

Rock-Art Recording

Processing Stereo-Photography using Topcon
PI-3000 '*Image Surveying Station*' software

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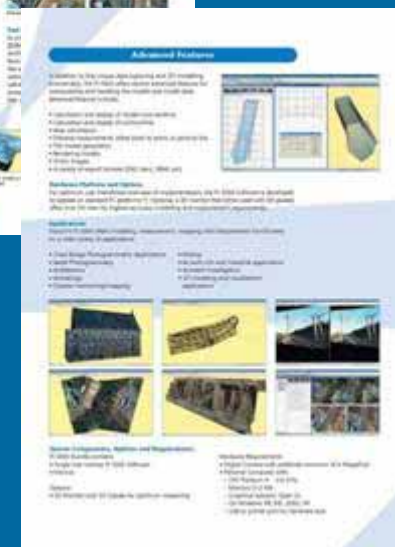
IMAGING GRAPHICS
AND SURVEY



ENGLISH HERITAGE

Topcon's PI-3000 'Image Surveying Station – key features

- Can use both metric and standard, non-metric digital cameras
- Includes camera calibration software for non-metric devices
- Uses '*fast and easy*' bundle adjustment to link multiple images together and create 3D model
- Can produce 3D data accurate to ½mm at 10m range – targeted points
- Can also produce 3D data from stereo-pairs using only scaled distances
- Calculation and display of distances, cross sections, contour lines and area calculation
- Can digitise line/vector data either from stereo screen or directly onto 3D model
- Generation and display of ortho-images and 3D models
- Basically all the tools required for photogrammetric processing



PI-3000 computing requirements

- According to page 8 of the manual the computer requirements are as follows:
 - Operating System - Windows 2000 or XP
 - Note, it is not MAC compatible
 - Processor – Pentium 4 (2GHZ) or AMD equivalent or above
 - Memory (RAM) – 512MB or above
 - Hard disk storage – 20GB or above
 - CD drive - should also work in DVD drive
 - USB port – at least one for the ‘dongle’
 - Wheel mouse – essential for 3D analysis
 - Graphics card – should support OpenGL

Overview of PI-3000

Operating Environment

Recommended Operating Environment

OS	Windows2000,XP
CPU	Pentium 4 2GHz or more
RAM	512MB or more
HDD	20GB or more
CDD	1
USB port	1 or more (when using USB type protection key)
Wheel Mouse	1
Graphic Accelerator	Supports OpenGL



PI-3000 installation

- For temporary licences either downloaded or supplied on CD, follow the installation instructions provided on screen
 - Note the 'Save Data' functions have been disabled which means 3D data and ortho images cannot be exported
 - Therefore will need to save project then reload on fully licensed version to allow export of processed data
- For the full licence, follow the installation instructions opposite

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PI-3000 Installation Manual

Before installing PI-3000, surely do the following:

- (1) Quit all the activated application software.
- (2) When installing under the environment of Windows 2000 and Windows XP, log into Windows and do installation as administrator.
- (3) Don't insert the USB protection key into the USB port, before installing the protection key driver.

Installing PI-3000 Software

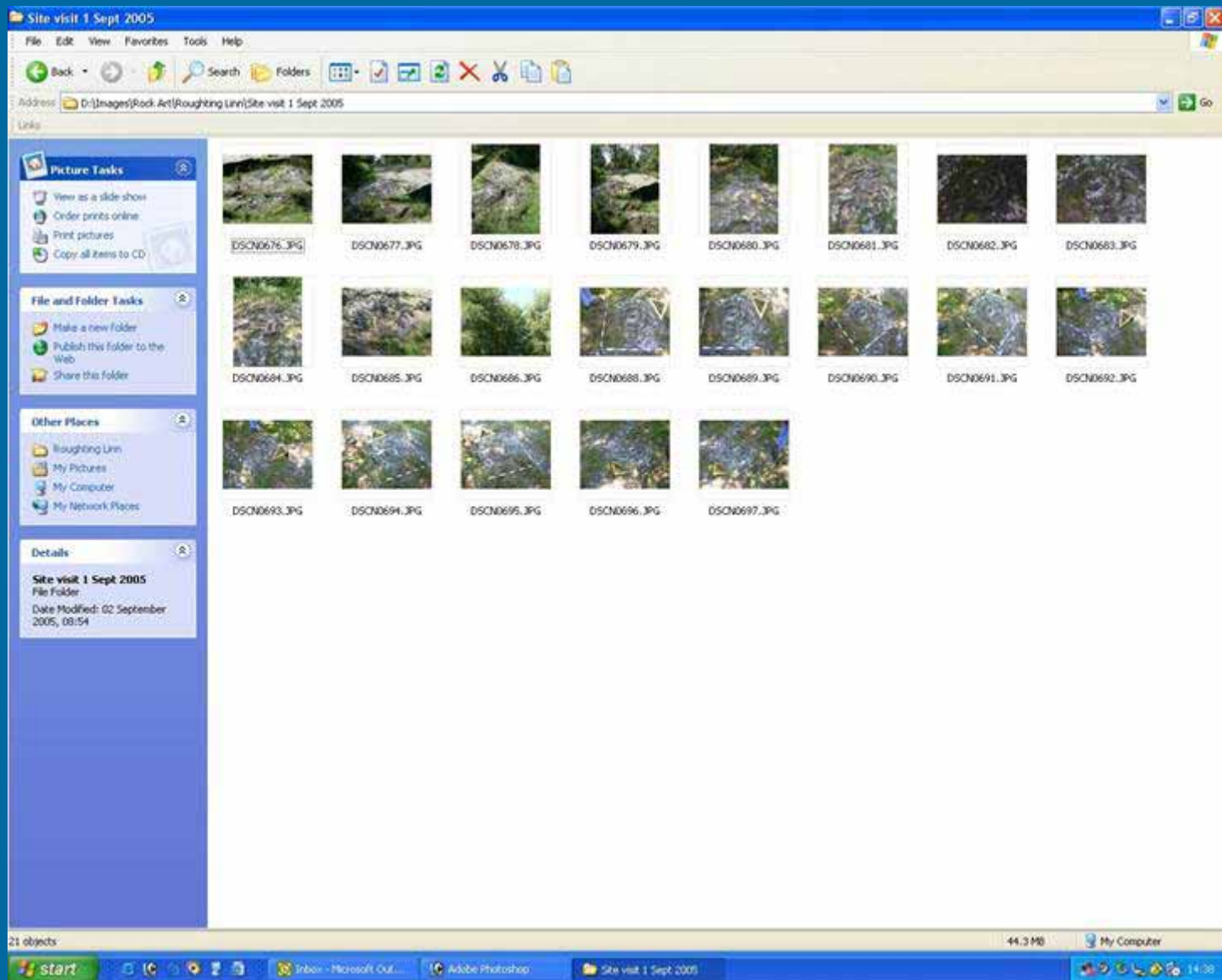
1. Start Windows.
2. Insert the PI-3000 CD into the CD-ROM drive of the computer.
3. Execute "Setup.exe" in the PI-3000 CD.
4. The installation program starts. Conduct installation following instructions on the screen.

Installing the Protection Key Driver

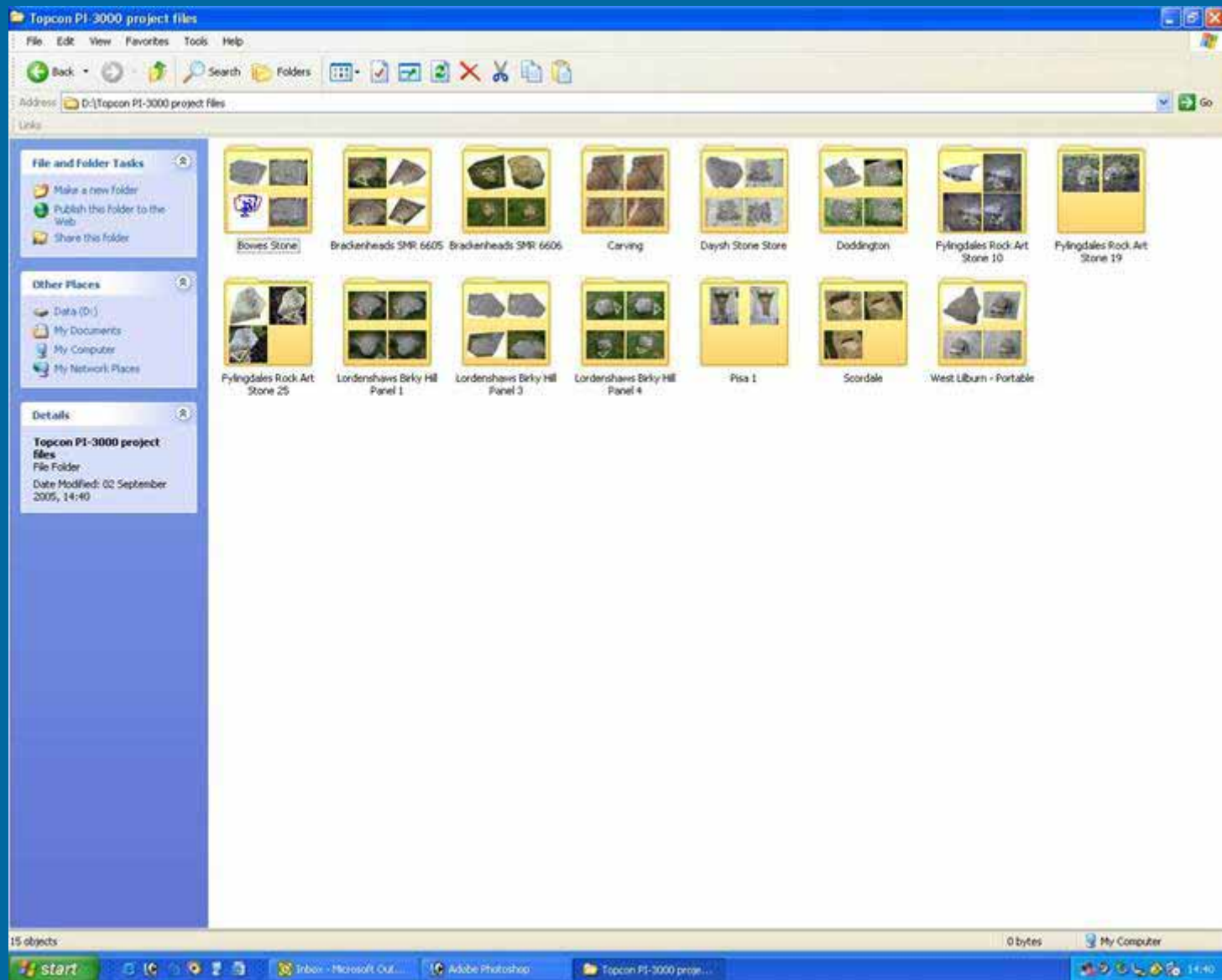
1. Select the menu as [Start]->[All Programs]->[PI-3000]->[Install Protection Key Driver].
2. When the installation is successful, a message "Installation of the driver was completed" is displayed.



