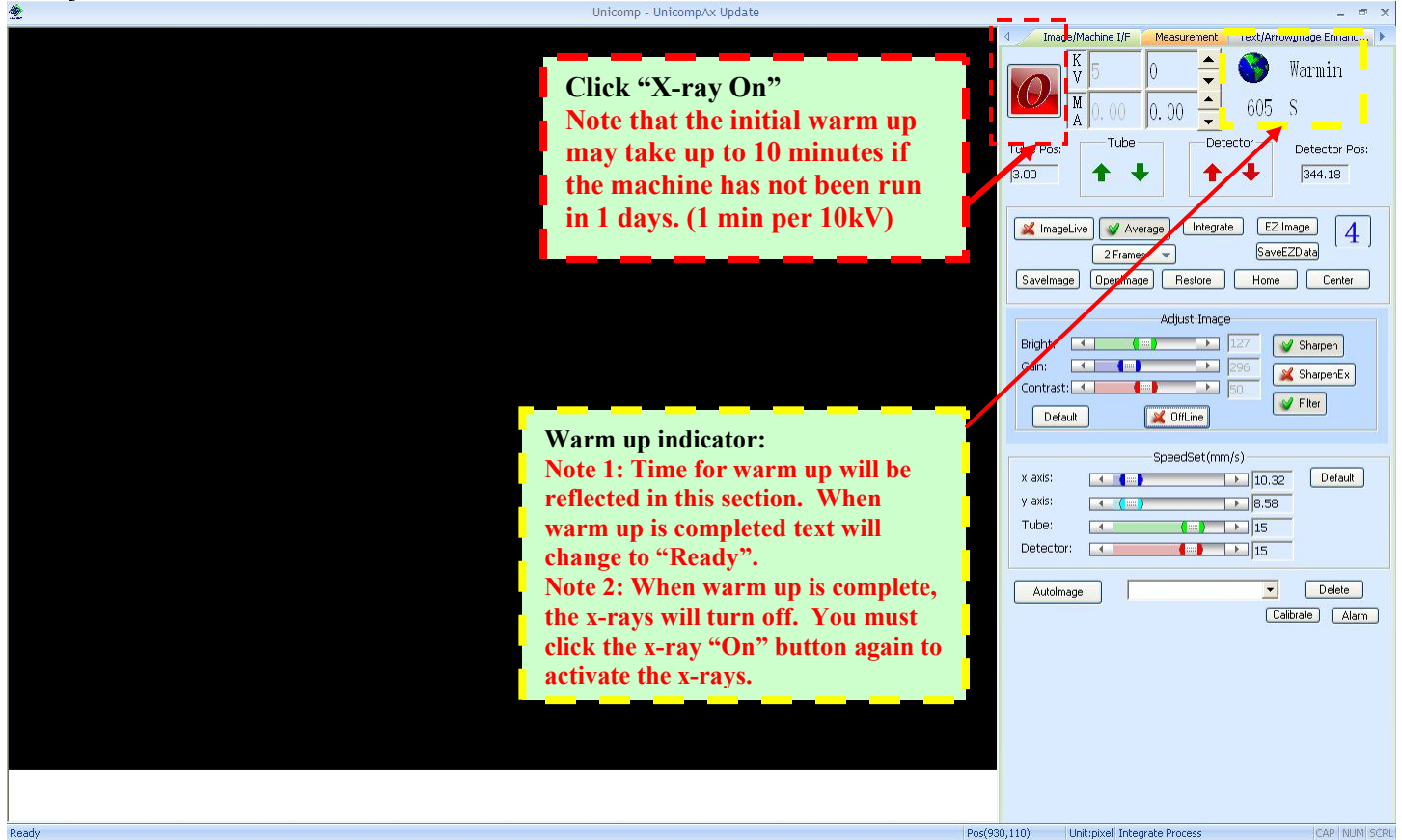# IMAGE/MACHINE INTERFACE PAGE FUNCTIONS AND FEATURES

X-ray On

Click "X-ray On"
Note that the initial warm up may take up to 10 minutes if the machine has not been run in 1 days. (1 min per 10kV)

Warm up indicator:
Note 1: Time for warm up will be reflected in this section. When warm up is completed text will change to "Ready".
Note 2: When warm up is complete, the x-rays will turn off. You must click the x-ray "On" button again to activate the x-rays.
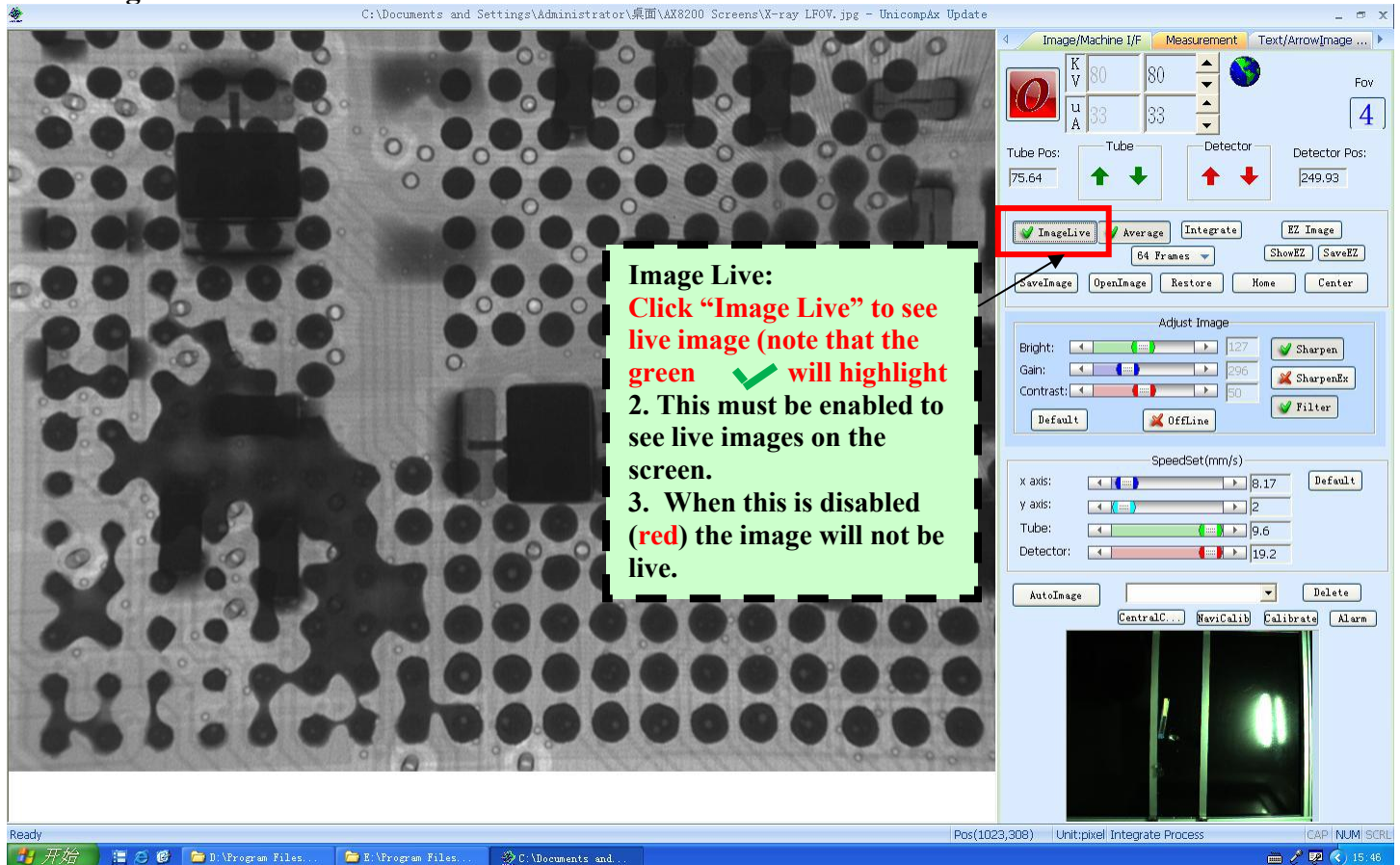
Live Image

Image Live:
Click "Image Live" to see live image (note that the green ✔ will highlight
2. This must be enabled to see live images on the screen.
3. When this is disabled (red) the image will not be live.

kV/mA Adjustment

1. Click kV to increase/decrease kV.
2. Click mA to increase/decrease mA.

X-ray Off

1. Click "X-ray Off".
Note that the kV cannot be more than 60kV to turn off x-rays. kV must be 60kV or less.

X-ray Tube Up/Down

1. Click ⬆ arrow to move x-ray tube up and down.
Note 1: This will change the image size and magnification.
Note 2: As the x-ray tube is moved up the kV will decrease

Tube Pos:
This will display the actual distance of the x-ray tube to the bottom of the X/Y table surface.

X-ray Detector Up/Down

1. Click ⬆ arrow to move x-ray detector up and down.
Note 1: This will change the image size and magnification.
Note 2: As the detector is moved up the kV will need to increase

Detector Pos:
This will display the actual distance of the detector to the top of the X/Y table surface.

X-ray FOV (Field of View) Change

1. Click FOV and the image magnification will double. FOV number will change from 4 to 2 and the FOV will change.
Note 1: This will change the image size and magnification.
Note 2: When the FOV is 4, the kV power will be approx. 15kV lower than the FOV 2.

Image Live

1. Click "Image Live" button until the ✔ is highlighted
2. This is needed to see live images on the screen
3. When this is disabled (red) the image will not be live

Average and Frames

1. Click "Average" until "green" and the image will be live.
2. If check mark is "red" the average function is not active.

1. Click "Frames" to reduce the noise in the image.
2. 16-32 frames is ideal for normal operation.
Note: As the frame number increases there may be some minor delay in the image movement.

Integrate

1. With a live image click "Frames" and select 64 frames. (64 frames is ideal, more frames will take longer to process)
2. Click the "Integrate" to activate the function.
3. Image noise will be reduced and the image will be stored in the camera frame buffer.
Note 1: This function is used primarily for saving images. 64 frames is the optimum number to create a very clean image.
Note 2: The x-ray kV can be turned off after the Integration is complete.

EZ Image Step 1

1. Click "Show EZ" and the image look up table will appear. You can customize your final integrated image.
2. If you want a "customized" image that is different than the our standard default image, make changes to the "EZ Image Data" table.
3. Click OK when completed.

