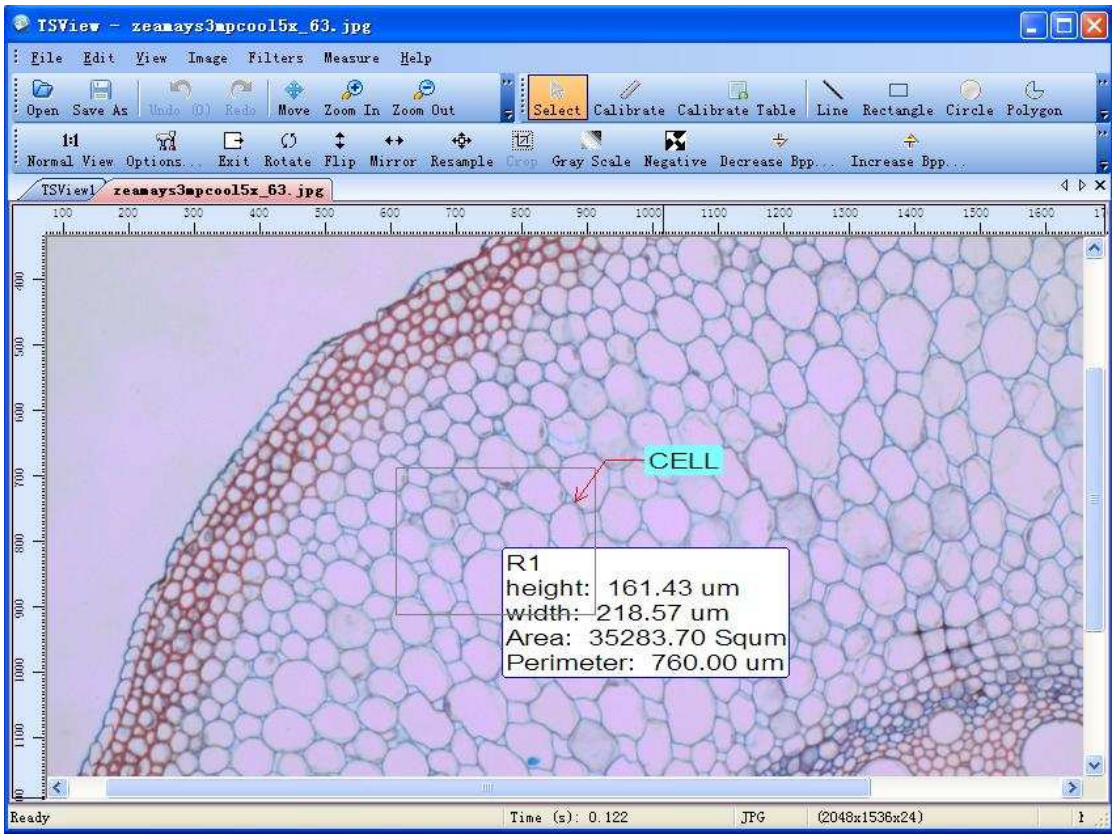



Diagram 55 Remarks' Effect Setting Window

### 3.2.4.4. Measure Table

**【Function】**

It's for viewing the information in connection with measurement and remarks already existing in the current image.

**【Operating Instruction】**

1. Click following the sequence of "Measure→Measure Table" on the menu bar, then TSV will cause the measurement data window to pop up as shown below

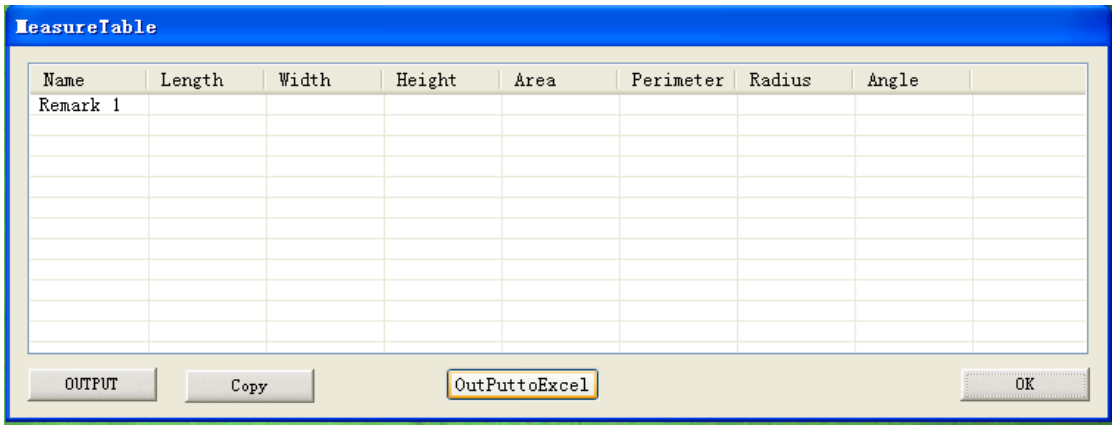
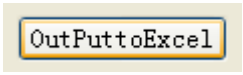



Diagram 56 Measurement Data Window

2. The content of measurement and the information of remarks already existing in the current image will be displayed in the window above.
3. If there's a need to save the measurement data, click on the button 

in the lower left corner, TSV will then automatically save the content of the "Measure Table" into the file titled "MeasureInfo.txt" under TSV.
4. Click on the button 

in the lower center corner, the measurement data will be saved to Excel.