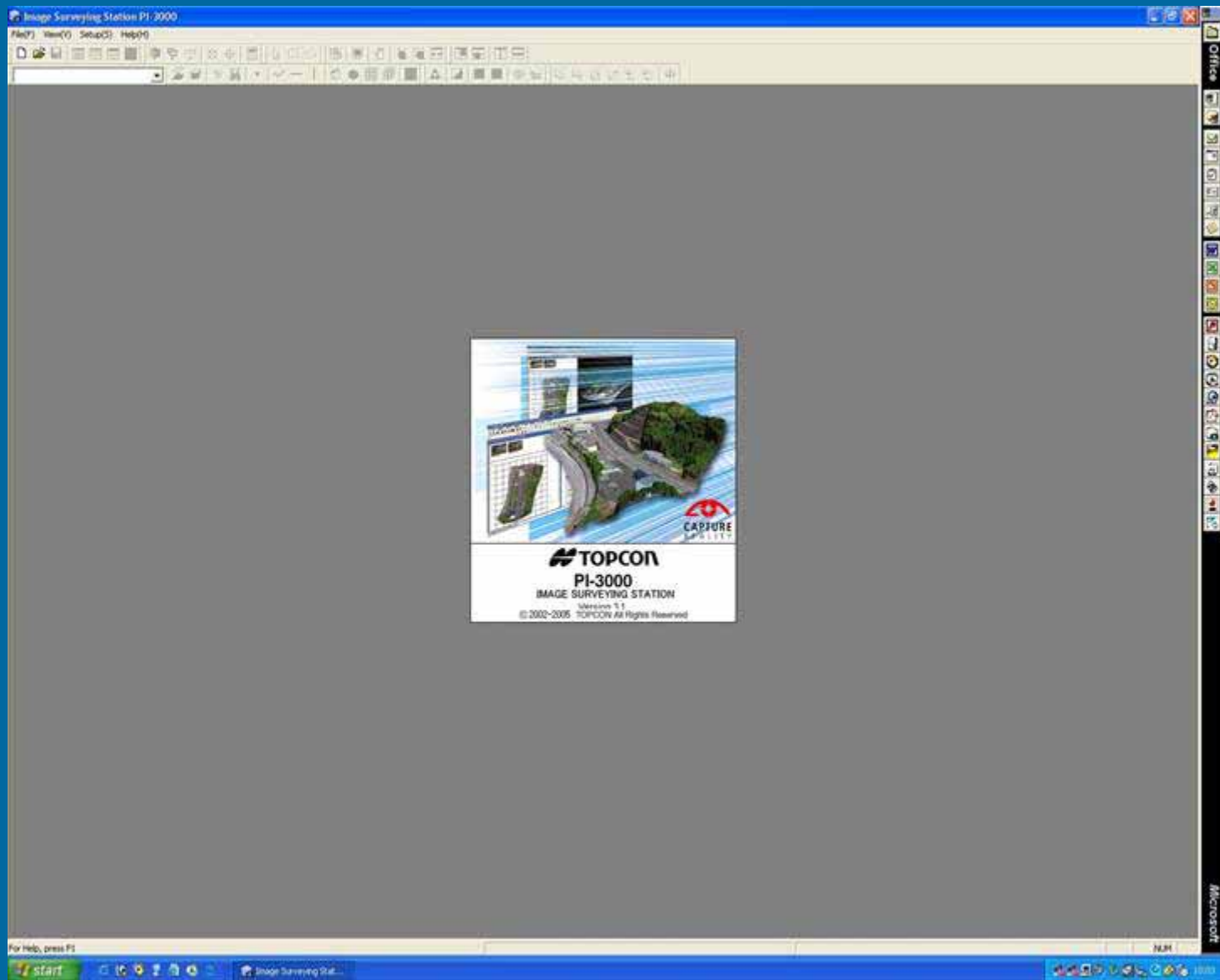
1. Place image files in separate folder on computer



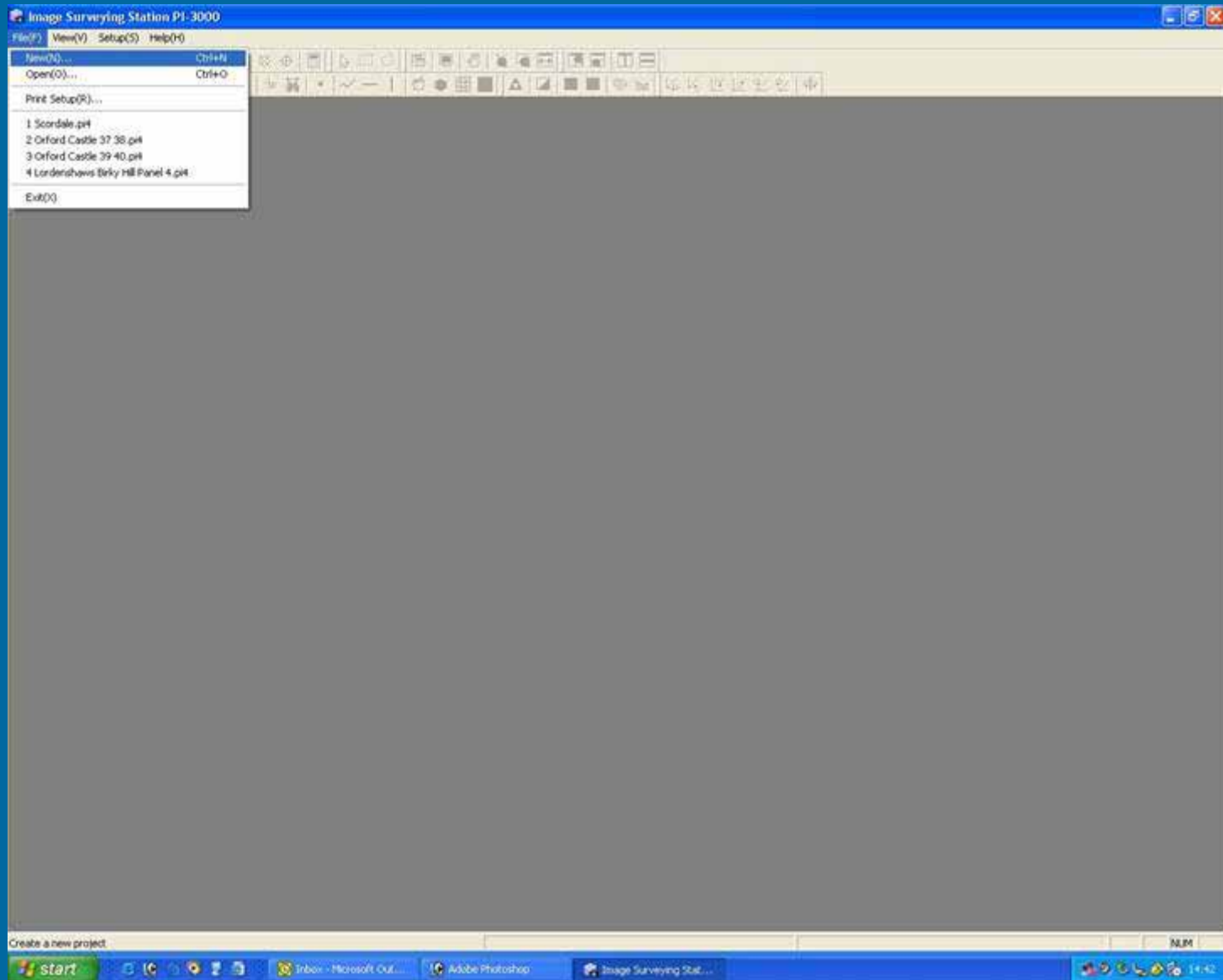
2. Create 'Topcon PI-3000 project files' folder