* Bright
* Gain
* Contrast
* Frame
*Sharpen
*SharpenEx
* Filter
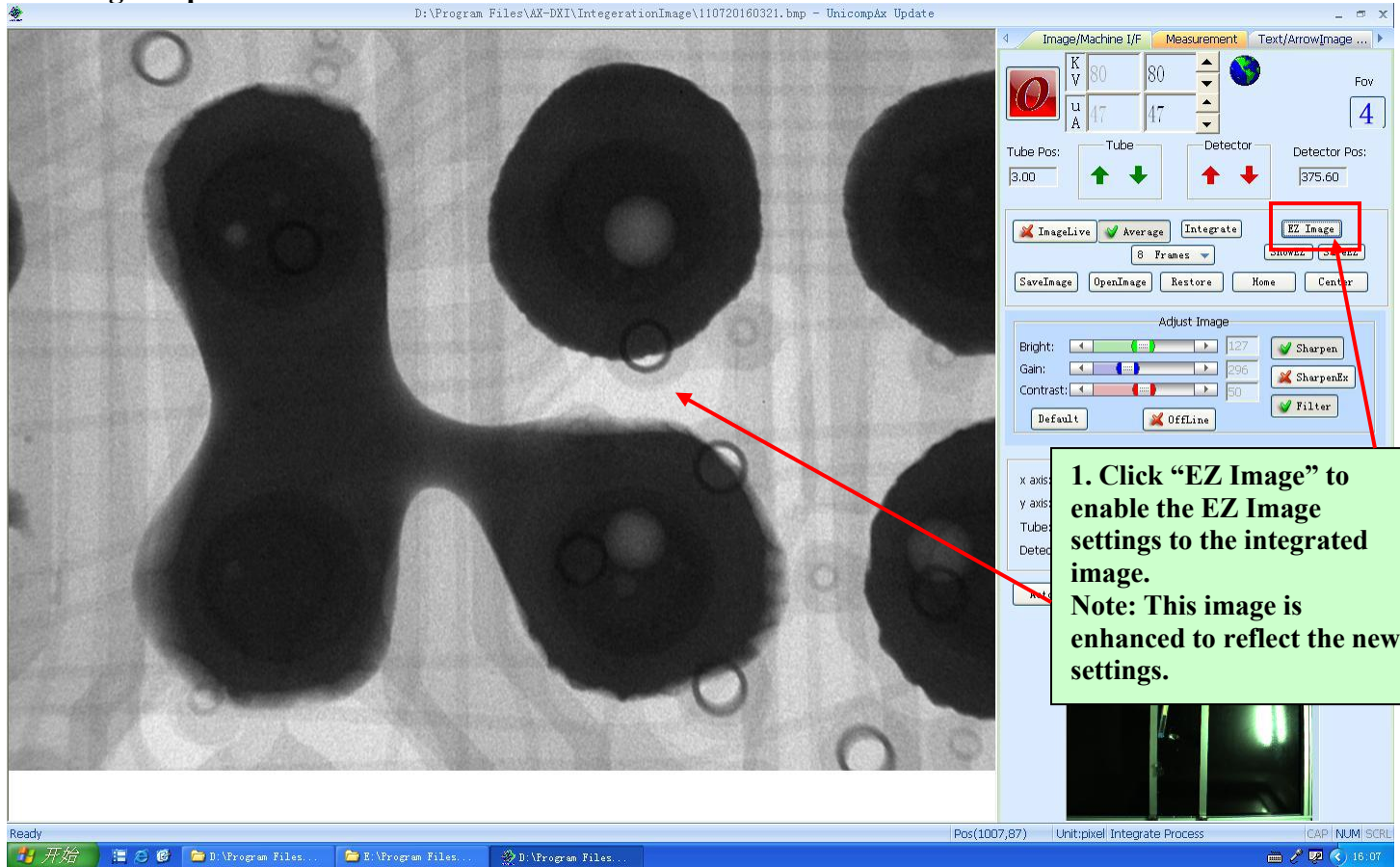
EZ Image Step 2

1. Click "Save EZ" and the EZ Image parameters will be saved .
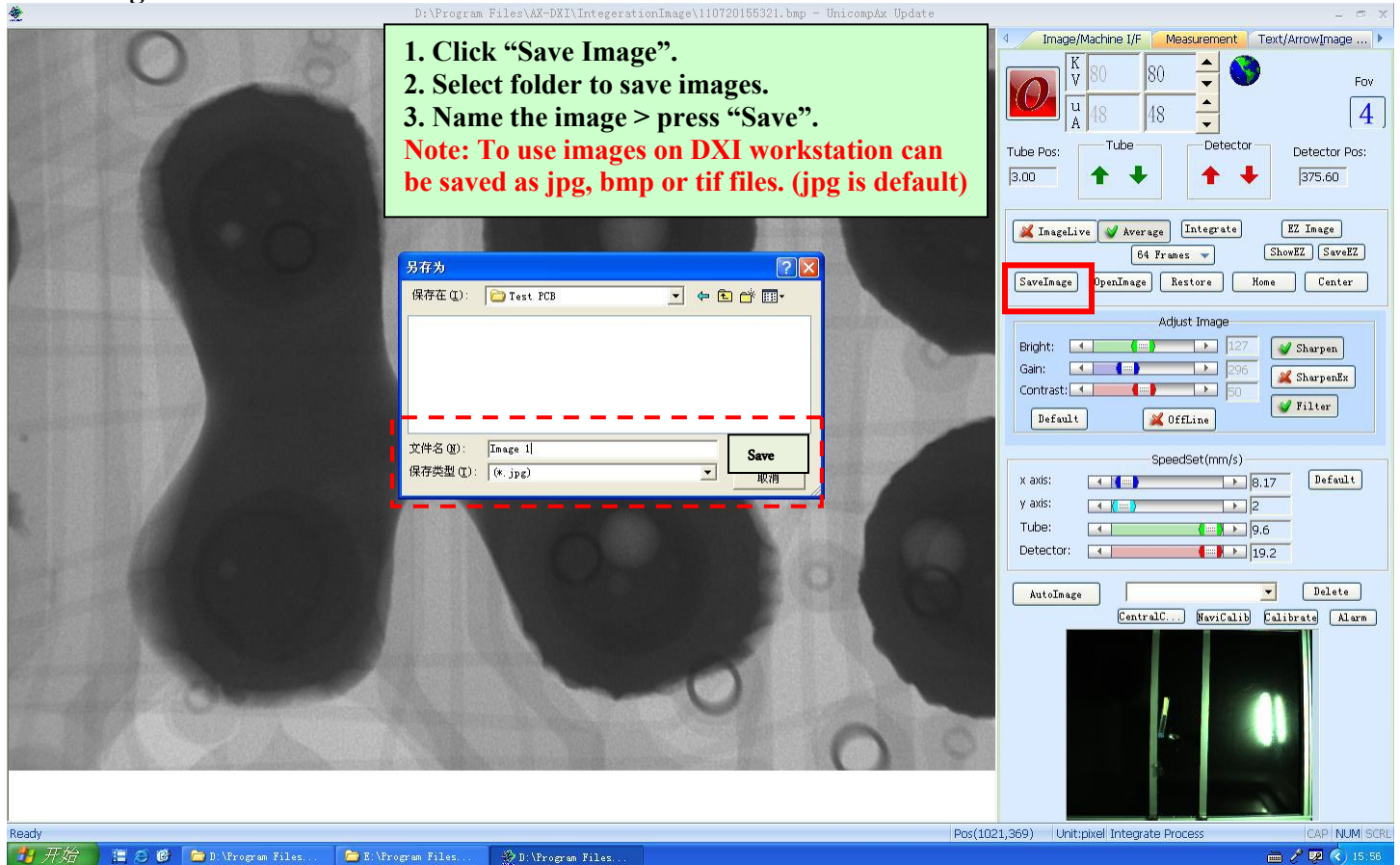2. Click "OK" when done

EZ Image Step 3

1. Click "EZ Image" to enable the EZ Image settings to the integrated image.
Note: This image is enhanced to reflect the new settings.

Save Image

1. Click "Save Image".
2. Select folder to save images.
3. Name the image > press "Save".
Note: To use images on DXI workstation can be saved as jpg, bmp or tif files. (jpg is default)

Open Image

1. Click "Open Image"
2. Select folder with images
3. Click file to open image

Restore

1. Click "Restore" to return to previous image settings.

Home

1. Click "Home" and the X/Y table will move to home position. (back left corner)

Center

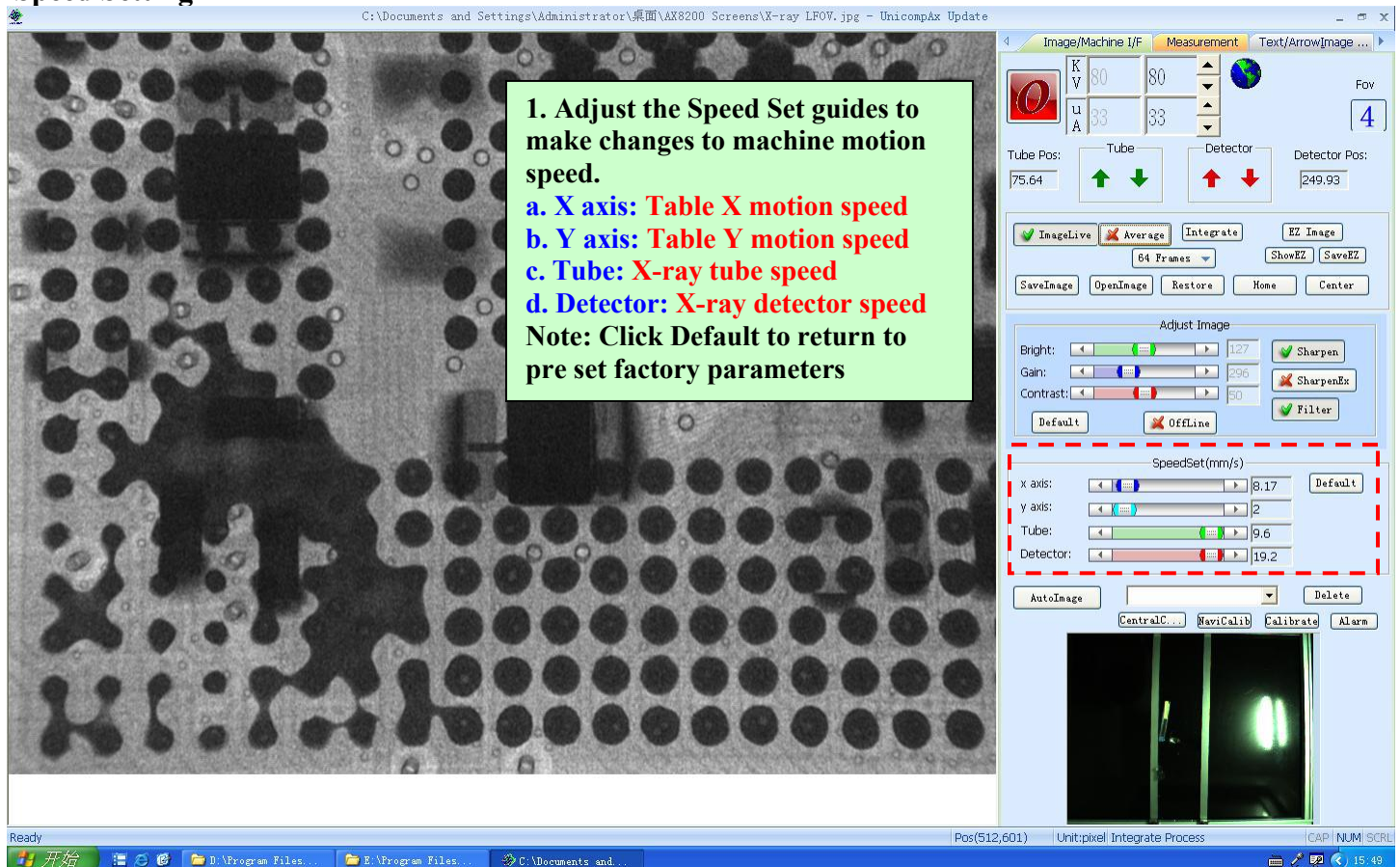**1. Click "Center" and X/Y table will move to center position of the machine.**
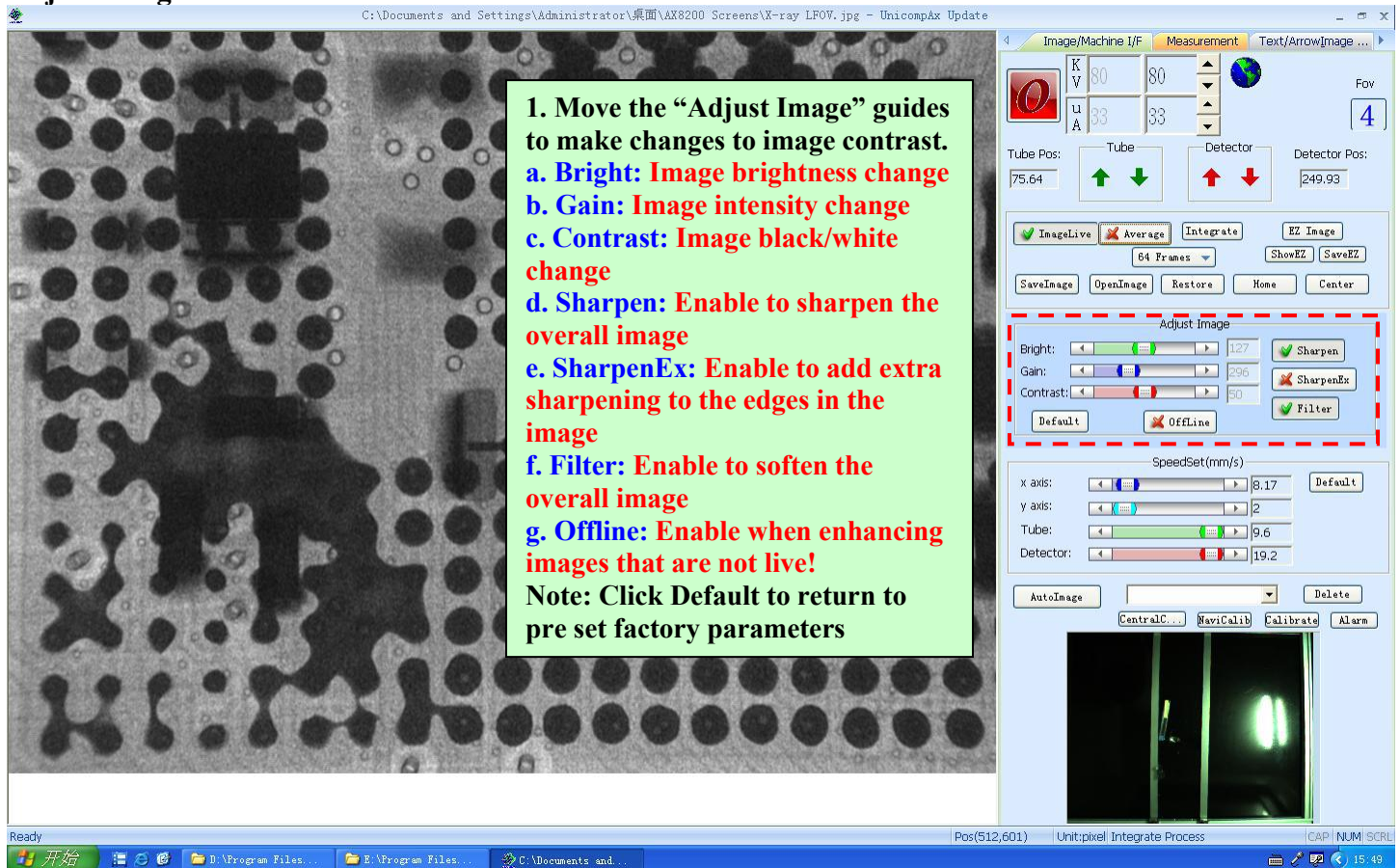
Adjust Image