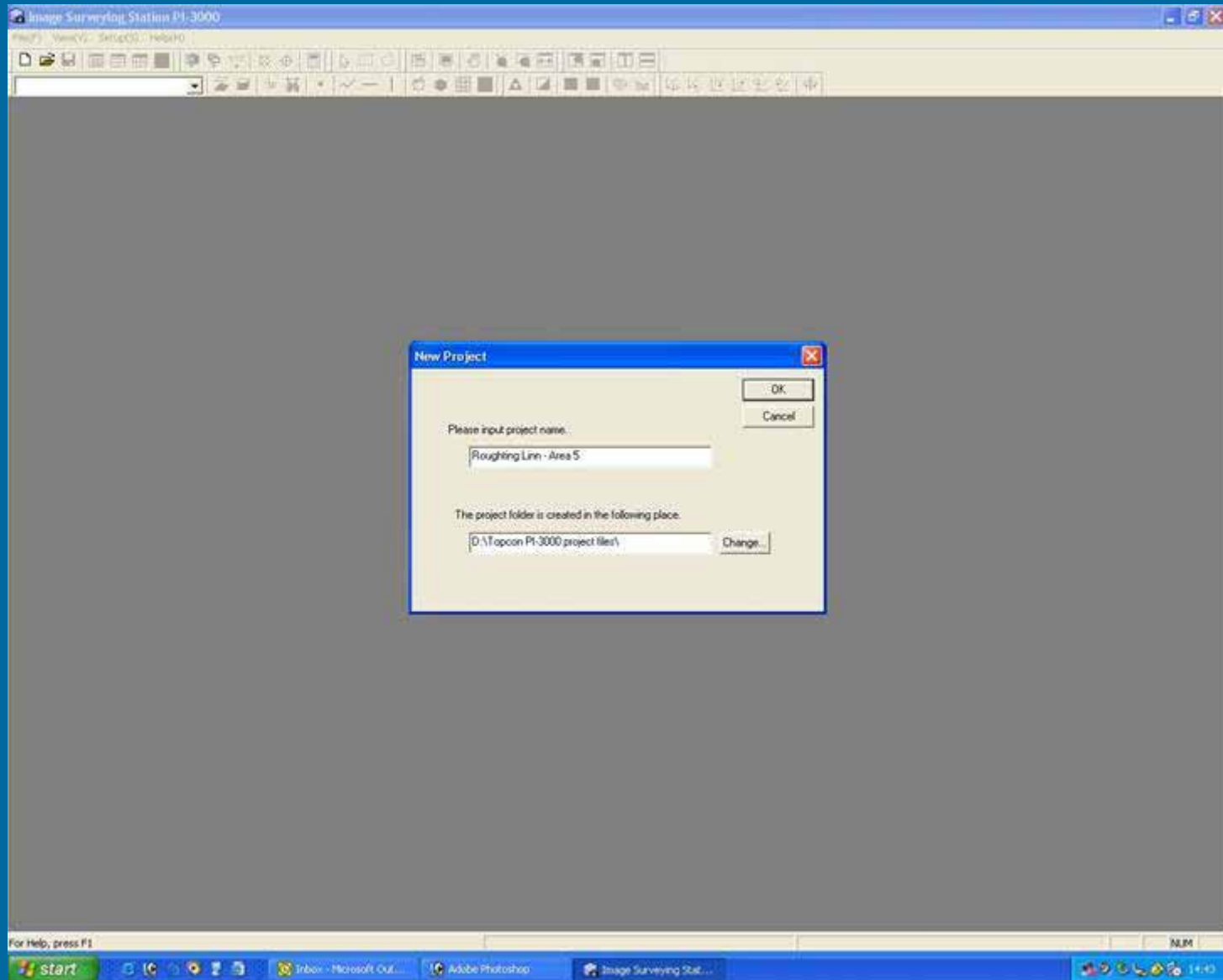
3. Open PI-3000



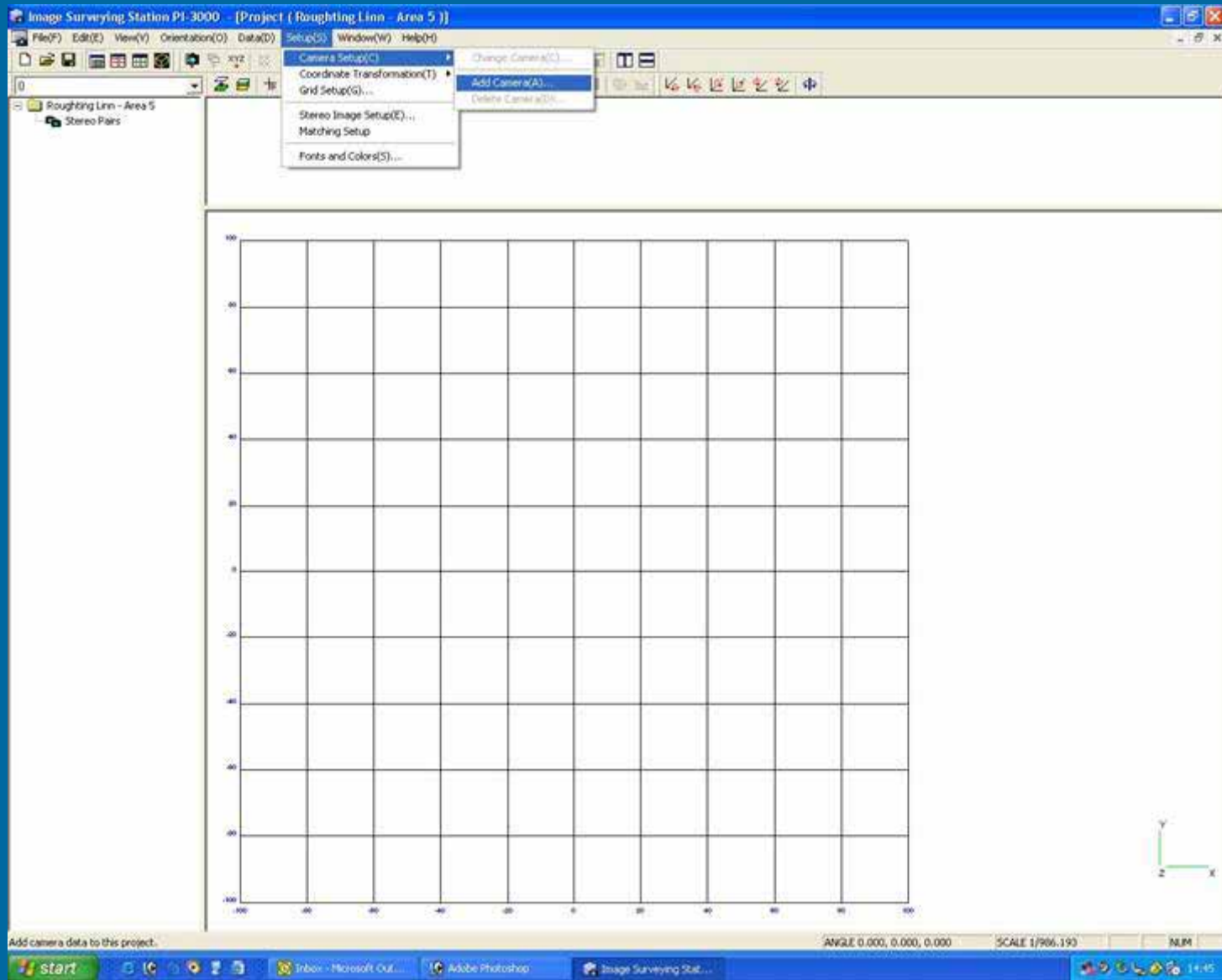
4. Create New project - File, New



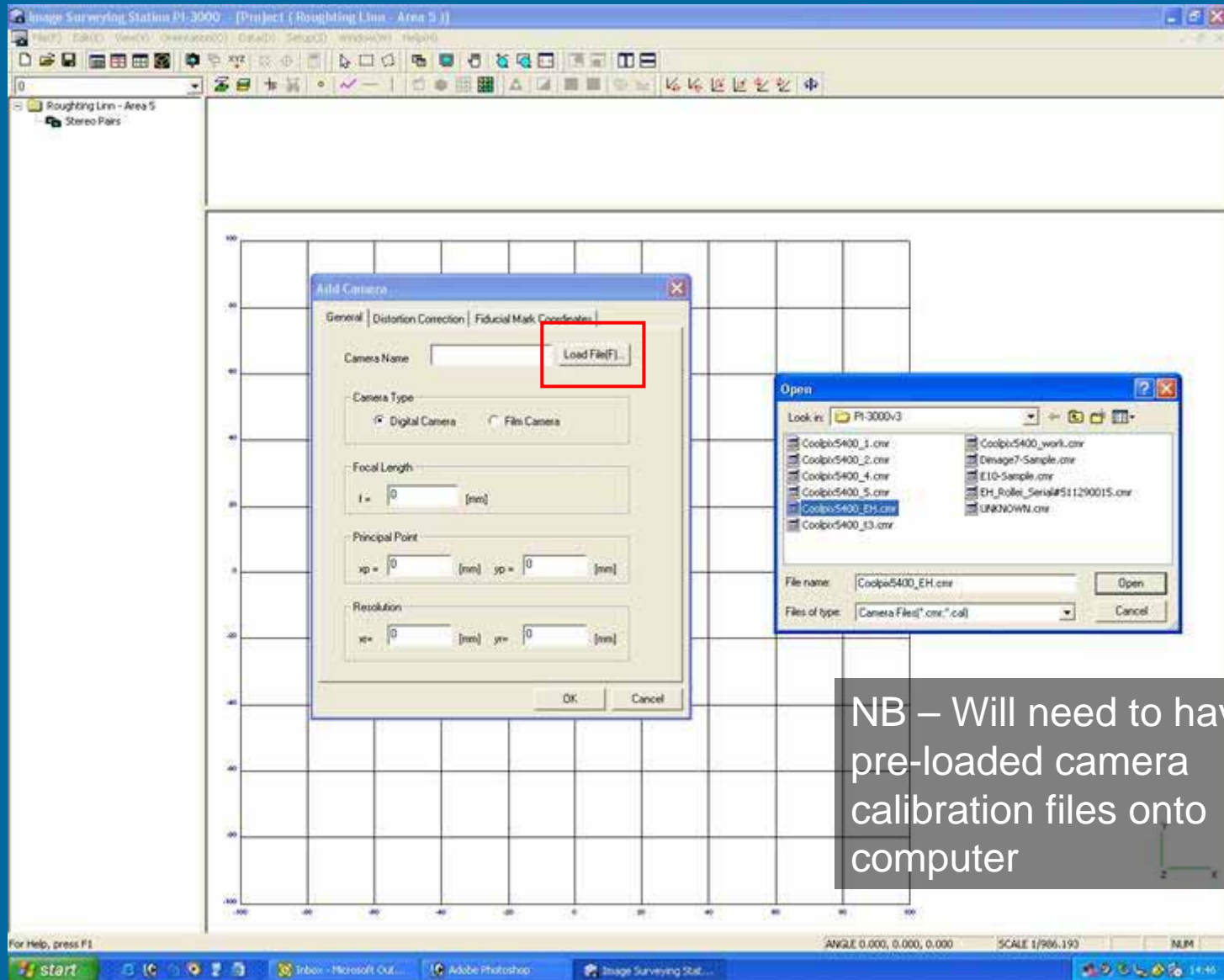
5. Input project name, set project file folder, OK



6. Setup correct camera file - Setup, Camera setup, Add camera



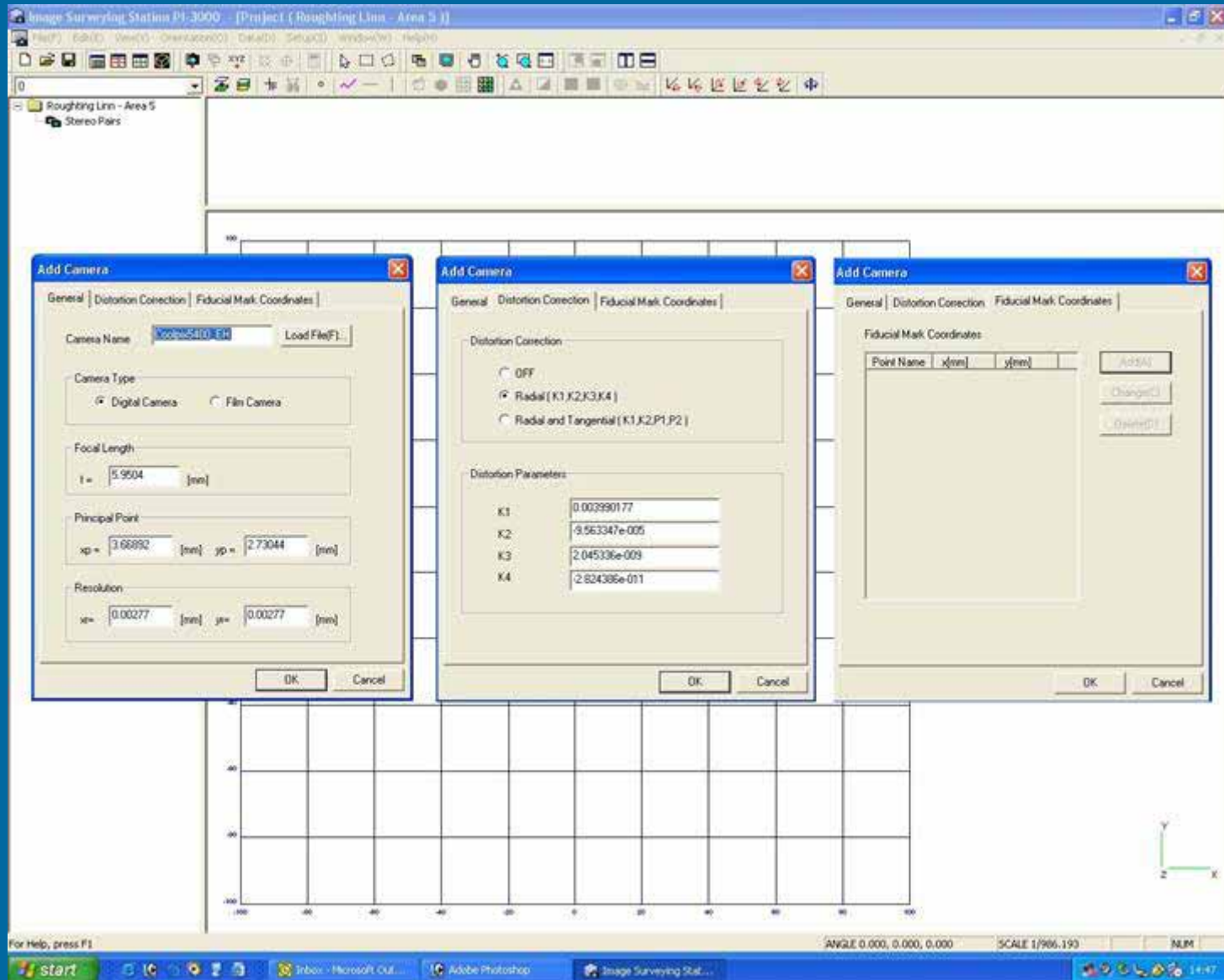
7. Load camera calibration file – Load File, Select correct file, Open



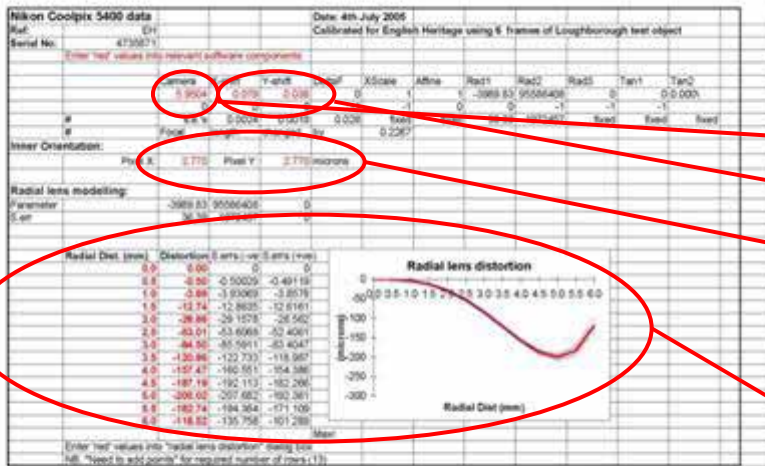
NB – Will need to have pre-loaded camera calibration files onto computer



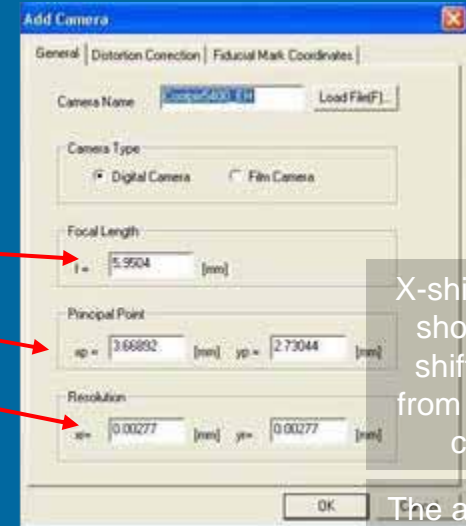
8. Camera calibration data



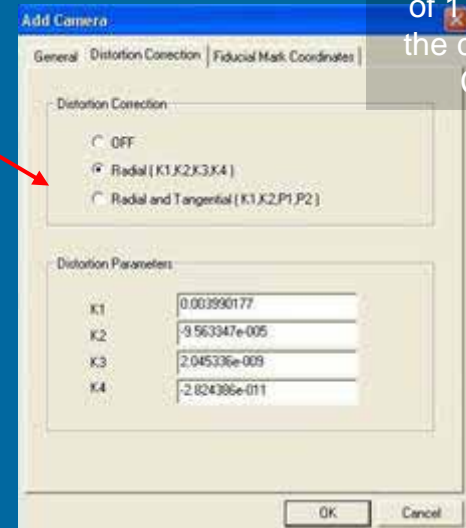
Camera calibration data – what does it mean?