1. Move the "Adjust Image" guides to make changes to image contrast.
a. Bright: Image brightness change
b. Gain: Image intensity change
c. Contrast: Image black/white change
d. Sharpen: Enable to sharpen the overall image
e. SharpenEx: Enable to add extra sharpening to the edges in the image
f. Filter: Enable to soften the overall image
g. Offline: Enable when enhancing images that are not live!
Note: Click Default to return to pre set factory parameters

Speed Setting

1. Adjust the Speed Set guides to make changes to machine motion speed.
a. X axis: Table X motion speed
b. Y axis: Table Y motion speed
c. Tube: X-ray tube speed
d. Detector: X-ray detector speed
Note: Click Default to return to pre set factory parameters

Auto Image Set© Step 1

1. Click "Auto Image" and the Auto Image Set© (AIS) box will appear
2. Enter the "project name" of the AIS image you want to set.

Auto Image Set© Step 2

1. Create the image you want to save in the Auto Image Set© (AIS). (Ex: BGA Corner)
2. Click "Read Data" and all of the parameters will be reflected in the AIS box.
Note: Compare the settings in the AIS box to the settings in the Machine Interface page.

Auto Image Set© Step 3

1. Click "Save Data" and all of the parameters/project name will be saved.
2. Click "Exit" to disable the AIS box.
3. Click the AIS tab to see all projects that are saved in AIS.

Auto Image Set© Step 4

1. Click the AIS tab to see all projects that are saved in AIS.
2. Select the project name and click "Activate"
3. The machine will now "automatically" apply all of the AIS settings from that program. This eliminates the need for the operator to make any manual settings.

Central C (Crosshair)

1. Click "Central C" and a center point crosshair will appear.

Navi-Calibrate Step 1

1. Click "NaviCalibrate" to activate the video camera positioning function.
2. This function will allow you to "point and click" anywhere in the video image for x/y positioning.

Navi-Calibrate Step 2

1. Click "Grab" to open the Region of Interest (ROI) window.

Navi-Calibrate Step 3

1. Click "Locate" to shape the Region of Interest (ROI) window inside the sample table.
Note: Be precise with the shaping of the ROI window. Shape ROI window to the inside edges of the table.

Navi-Calibrate Step 4

1. Click "Application" to save the Region of Interest (ROI) window setting.
2. Click "OK" when done.
3. Now you can point and click inside the video window to position your sample. No need to use the mouse of joystick.

Calibrate

Calibrate

Dist of laser to Y axis:	34.00	mm
Dist of laser to X axis:	397.00	mm
Max MoveDist of X axis:	420.00	mm
Max MoveDist of Y axis:	396.00	mm
Max MoveDist of Tube:	157.00	mm
Max MoveDist of Detec:	281.00	mm
Dist of Detec to Table:	150.00	mm
Dist of Tube to Table:	3.00	mm

1. Click "Calibrate" and the Calibrate look up window will appear.
2. These are factory settings for the distance and motion of the machine. (x/y/z) Note: These can be modified if needed.
3. Click "Set Data" and the machine will self calibrate. (10 second process)

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Alarm

1. Click "Alarm" to see real time updates of the machine interface report.

MEASUREMENT PAGE FUNCTIONS AND FEATURES

Auto Measure Open

1. Click the "Auto Measure" button to enter this feature

No.	BGAArea	VoidArea	Void/BGA	BGASize	PASS/FAIL
B0	0.6978	0.1001	14.35%	-12.72%	fail
B1	1.0511	0.0046	0.44%	31.45%	fail
B2	0.8773	0.1442	16.44%	9.72%	pass
B3	0.6769	0.0830	12.26%	-15.35%	fail
B4	0.7192	0.0346	4.81%	-10.06%	fail
B5	0.9011	0.1051	11.66%	12.70%	fail
B6	0.6978	0.0026	0.37%	-12.72%	fail
B7	0.6978	0.0404	5.79%	-12.72%	fail
B8	0.8773	0.1500	17.09%	9.72%	pass

Diameter(mm): 1
Threshold:(0-255) 48
Tolerance of Void %:(0-100) 25
Tolerance of BGA %:(0-100) 10

Auto Measure Set Region of Interest (ROI)

No.	BGAArea	VoidArea	Void/BGA
B0	0.0134	0.0000	0.00%
B1	0.0343	0.0000	0.00%
B2	1.3956	0.0435	3.11%
B3	1.3147	0.0773	5.88%
B4	1.2882	0.0263	2.04%
B5	1.2362	0.0086	0.69%
B6	1.2362	0.0537	4.34%
B7	1.2621	0.0193	1.53%

Diameter(mm): 1
Threshold:(0-255) 42
Tolerance of Void %:(0-100) 25
Tolerance of BGA %:(0-100) 10

1. Click "Reset Area".
2. Shape the ROI (region of interest) blue box around area to be tested.
Note: ROI box cannot touch edges of solder balls.

Auto Measure Measurement Selections

Measurement Selections:
* **Void Area: % void inside solder ball**
* **BGA Area: Total area of BGA solder ball**
* **Diameter (mm): Set this to the actual BGA ball diameter. (Ex. 0.7mm, 1mm…)**

Note 1: "Single" and "All" function instructions are listed below

Auto Measure Inspection Settings

Auto Measure Inspection Settings:
* **Threshold:** Image setting to optimize the BGA inspection. Default is 55, but you may need to adjust this based on the overall contrast of the image.
* **Tolerance of Void:** Set this to the "acceptable" void % allowable inside the solder ball
* **Tolerance of BGA:** Set this to the "acceptable" solder ball area % change allowable

Auto Measure Inspect BGA Void Area

Void Area Inspection
1. Select "Void Area" tab
2. Click "Inspect" tab to activate BGA test
3. Results of the test will be seen in the report matrix for Void and Area %.
4. All measurement data is presented in mm² dimension.
Note: Failures in the image will be highlighted in red

Auto Measure Single BGA Void & BGA Area

Singe Void Area Inspection
1. Select "Single" tab
2. Click "Inspect" tab to activate BGA test
3. The largest void in each ball will be highlighted.
4. Results of the test will be seen in the report matrix for Void and Area %.
5. All measurement data is presented in mm² dimension.

Auto Measure Inspect BGA Area

BGA Area Inspection
1. Select "BGA Area" tab
2. Click "Inspect" tab to activate BGA test
3. Results of the test will be seen in the report matrix for Void and Area %.
4. All measurement data is presented in mm² dimension.
Note: Failures in the image will be highlighted in red

Auto Measure Save Image

1. Click "Save Image" tab to save image to folder. (bmp, jpeg or tiff)
2. Enter the name of the image and click "Save".

Auto Measure Save Data

1. Click "Save Data" tab to save and all SPC data will be transferred to a spread sheet.
2. Close SPC window when done
3. Click "Exit" to disable Auto Measure

Auto Measure table (in software):

No.	BGAArea	VoidArea	Void/BGA	BGASize
B0	0.0162	0.0000	0.00%	-98.33%
B1	0.0302	0.0000	0.00%	-96.90%
B2	1.3956	0.0435	3.11%	43.51%
B3	1.3147	0.0773	5.88%	35.20%
B4	1.2882	0.0263	2.04%	32.48%
B5	1.2362	0.0086	0.69%	27.13%
B6	1.2362	0.0537	4.34%	27.13%
B7	1.2621	0.0193	1.53%	29.79%

Excel — Book1:

Unicomp Test Result-Time:(time: 2011-7-29 15:33:49)

NO.	BGAArea	VoidArea	Void/BGA	BGASize	Pass/Fail
B0	0.0162	0	0.00%	-98.33%	fail
B1	0.0302	0	0.00%	-96.90%	fail
B2	1.3956	0.0435	3.11%	43.51%	fail
B3	1.3147	0.0773	5.88%	35.20%	fail
B4	1.2882	0.0263	2.04%	32.48%	fail
B5	1.2362	0.0086	0.69%	27.13%	fail
B6	1.2362	0.0537	4.34%	27.13%	fail
B7	1.2621	0.0193	1.53%	29.79%	fail

QFN Step 1

Instructions and English interface to come later!

QFN Step 2

Instructions and English interface to come later!

QFN Step 3

Instructions and English interface to come later!