EH camera



X-shift, Y-shift shows lens shift values from the CCD centre

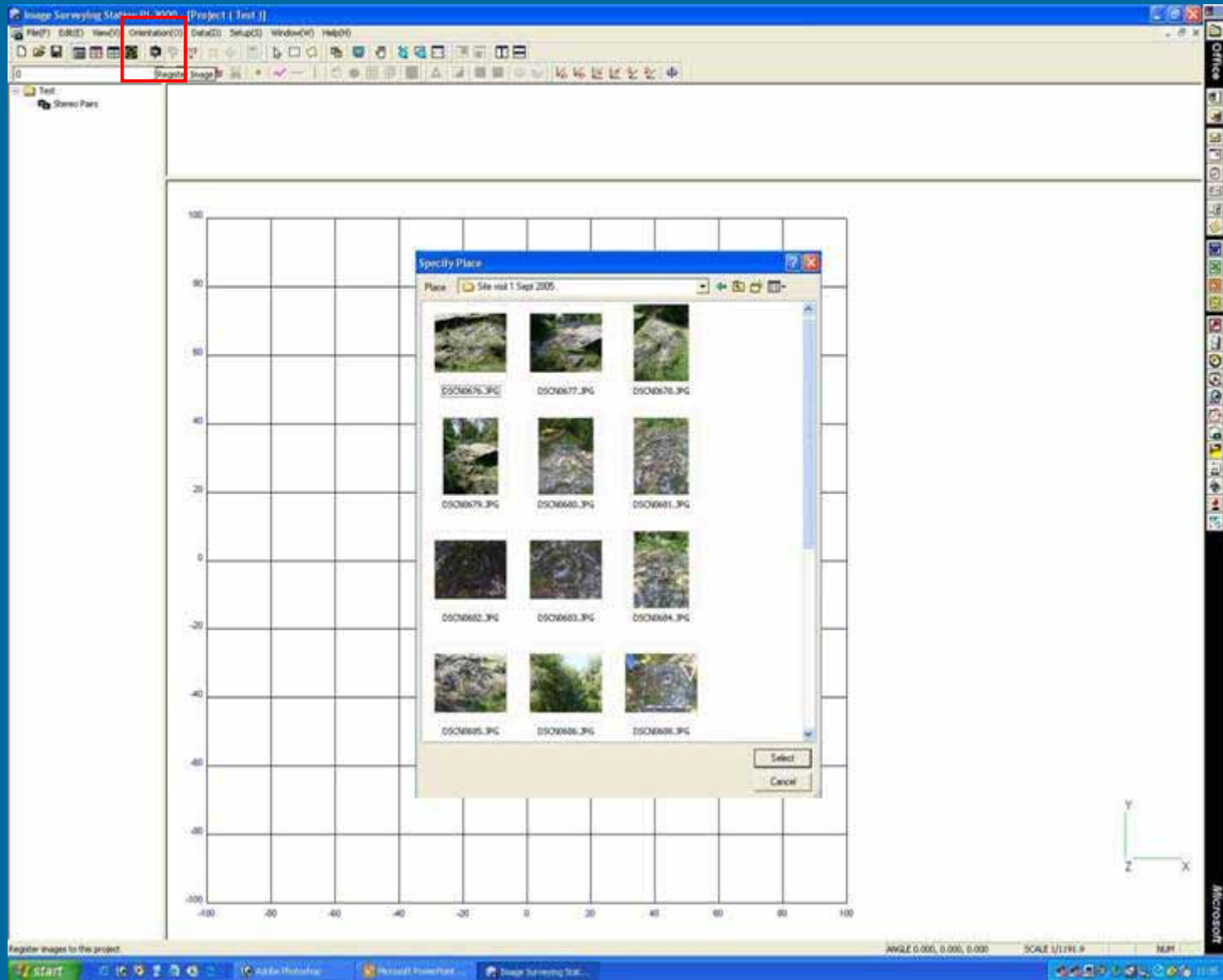


The actual size of 1 pixel on the camera's CCD

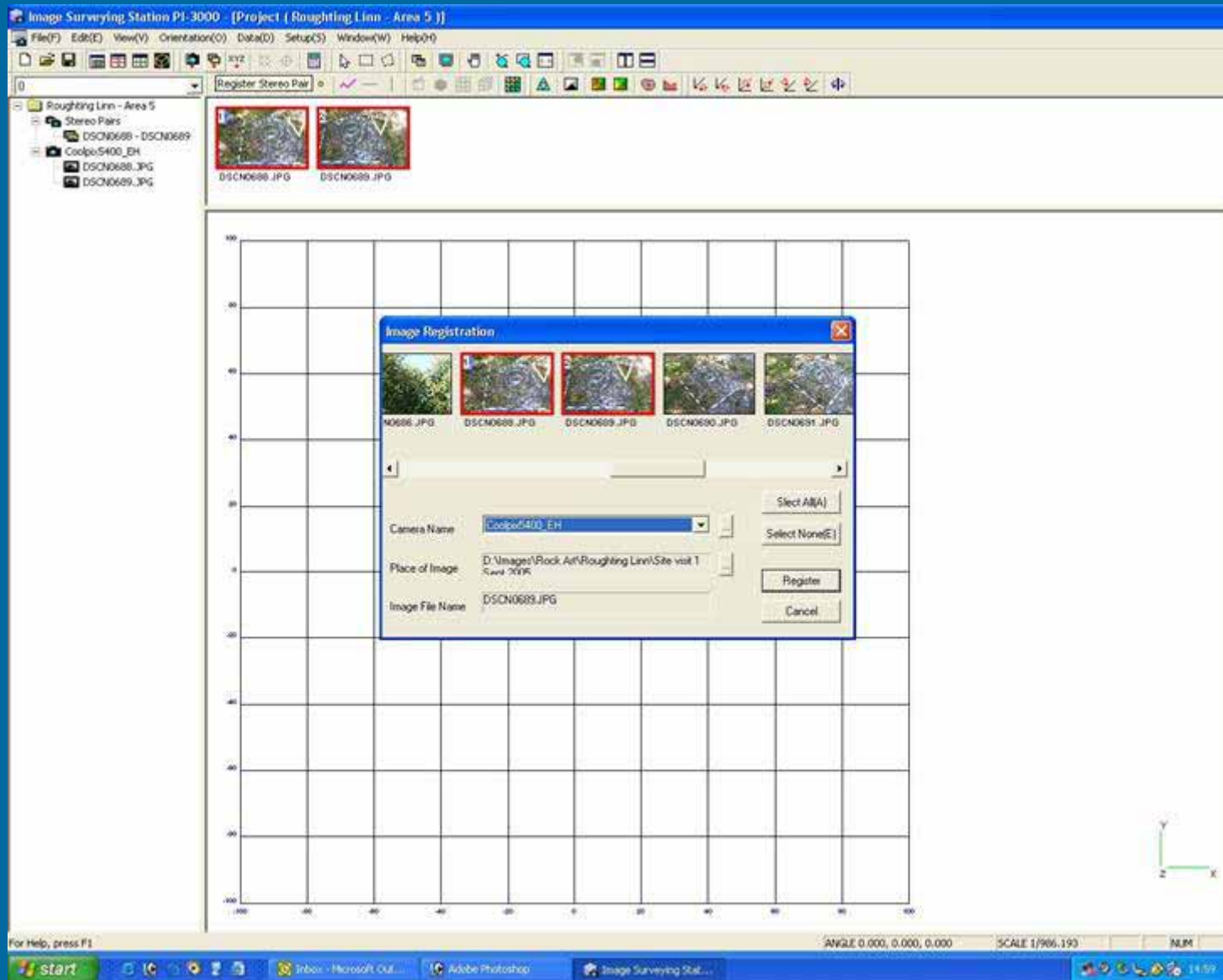
Camera calibration information provided by Dr Jim Chandler, Loughborough University



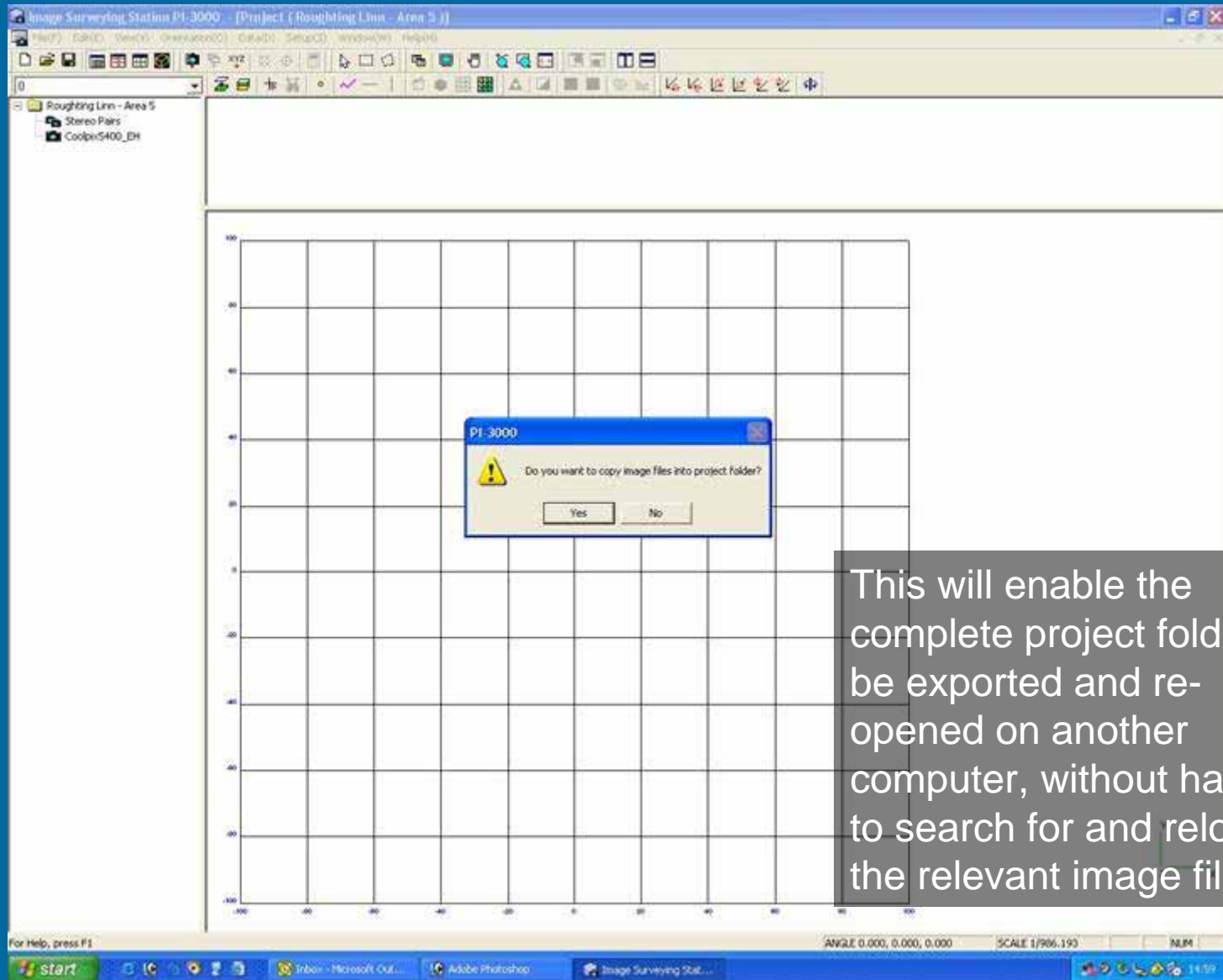
9. Register Image , Specify Place (folder), Select