IC Measure Open/Set Region Of Interest (ROI)

1. Click "IC Measure"
2. Set Reset Area: Shape the ROI blue box around area to be tested

IC Measure Set Inspection Parameters

1. Click "SaveImage"icon

Set Inspection Parameters: Click Void Area
a. Param 1: Grey scale adjustment to highlight the voids
b. Param 2: Contrast adjustment for refined highlighting of the voids
Note: Typical range is 80-98 and 2-3

IC Measure Inspect Void Area

1. Tolerance of Void%: Input +/- acceptance tolerance.
2. Click "Inspect" to activate the program.
Note: Test results will be displayed in the report matrix.

IC Measure Inspect Pad Area

1. Click "Inspect" to activate the program.
Note: Test results will be displayed in the report matrix.

IC Measure Single Void Highlight

1. Click "Single" to highlight the largest void in the image.

IC Measure Save Image

1. Click "Save Image" and select the folder for image storage.
2. Enter the image name and click "Save"

IC Measure Save Data

1. Click "Save Data" and inspection results will be transferred to a SPC data sheet.
2. Close SPC data sheet and IC Measure when finished.

Calibrate Instructions

Place cursor on start point of known distance and span to end point. Right click when done.

Start

End

1. Click "Calibrate" and select "mm" or "inch".
2. Enter "known distance" in the "Enter Length" location. (Ex: 3.8mm)
3. Place mouse on start point of known distance and span to end point. Right click when done.
4. Click "Save" when finished.
Note: Magnif reflects the actual image magnification from point to point
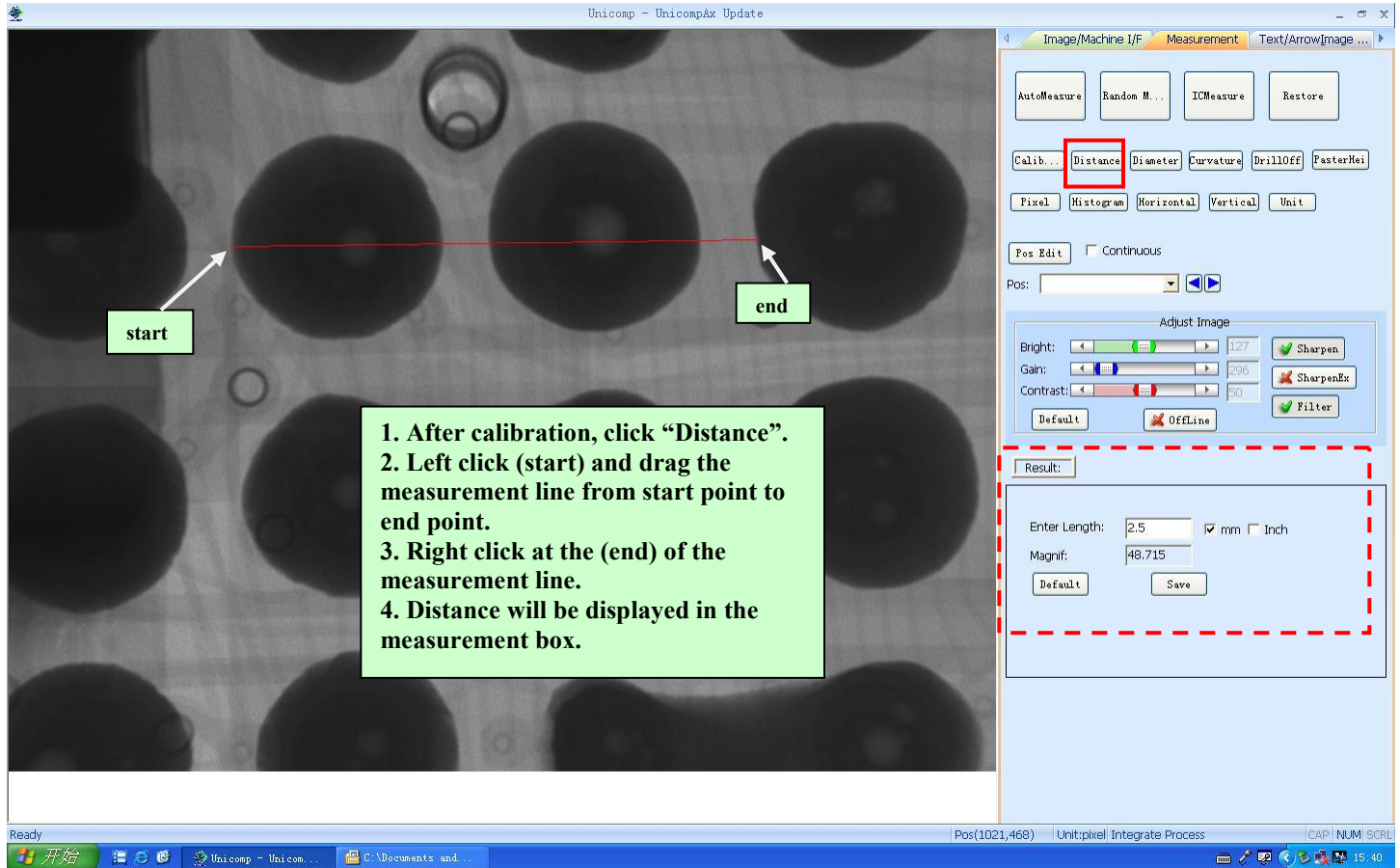
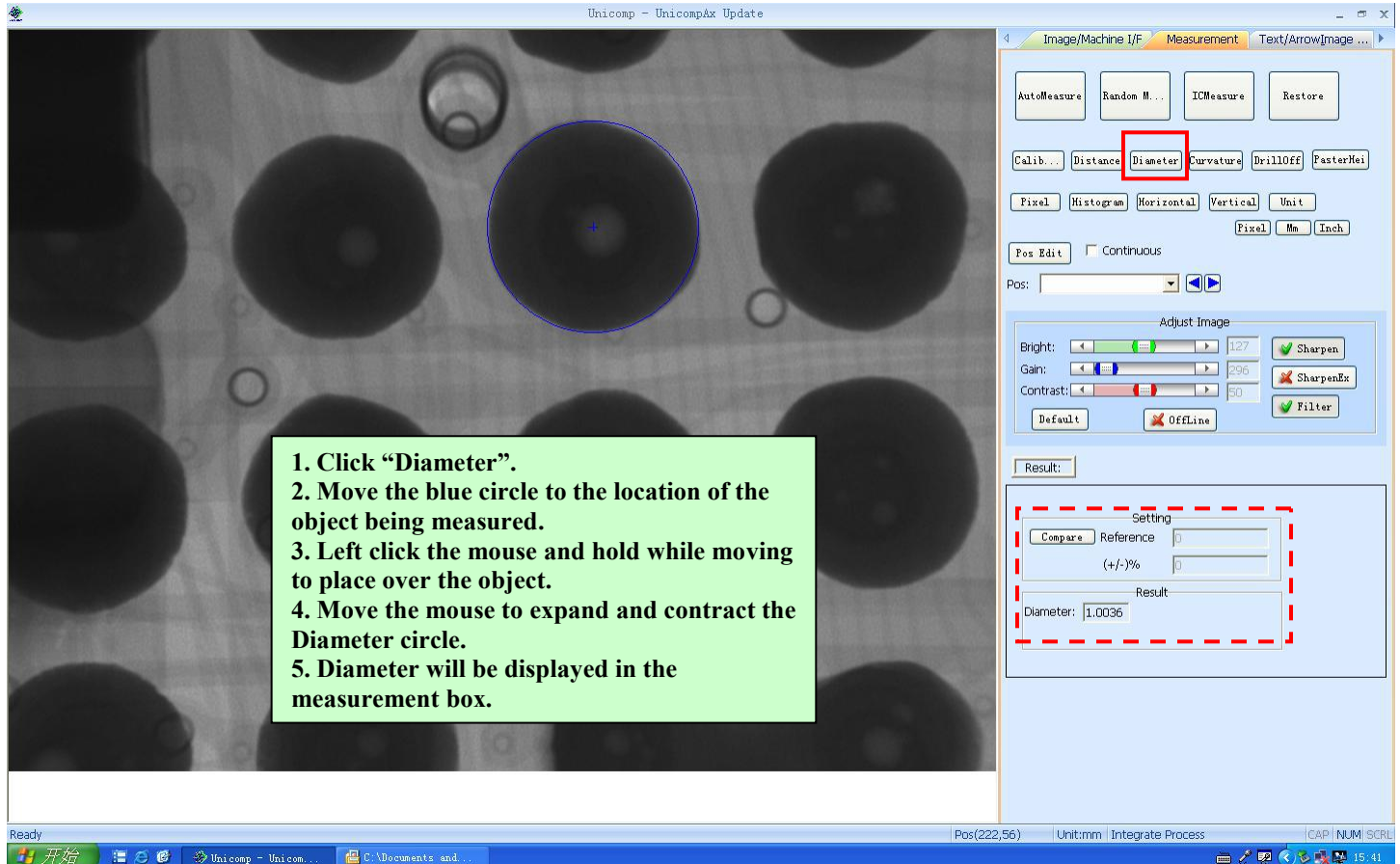## Distance

1. After calibration, click "Distance".
2. Left click (start) and drag the measurement line from start point to end point.
3. Right click at the (end) of the measurement line.
4. Distance will be displayed in the measurement box.

Diameter

1. Click "Diameter".
2. Move the blue circle to the location of the object being measured.
3. Left click the mouse and hold while moving to place over the object.
4. Move the mouse to expand and contract the Diameter circle.
5. Diameter will be displayed in the measurement box.

Curvature

**1. Click "Curvature".
2. Left click ball bond on IC and drag green line to the stitch bond.
3. Left click and hold then span the red line to the top of the wire loop.
4. % deviation of the wire sweep will be displayed in the box.
Note: Point to point and vertical line distances are also shown in the results.**

Drill Offset Step 1

**1. Click "Drilloff" to measure x/y offset distances inside the image.
2. This is primarily designed for PCB inner layer misregistration measurements.**

Drill Offset Step 2

1. Move the blue circle to the first measurement location. Span or contract the circle to the size of the feature in the image.
2. Move the red circle to the first measurement location. Span or contract the circle to the size of the feature in the image.
3. Horizontal and vertical offset will be displayed in the results.
Note: Horizontal and vertical distances are also displayed in the results.

PTH

1. Click "PTH"
2. Move the cursor to the bottom of the PTH. Span the green line to the top of the hole. Right click.
2. Move the cursor to the bottom of the PTH. Span the red line to the top fill point of the hole. Right click.
3. % of hole fill will be displayed in the results.
Note: Green and Red line distances are also displayed in the results.
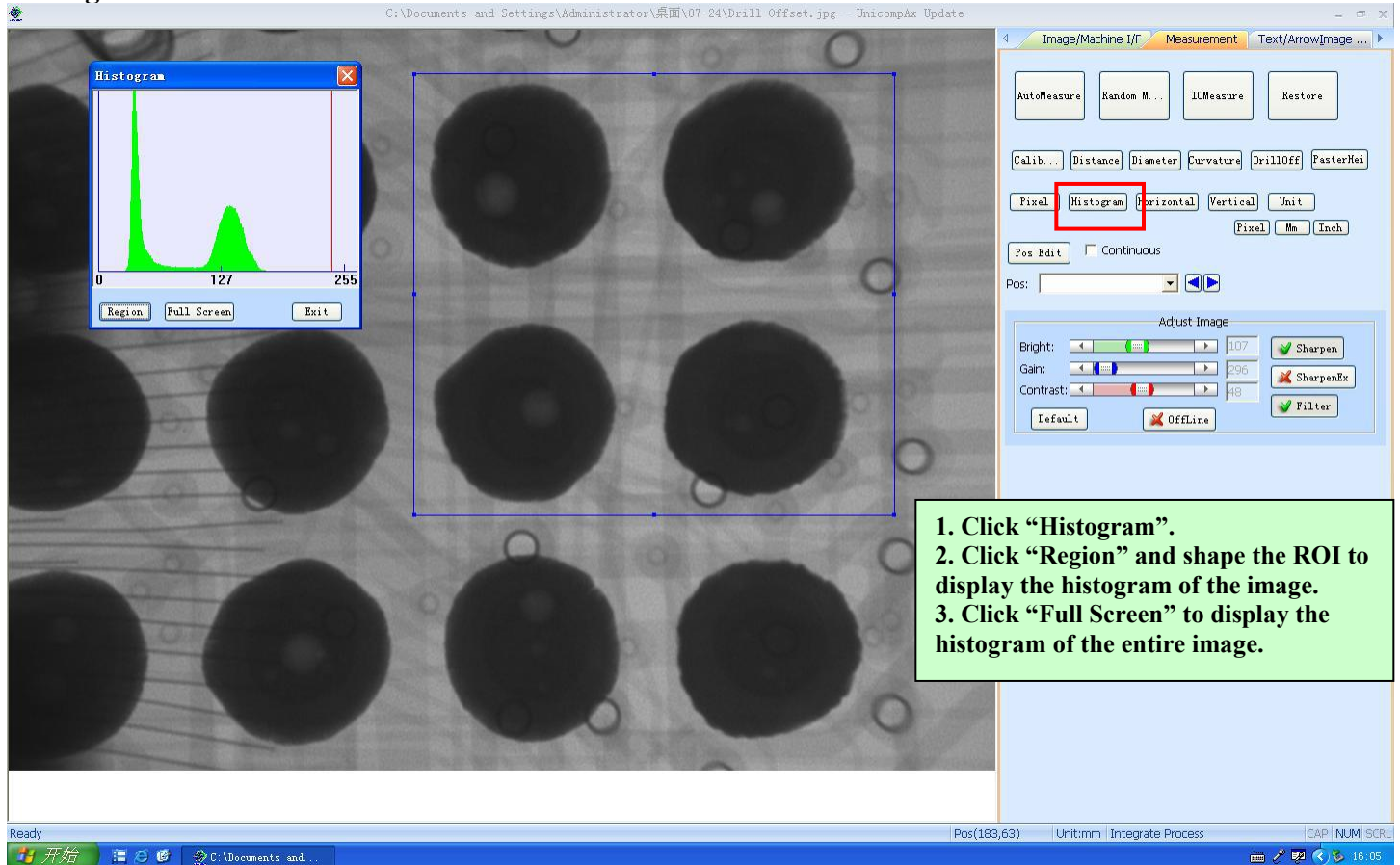
Pixel

1. Click "Pixel".
2. Move the cursor across the image to highlight the actual grey scale value (GSV).
Note: "0" is black, "255" is white

Histogram
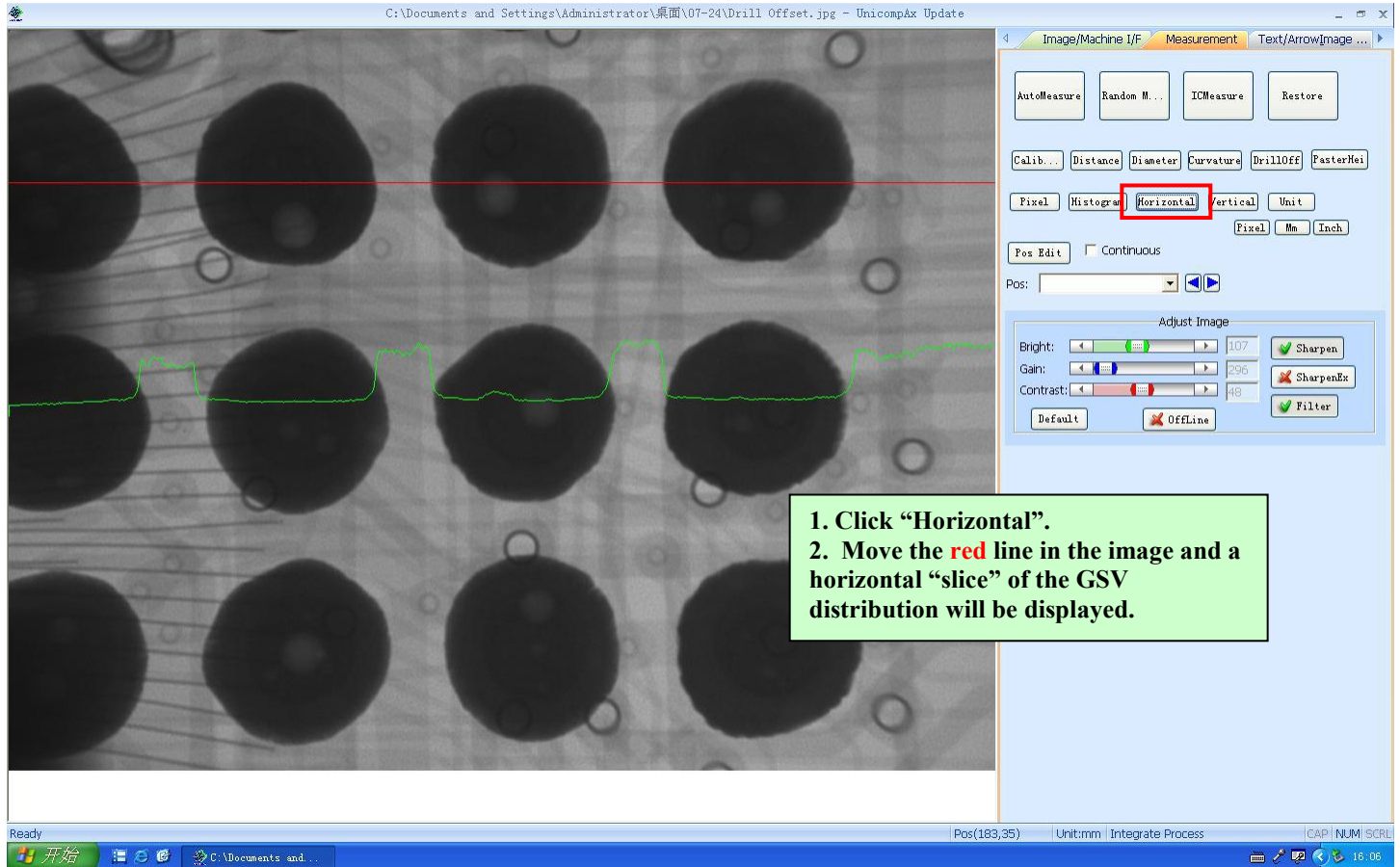
1. Click "Histogram".
2. Click "Region" and shape the ROI to display the histogram of the image.
3. Click "Full Screen" to display the histogram of the entire image.

Horizontal

1. Click "Horizontal".
2. Move the red line in the image and a horizontal "slice" of the GSV distribution will be displayed.

Vertical

1. Click "Vertical".
2. Move the red line in the image and a vertical "slice" of the GSV distribution will be displayed.

Unit

1. Click "Unit".
2. When calibration is completed, make the selection for the measurement "unit" you want displayed. (Pixel, mm, inch)
3. Make this selection prior to using the measurement function.

Pos Edit Open

1. Click "Pos Edit" to open the step and repeat programming function.

Pos Edit Add Project Name

1. Click "Add Proj" and enter the new project name.
2. Click "Save" to store new project.

Pos Edit Add Program Position 1

1. Move to the first location on the PCB.
2. Click "Add" and the position will be transferred to the Pos Edit screen.
Note: All data (kV, mA, image settings, x/y/z location) is transferred.

Pos Edit Add Program Position 2, 3, 4……

1. Move to the next locations on the PCB.
2. Click "Add" and the position will be transferred to the Pos Edit screen. (repeat until the program is completed)
Note: All data (kV, mA, image settings, x/y/z location) is transferred.

Pos Edit Save Program

1. When the program is completed, click "Save" and the final step and repeat program will be stored.
Note: The step and repeat program can be edited using the active buttons (Insert, Edit, Delete, Import, Export)

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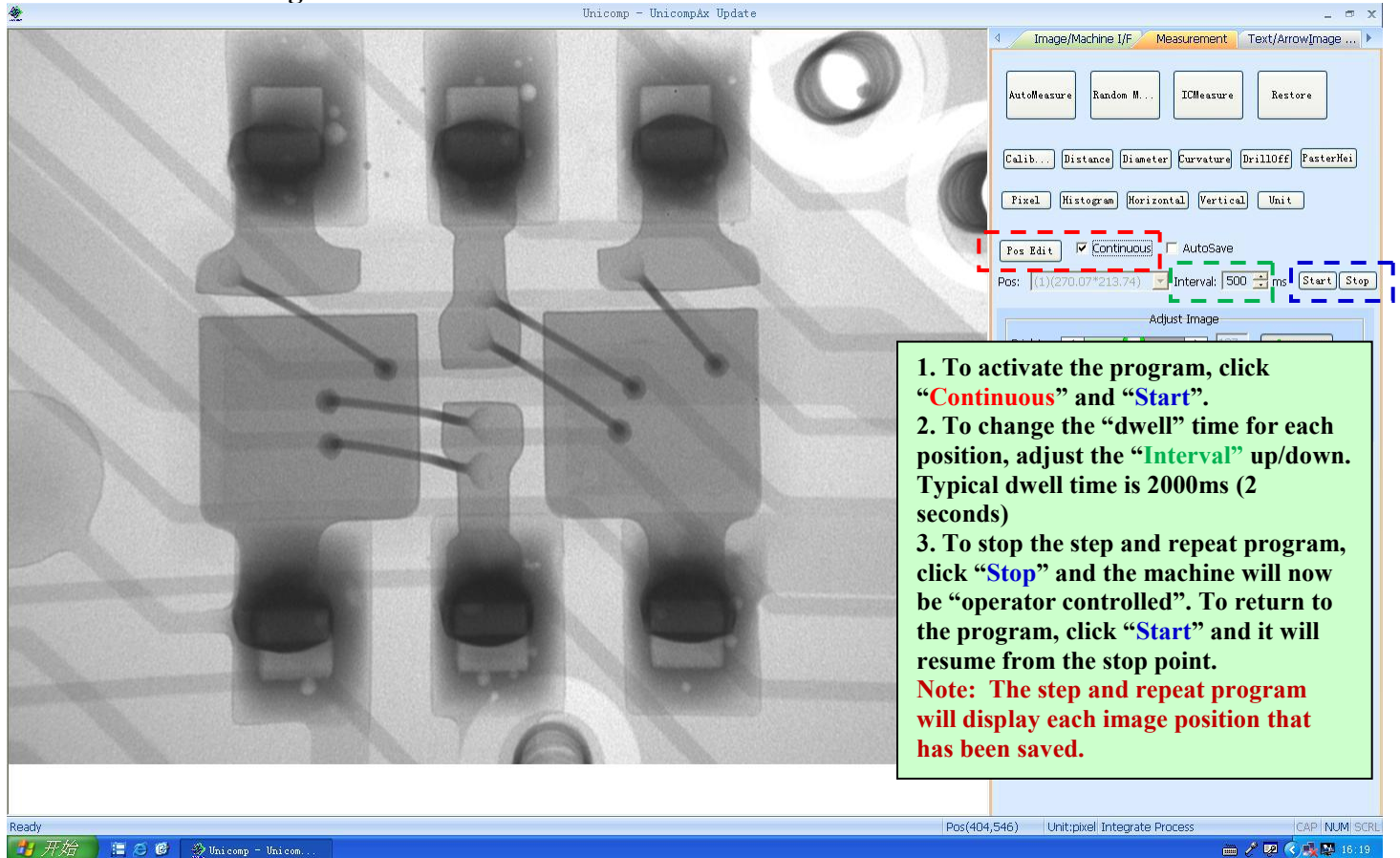
Pos Edit Program Review (Manual Indexing of Images)

1. To review the step and repeat program, click ""Pos" ▲.
Note: You can index forward/backward each image position that has been stored.