10. Image Registration, Highlight Stereo Pair, Register



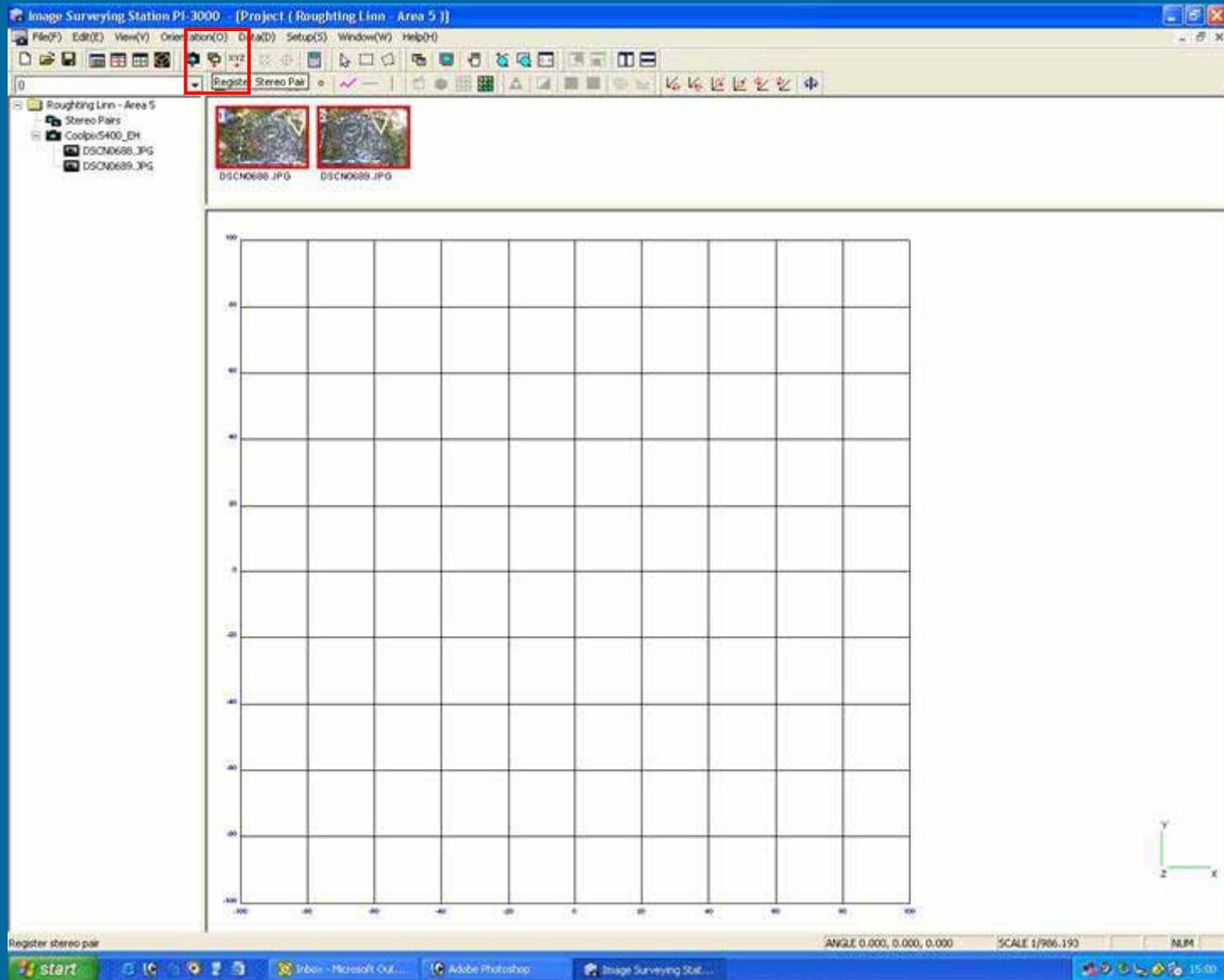
11. Copy image files, Yes



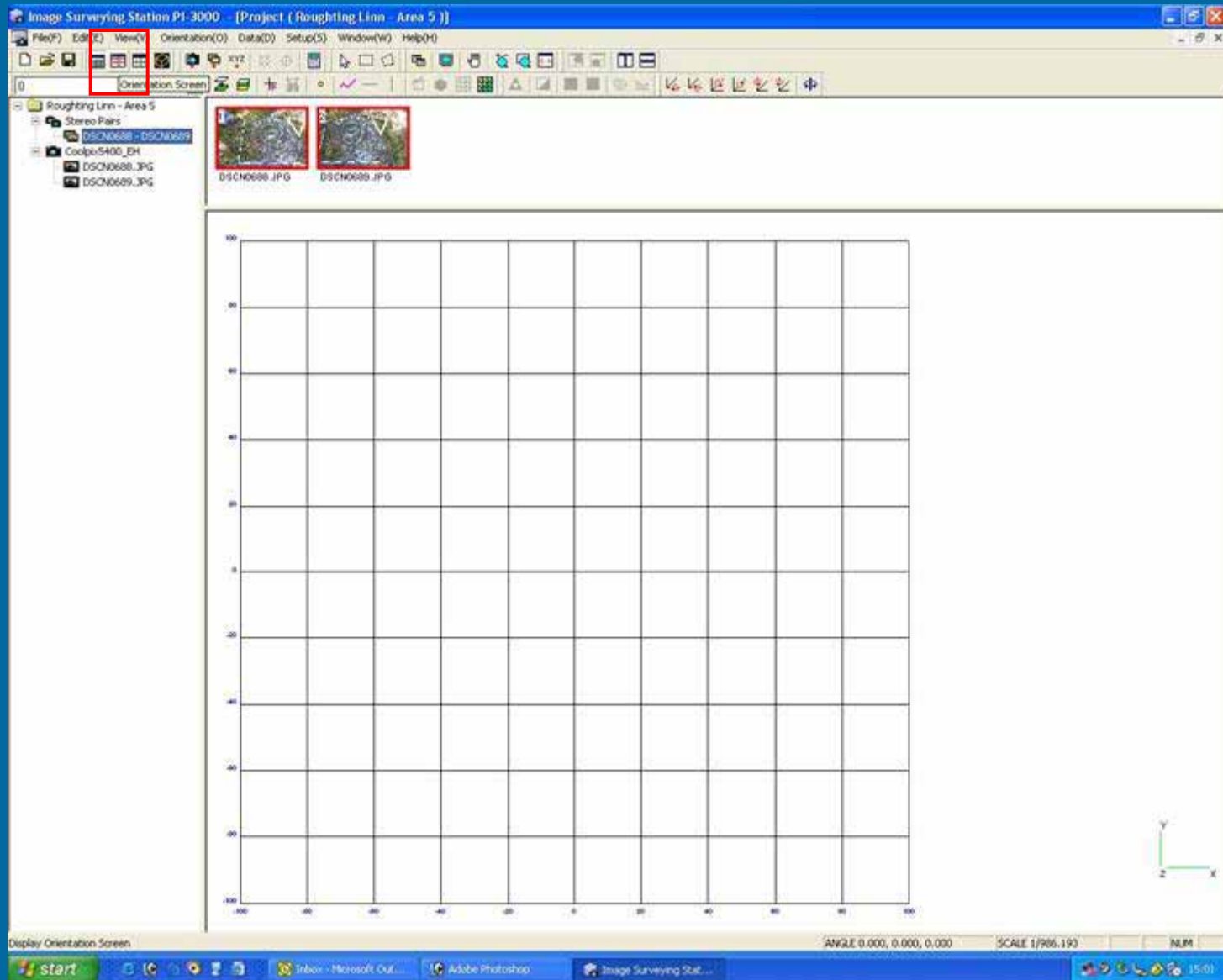
This will enable the complete project folder to be exported and re-opened on another computer, without having to search for and relocate the relevant image files