Pos Edit Activate Program

1. To activate the program, click "Continuous" and "Start".
2. To change the "dwell" time for each position, adjust the "Interval" up/down. Typical dwell time is 2000ms (2 seconds)
3. To stop the step and repeat program, click "Stop" and the machine will now be "operator controlled". To return to the program, click "Start" and it will resume from the stop point.
Note: The step and repeat program will display each image position that has been saved.
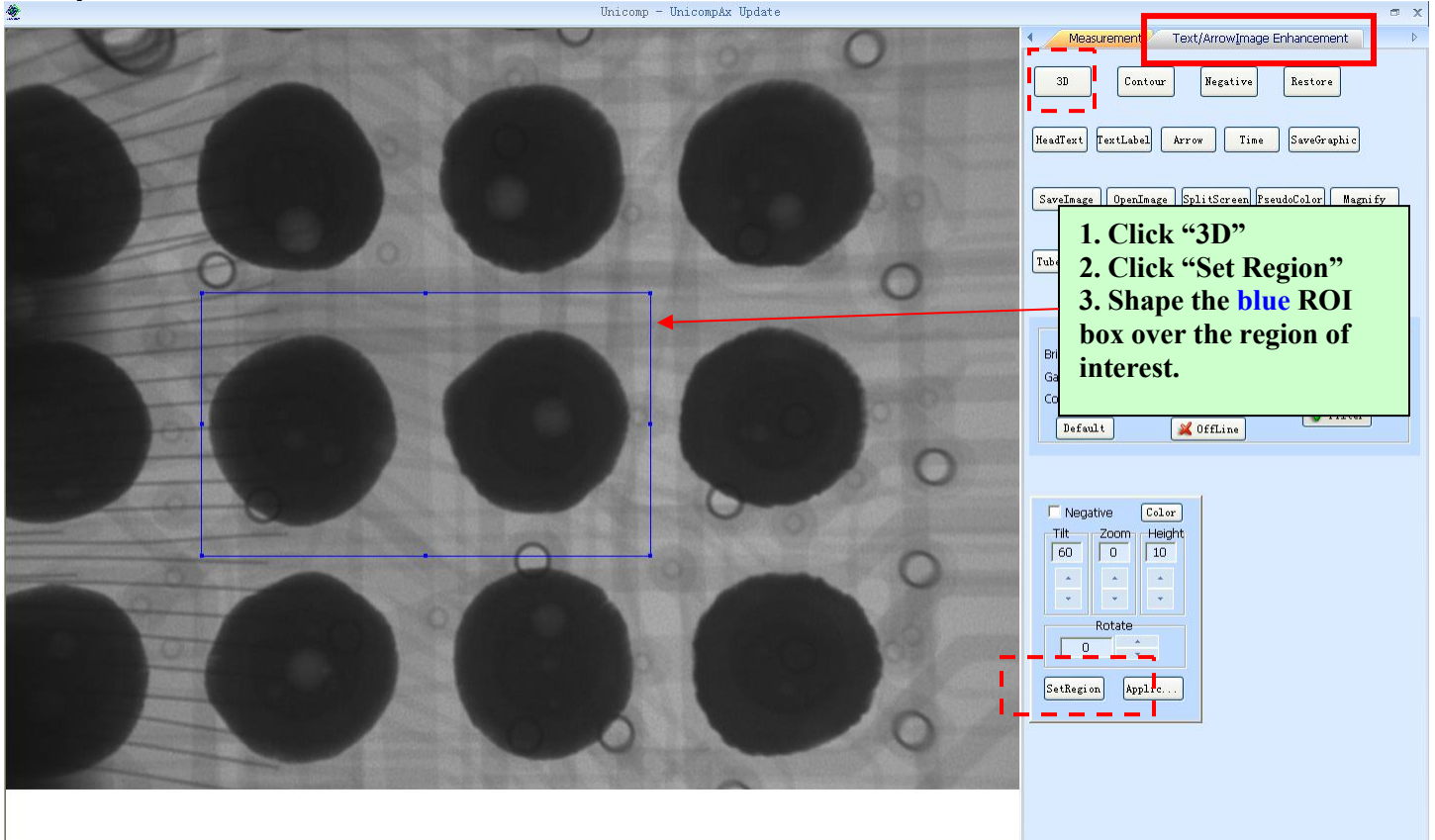
Pos Edit Auto Save Images

1. To save each image from the step and repeat program, click "Auto Save".
2. Choose the folder to save the images and click "OK".

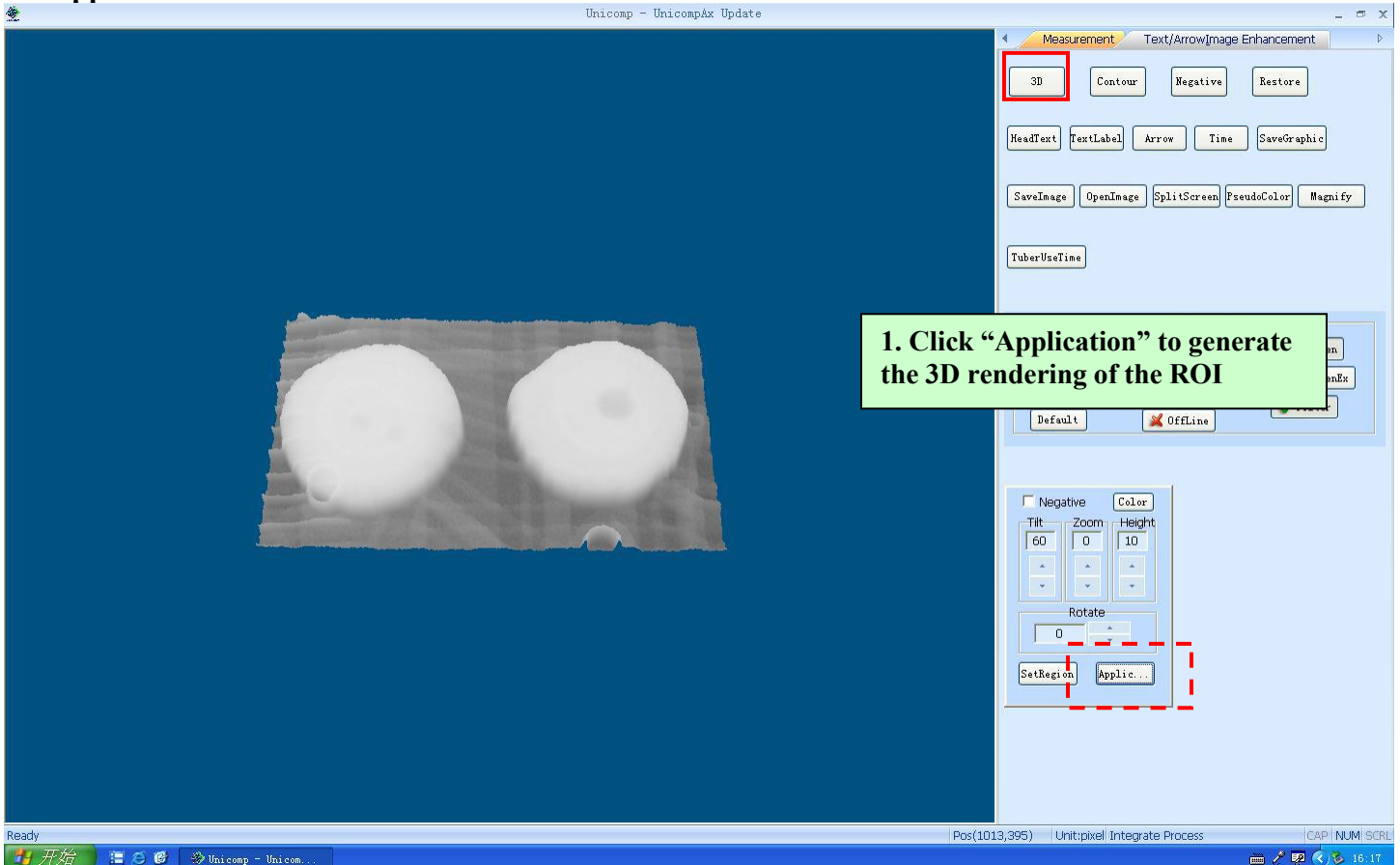# TEXT/ARROW/IMAGE ENHANCEMENT PAGE

3D Open/Set ROI

1. Click "3D"
2. Click "Set Region"
3. Shape the blue ROI box over the region of interest.

3D Application

1. Click "Application" to generate the 3D rendering of the ROI
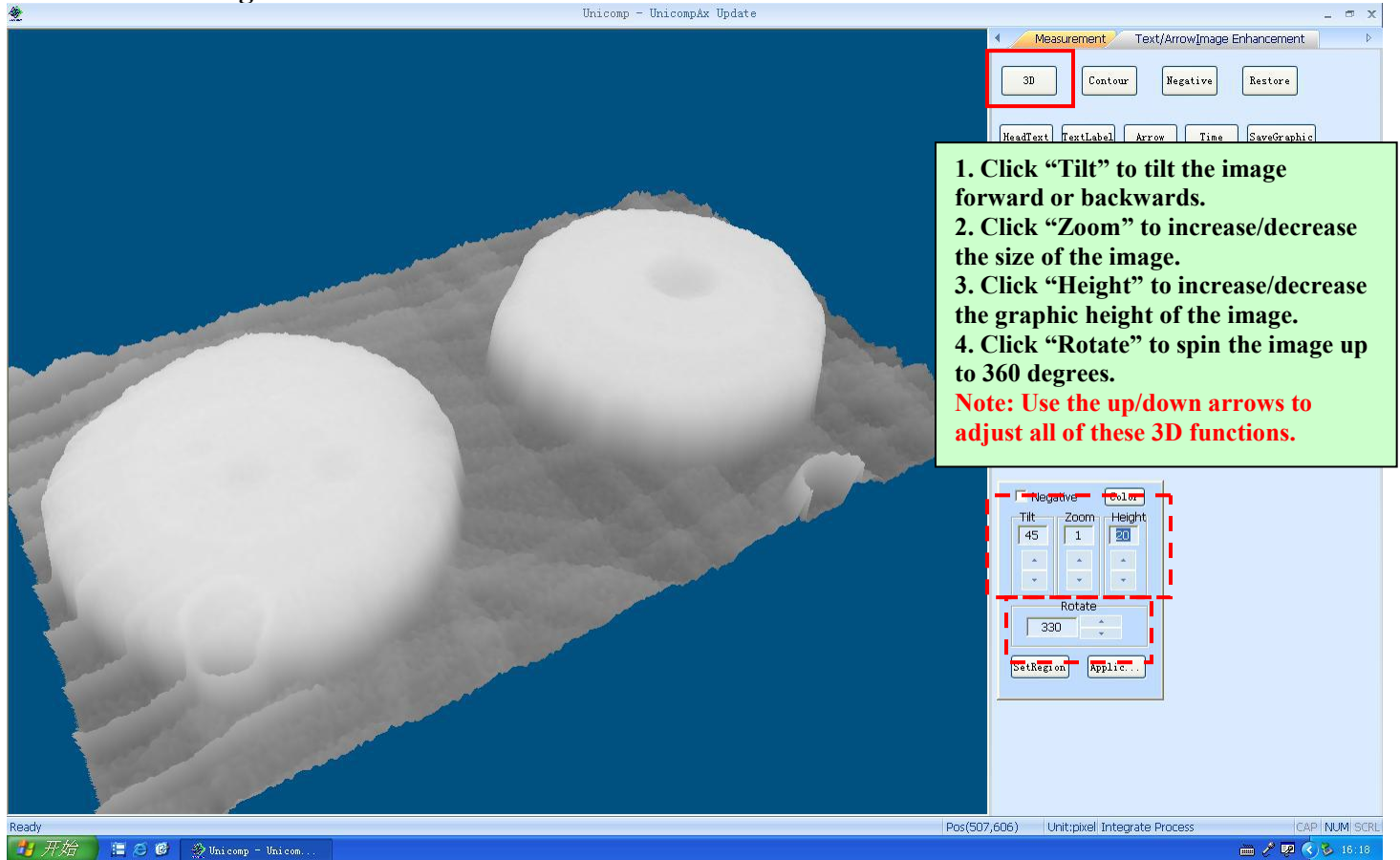
3D Tilt/Zoom/Height/Rotate

1. Click "Tilt" to tilt the image forward or backwards.
2. Click "Zoom" to increase/decrease the size of the image.
3. Click "Height" to increase/decrease the graphic height of the image.
4. Click "Rotate" to spin the image up to 360 degrees.
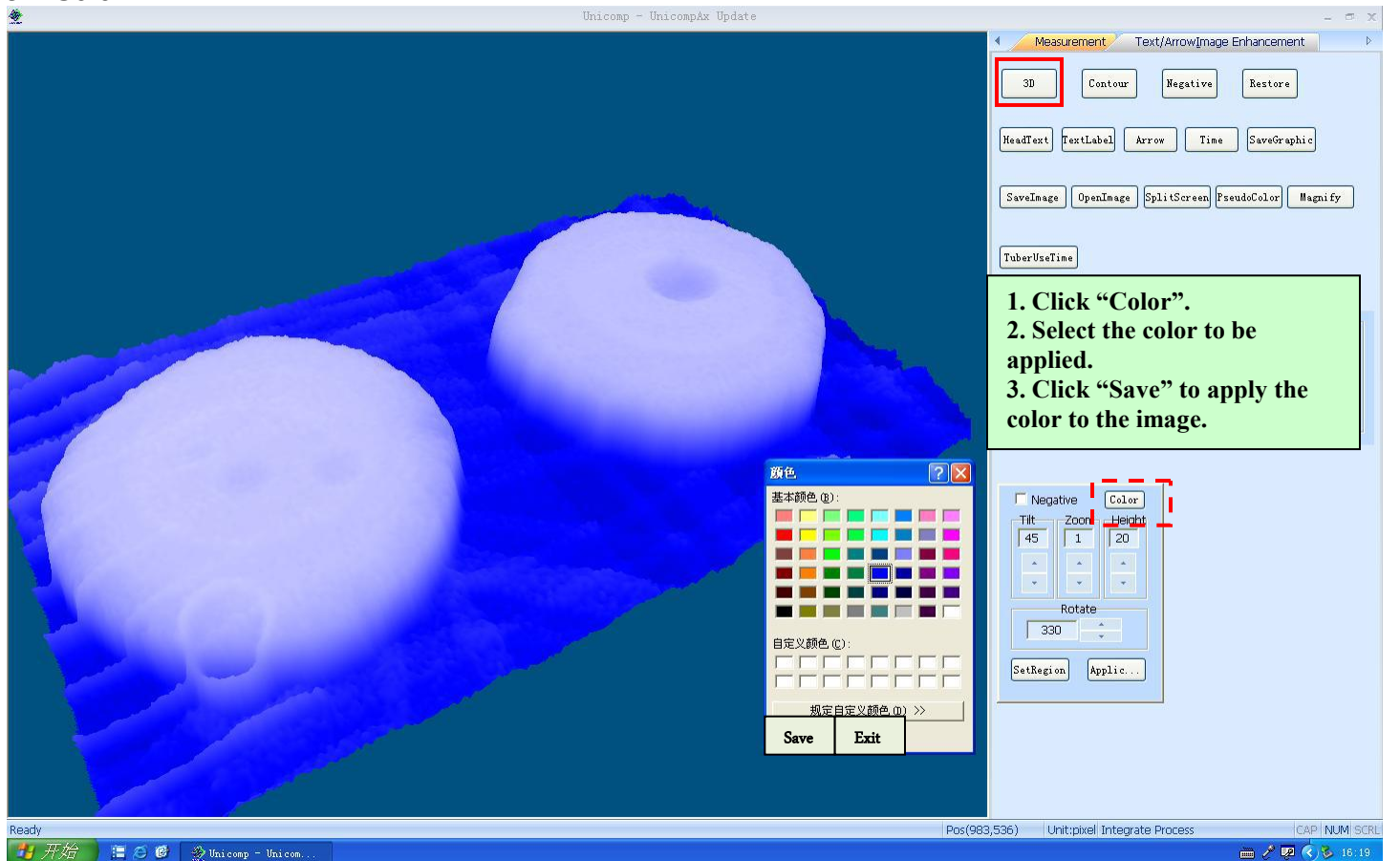Note: Use the up/down arrows to adjust all of these 3D functions.

3D Color

1. Click "Color".
2. Select the color to be applied.
3. Click "Save" to apply the color to the image.

3D Negative

1. Click "Negative" to generate an opposite (negative) impression of the image.
Note: This can be applied to black/white and color images.
2. Click "3D" to exit.

Contour

1. Click "Contour" to generate an offset contoured image.
Note: Use "Adjust Image" to enhance the contour as needed (see "Adjust Image" instructions in Machine Interface page)
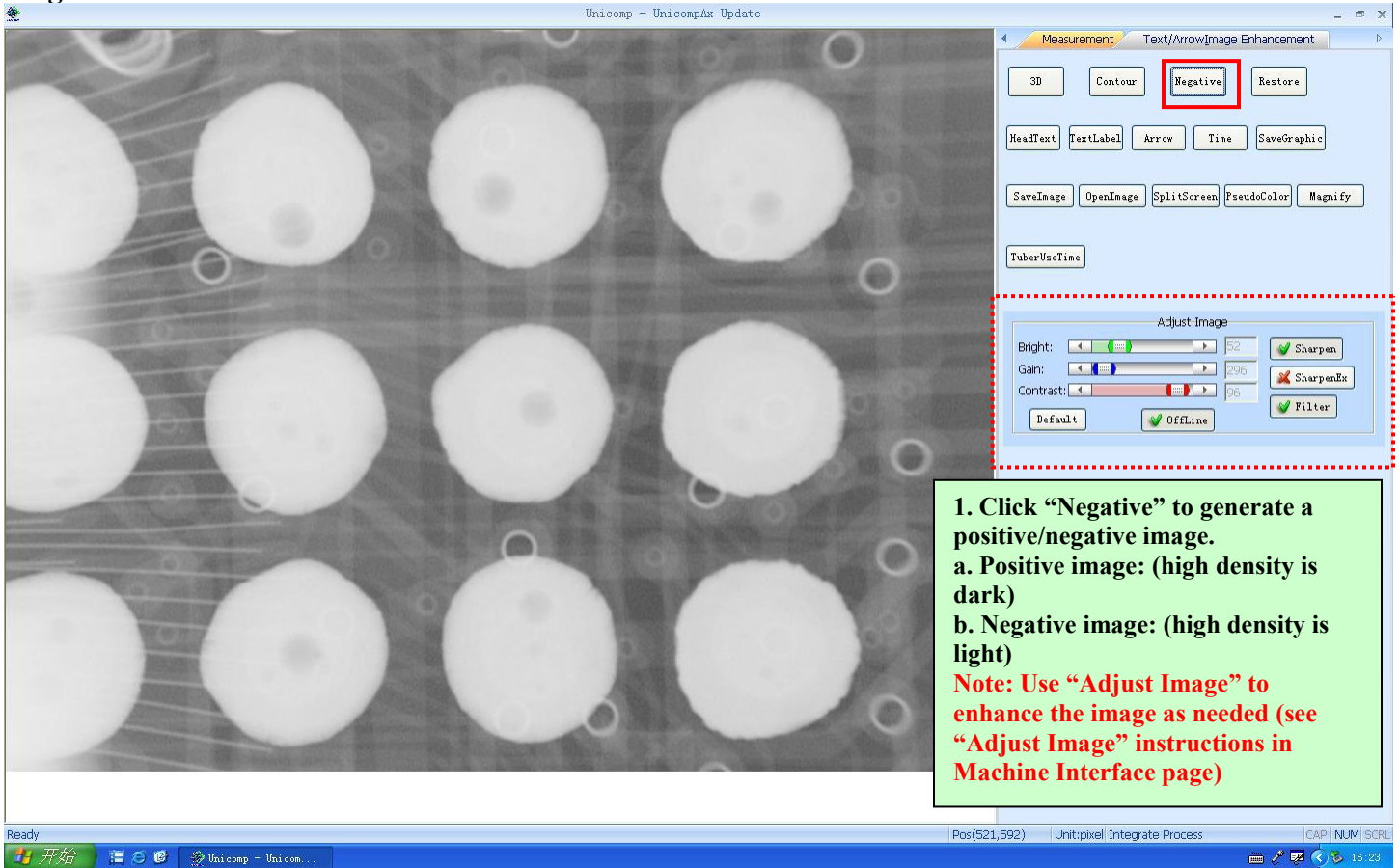
Negative