12. Highlight in correct left/right order, Register Stereo Pair



13. Highlight registered pair, Orientation screen



14. Orientation screen

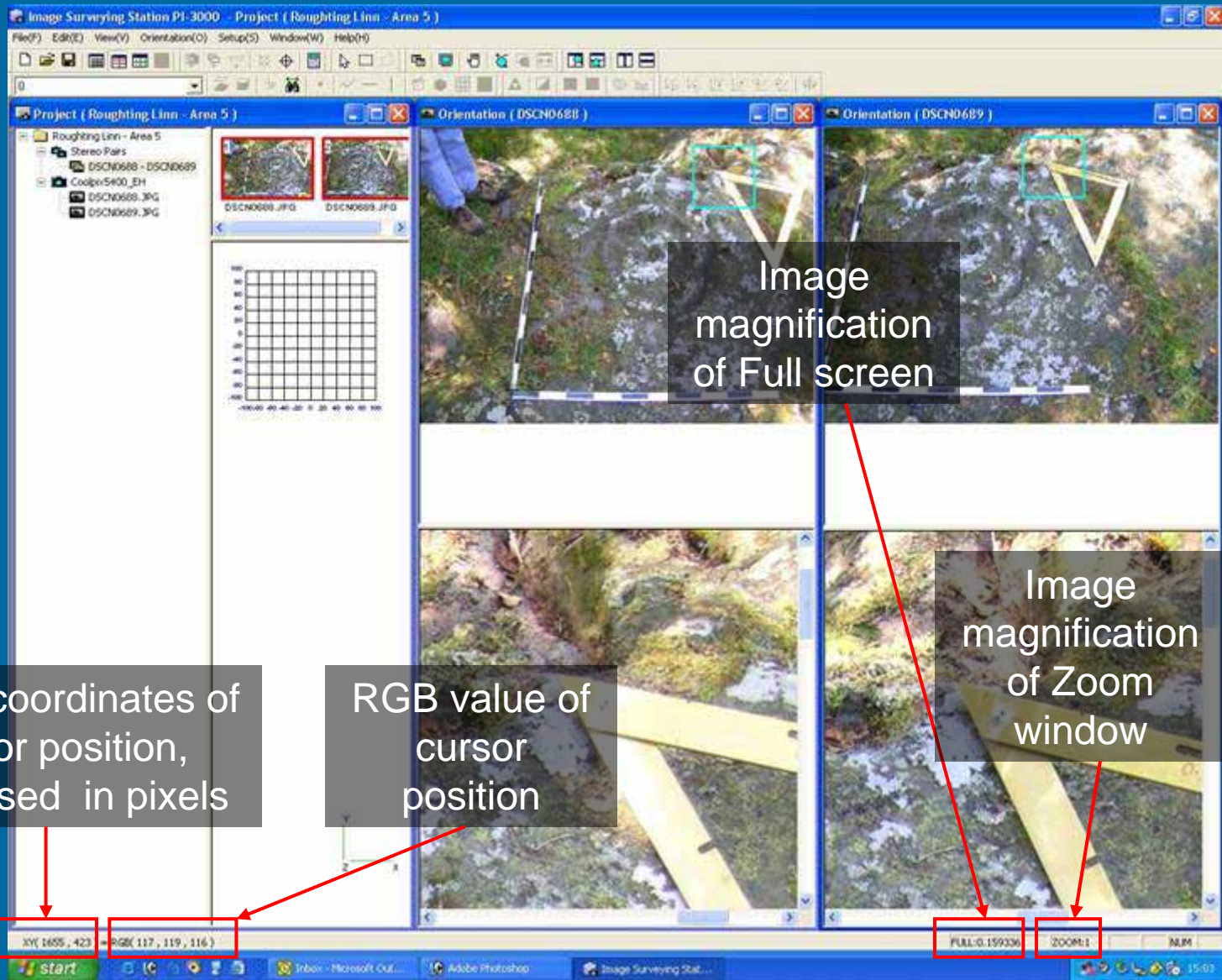


Image coordinates of cursor position, expressed in pixels

RGB value of cursor position

Image magnification of Full screen

Image magnification of Zoom window

XY: 1655, 423

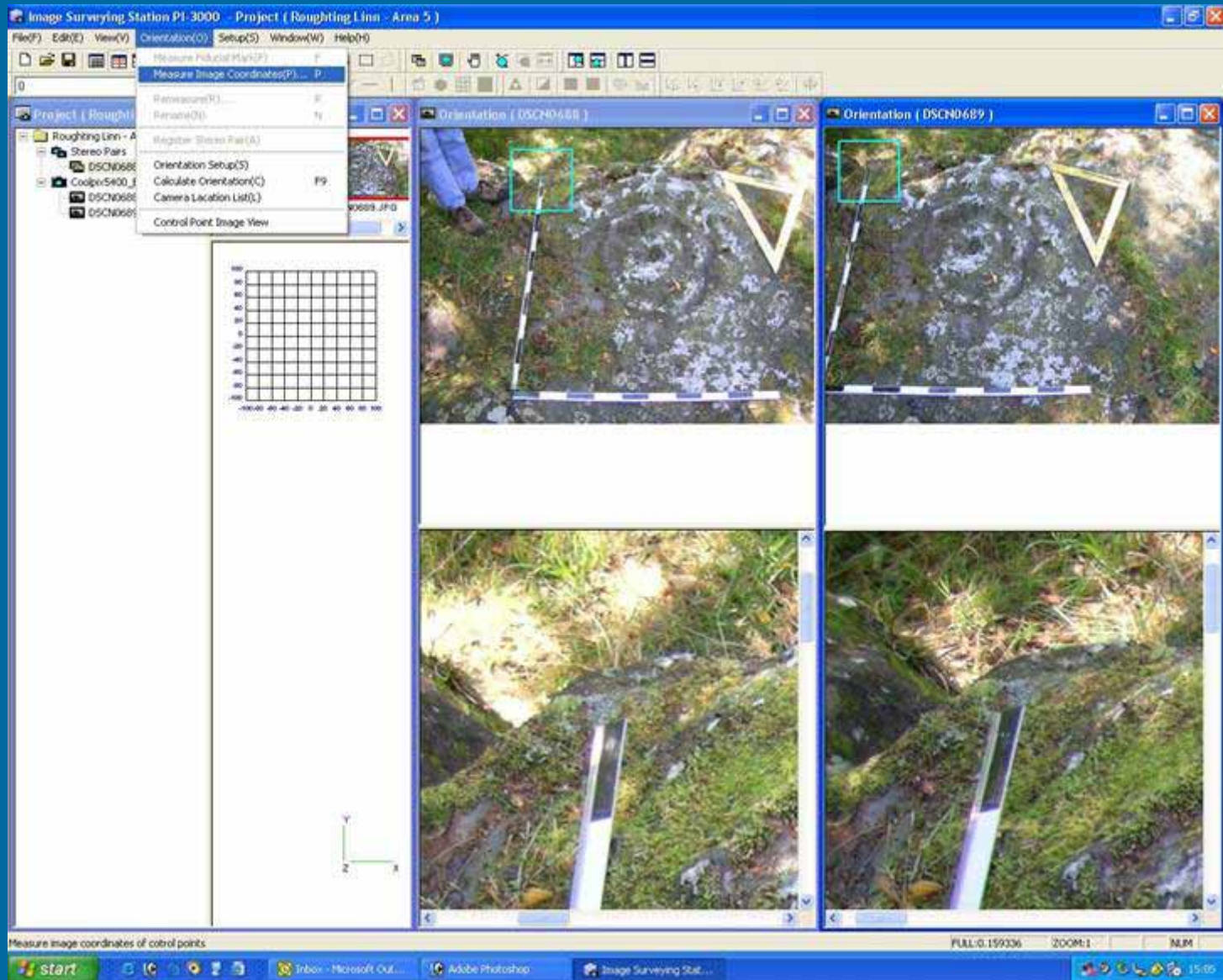
RGB: 117, 119, 116

FULL: 0.159336

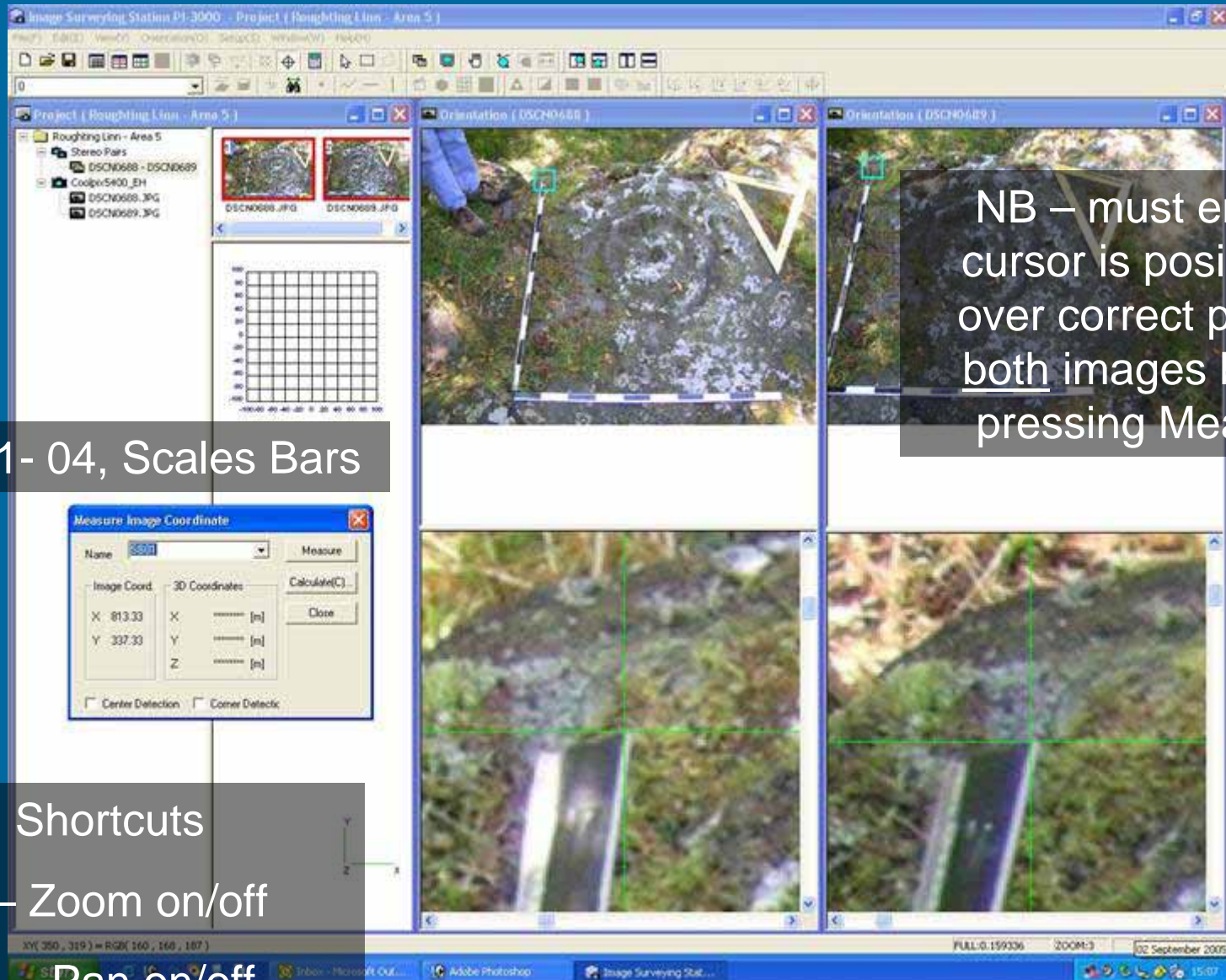
ZOOM: 1



15. Orientation, Measure Image Co-ordinates



16. Measure Image Coordinate – SB01, Set cursor on point, Measure



SB01- 04, Scales Bars

NB – must ensure cursor is positioned over correct point in both images before pressing Measure

Shortcuts

Z – Zoom on/off

M – Pan on/off



17. Measure Image Coordinate – SB02, Set cursor on point, Measure

The screenshot displays the Image Surveying Station P1-3000 software interface. The main window is titled "Project (Roughing Linn - Area 5)" and contains several panes:

- Project (Roughing Linn - Area 5):** A file explorer on the left shows a folder structure with "Stereo Pairs" containing "DSCN0688 - DSCN0689" and "Codelv5400_EH" with sub-files "DSCN0688.JPG" and "DSCN0689.JPG".
- Orientation (DSCN0688):** A top-left pane showing a stereo image of a rocky terrain with a yellow triangle and a scale bar. A green box labeled "SB02" is placed on a point in the image.
- Orientation (DSCN0689):** A top-right pane showing the corresponding stereo image of the same scene.
- Measure Image Coordinate:** A dialog box in the foreground with the following fields:

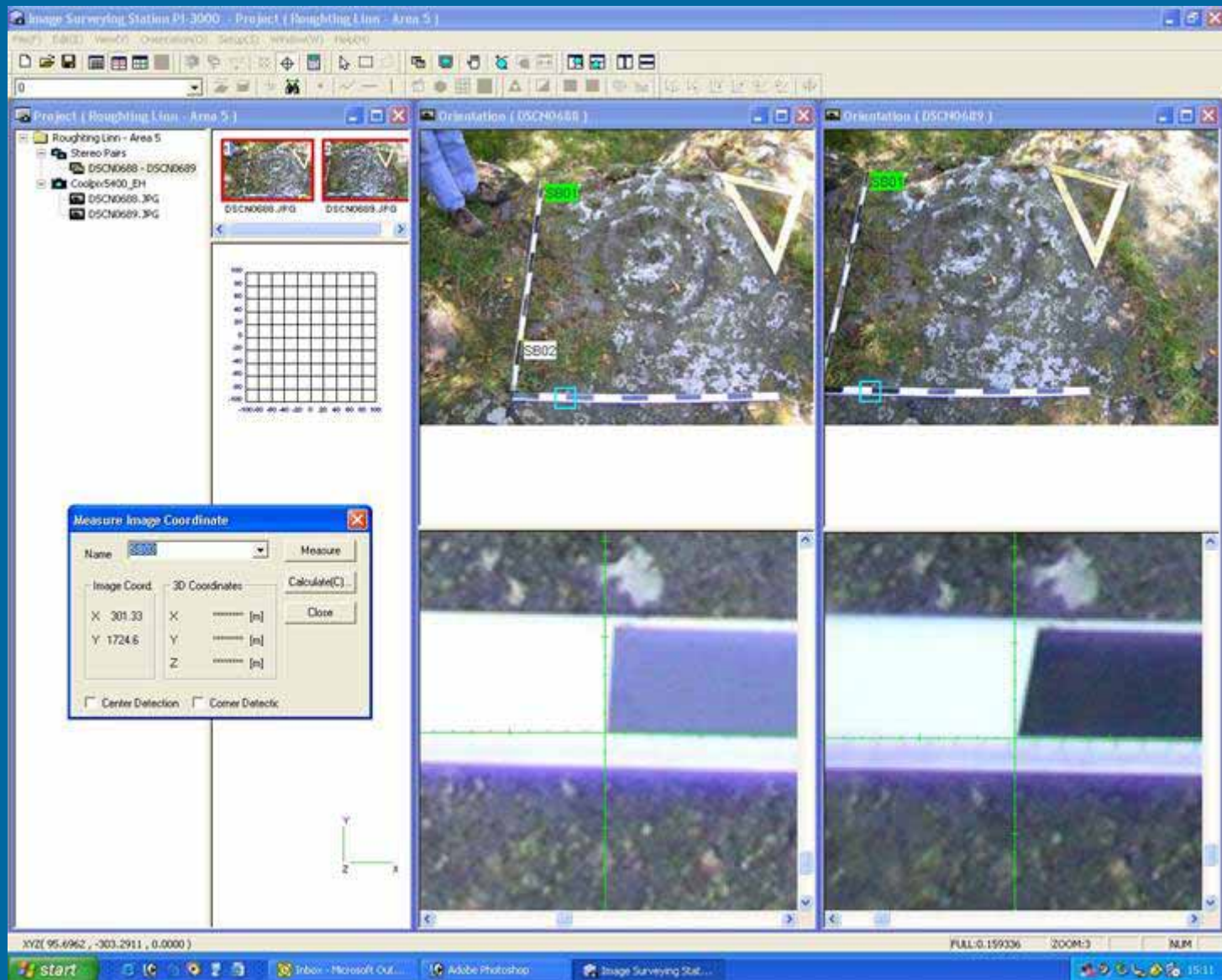
Name		SB02	Measure
Image Coord. - 3D Coordinates			
X	60.33	X [m]
Y	1323.3	Y [m]
Z		Z [m]

Buttons include "Calculate(C)", "Close", "Center Detection", and "Corner Detect".
- Grid:** A 30x30 grid with axes ranging from -100 to 100.
- XYZ:** A small 3D coordinate system icon.