1. Click "Negative" to generate a positive/negative image.
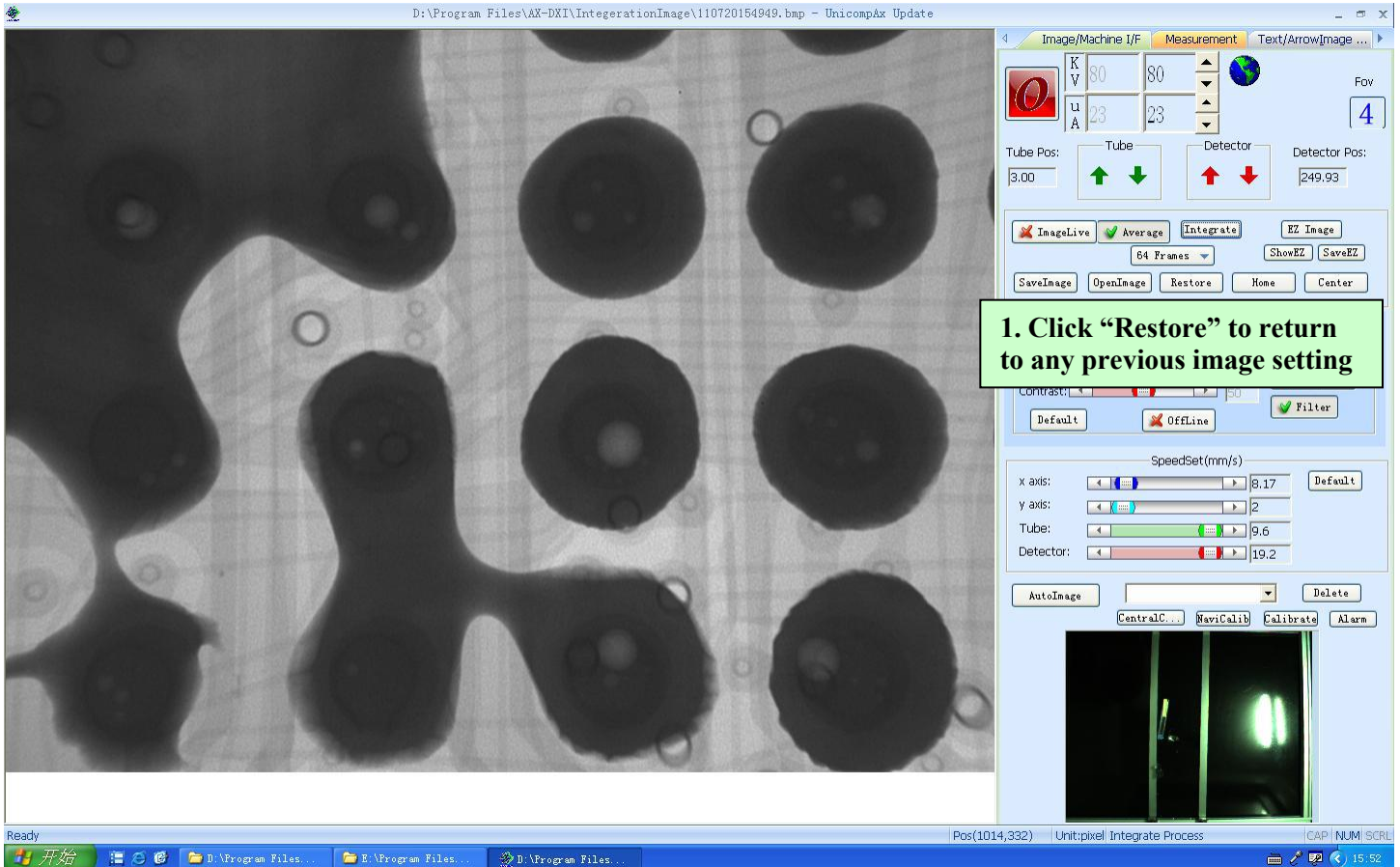**a. Positive image: (high density is dark)**
b. Negative image: (high density is light)
Note: Use "Adjust Image" to enhance the image as needed (see "Adjust Image" instructions in Machine Interface page)

Restore

1. Click "Restore" to return to any previous image setting

Header Text

1. Click "Header Text"
2. Enter text in the text header page and click "Apply" to transfer to the image
3. Use mouse to position the text on the image
4. Click "Save" to retain text header on the image
5. Click "Cancel" to exit Text Header
Note: Double click the text on the screen to enter "text format" screen to adjust size, color, etc.

Text Label

1. Click "Text Label" icon
2. Enter text in the text label box and click "Apply" to transfer to the image
3. Use mouse to position the text on the image
4. Click "Save" to retain text header on the image
5. Click "Cancel" to exit Text Label
Note: Double click the text on the screen to enter "text format" screen for adjustments to size, color, etc.

Arrow

1. Click "Arrow".
2. Click the arrow to transfer to the image
3. Use mouse to position the arrow on the image
4. Click "Save" to retain text arrow on the image

Time

1. Click "Time" to time and date to the image.
2. Click cursor over stamp to position on image screen

Save Graphics

1. Click "Save Graphics" to retain graphics when saving the image
2. Save the file to desired folder and all graphics will be stored on the image.
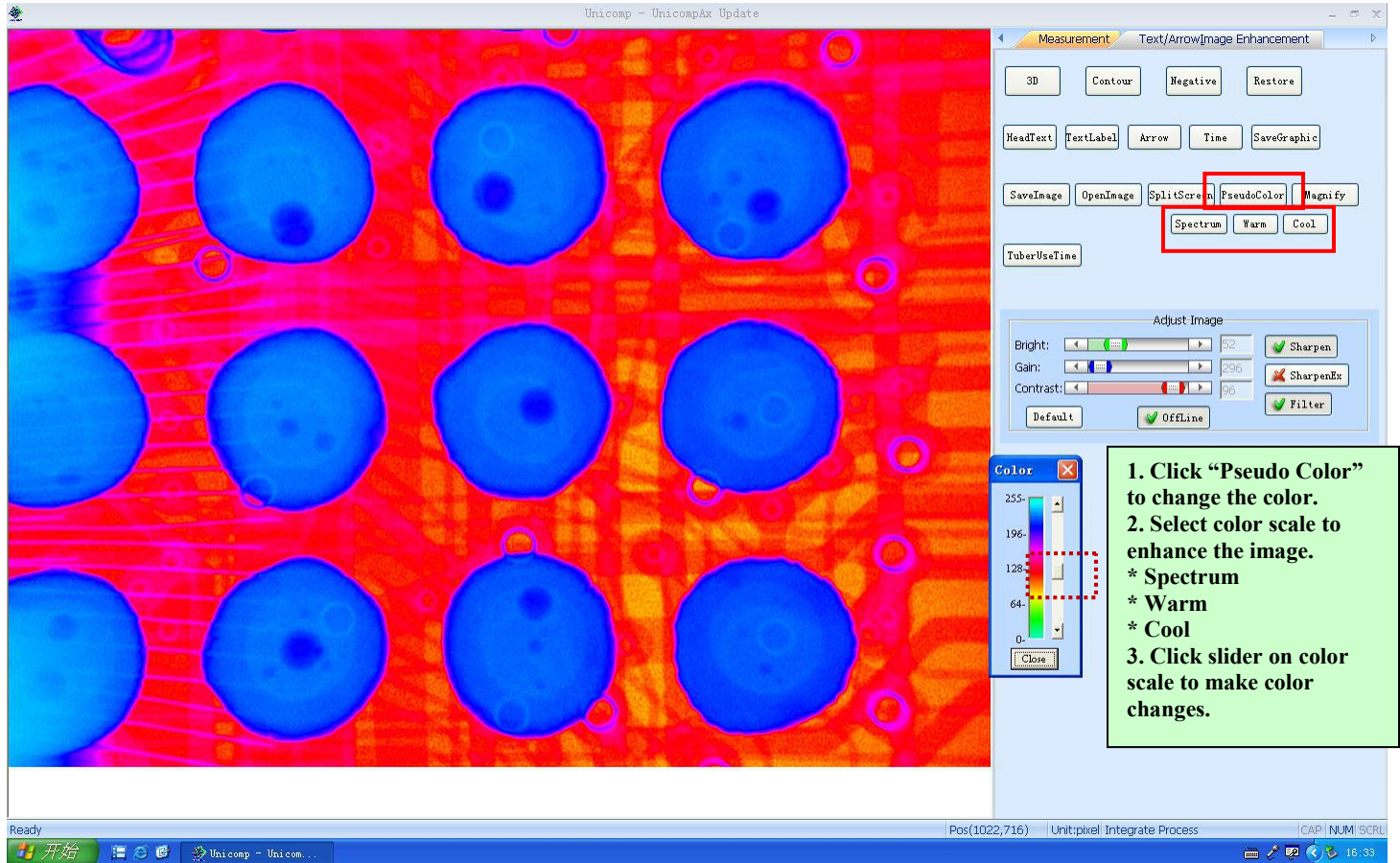
Split Screen

1. Capture an image, then click "Split Screen". This image will be stored in the upper half of the screen.
2. Enter the live image mode again that the "live" image will be displayed in the bottom half of the screen.
3. This is an excellent function to compare the 2 images.
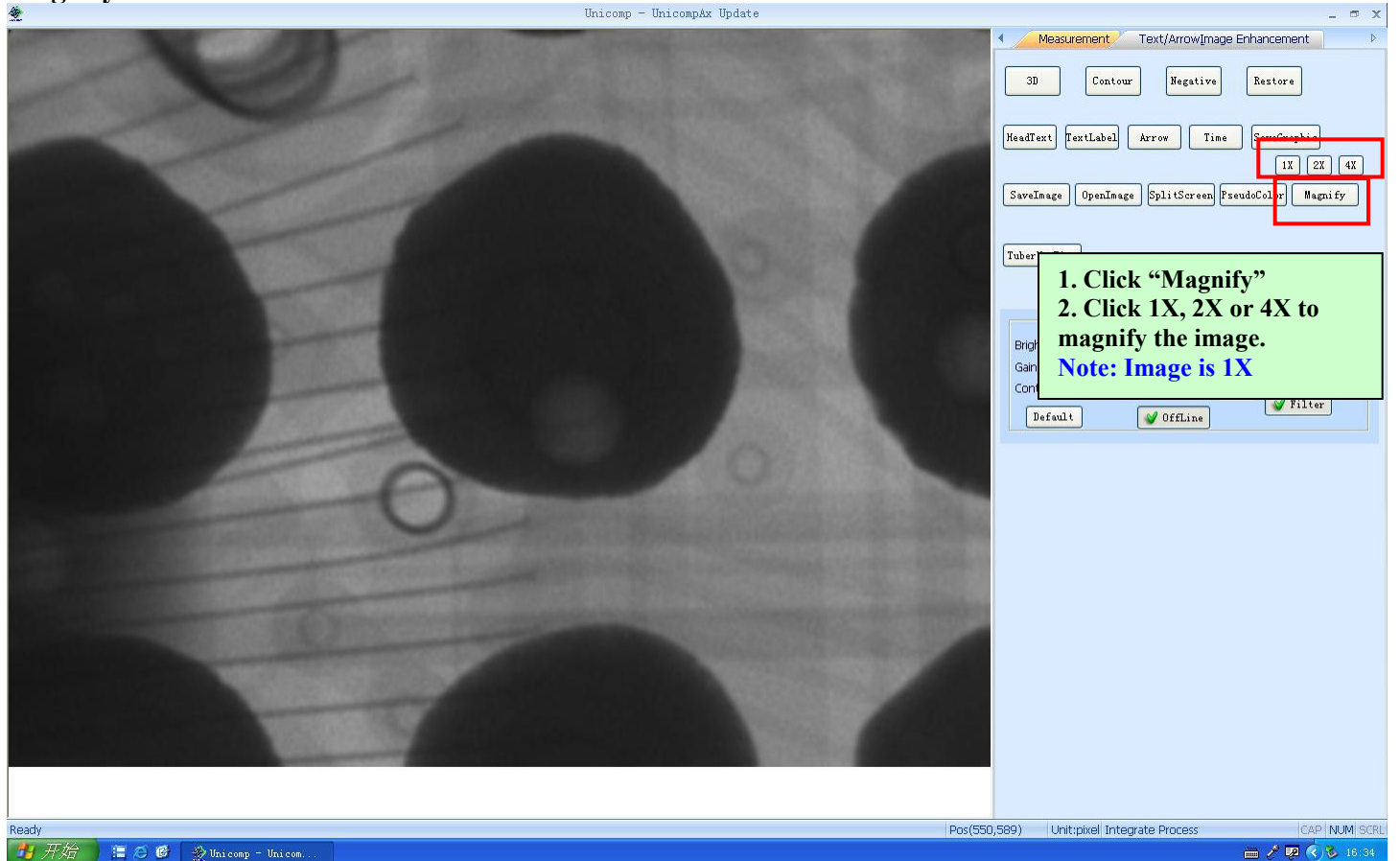
Pseudo Color

1. Click "Pseudo Color" to change the color.
2. Select color scale to enhance the image.
* Spectrum
* Warm
* Cool
3. Click slider on color scale to make color changes.

Magnify

1. Click "Magnify"
2. Click 1X, 2X or 4X to magnify the image.
Note: Image is 1X

Tube User Time

1. Click "Tube User Time" to see the current total hours the x-ray tube has been active.

TuberUsedTime: 19 Hour