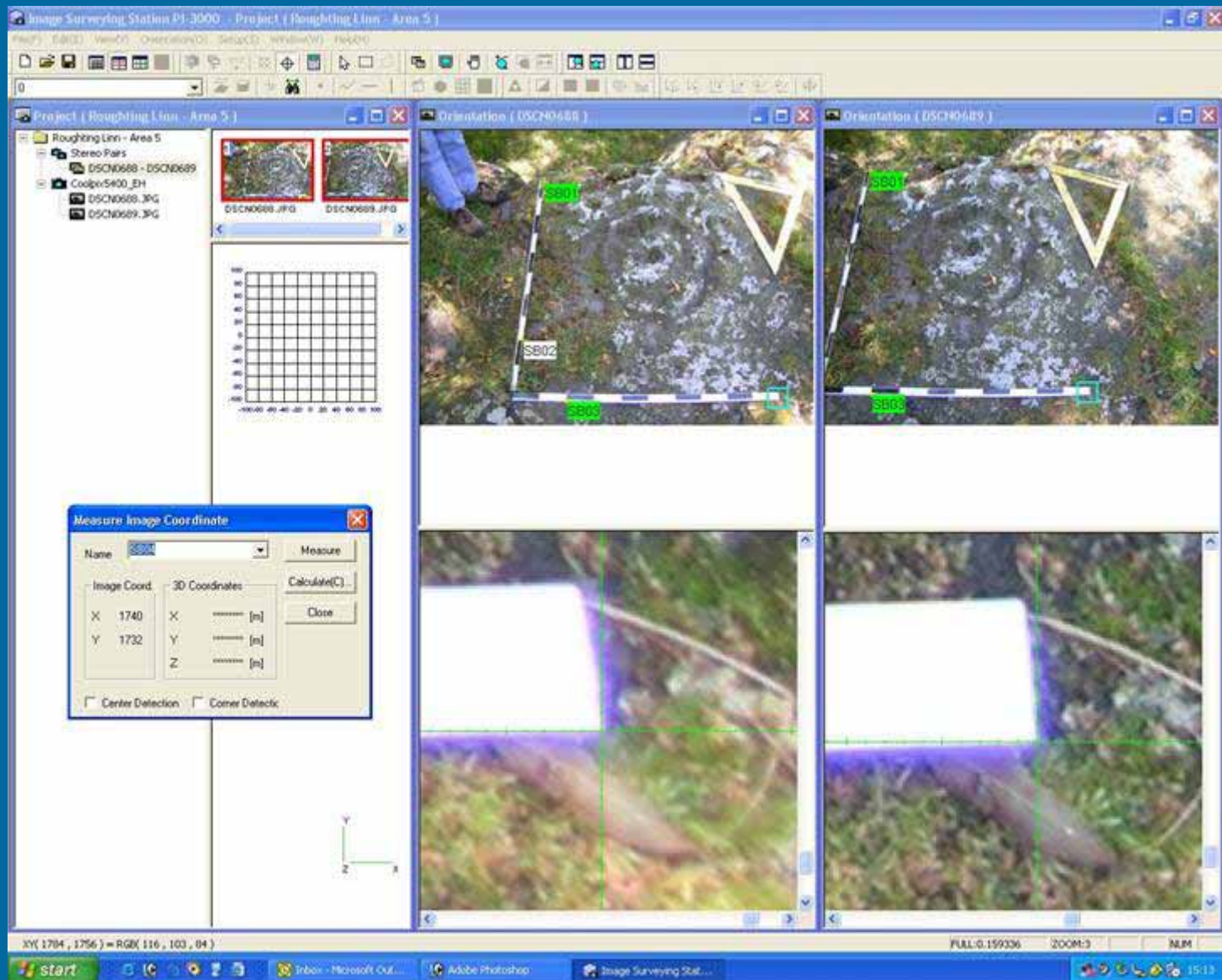
The bottom status bar shows "XYZ(90.2276 , -389.3671 , 0.0000)", "FULL:0.159336", "ZOOM:3", and "NUM". The Windows taskbar at the bottom includes the Start button, system tray, and open applications like "Inbox - Microsoft Out...", "Adobe Photoshop", and "Image Surveying Stat...".



18. Measure Image Coordinate – SB03, Set cursor on point, Measure



19. Measure Image Coordinate – SB04, Set cursor on point, Measure



20. Measure Image Coordinate – TL01, Set cursor on point, Measure

The screenshot displays the 'Image Surveying Station' software interface. The main window shows a stereo pair of images of a rocky terrain. A white triangle is drawn on the right image, with vertices labeled 'SB01', 'SB02', and 'SB03'. A scale bar is visible at the bottom of the images. The 'Measure Image Coordinate' dialog box is open, showing the name 'TL01' and the image coordinates X=1491.6 and Y=247. The dialog also includes fields for 3D coordinates (X, Y, Z) and buttons for 'Measure', 'Calculate(C)', and 'Close'. A small 3D coordinate system icon is visible at the bottom of the dialog.

Project (Roughing Lin - Area 5)

Orientation (DSCN0688)

Orientation (DSCN0689)

Measure Image Coordinate

Name: TL01

Image Coord: X: 1491.6, Y: 247

3D Coordinates: X: [m], Y: [m], Z: [m]

TL01- 03, Triangle

NB Steps 20-22 are only necessary if a triangular or similarly proportioned scale is used alongside the standard scaling bars



21. Measure Image Coordinate – TL02, Set cursor on point, Measure

The screenshot displays the Image Surveying Station software interface. The main window shows a stereo pair of images (Orientation: DSCN0688 and DSCN0689) with a yellow triangle and a cyan square highlighting a point labeled TL02. A white scale bar is visible in the images. The 'Measure Image Coordinate' dialog box is open, showing the name 'TL02' and the following data:

Image Coord.	3D Coordinates
X: 2500.6	X: [m]
Y: 412.67	Y: [m]
	Z: [m]

Buttons for 'Measure', 'Calculate(C)', and 'Close' are present. Checkboxes for 'Center Detection' and 'Corner Detectic' are at the bottom. The status bar at the bottom shows 'XY(1987 , 422) = RGB(92 , 82 , 60)', 'FULL:0.159336', 'ZOOM:3', and 'NUM'. The Windows taskbar at the bottom includes the start button and open applications like Inbov - Microsoft Out... and Adobe Photoshop.



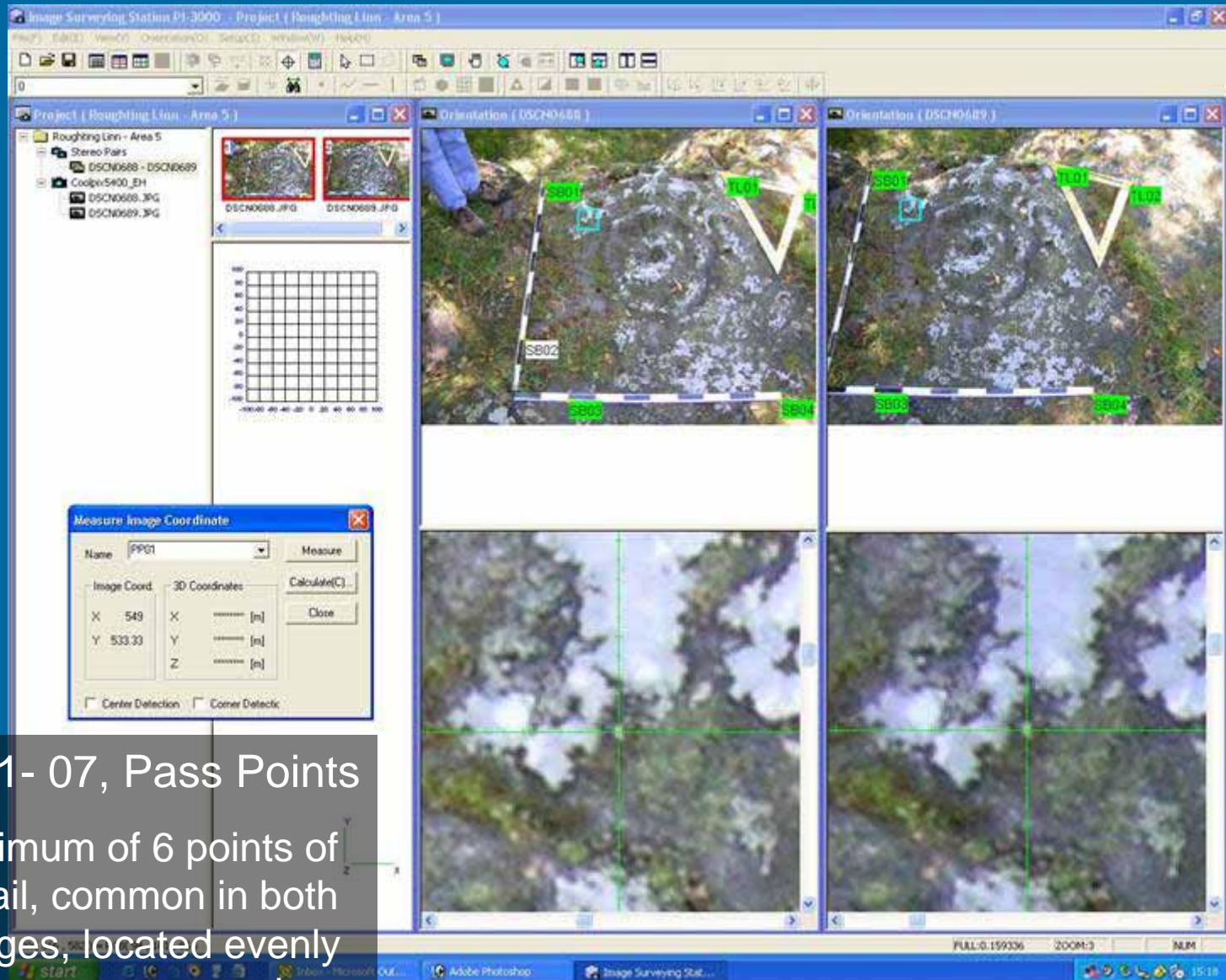
22. Measure Image Coordinate – TL03, Set cursor on point, Measure

The screenshot displays the Image Surveying Station software interface. The main window shows a stereo pair of images (Orientation: DSCN0688 and DSCN0689) with several control points marked: SB01, SB02, SB03, SB04, TL01, TL02, and TL03. A 'Measure Image Coordinate' dialog box is open, showing the name 'TL03' and the image coordinates X: 1773.6 and Y: 838.33. The dialog also includes fields for 3D coordinates (X, Y, Z) and buttons for 'Measure', 'Calculate(C)', and 'Close'. The status bar at the bottom indicates 'XY (1760, 845) = RGB (254, 248, 224)', 'FULL: 0.159336', 'ZOOM: 3', and 'NUM'. The Windows taskbar at the bottom shows the start button and several open applications including Inbox, Microsoft Outlook, Adobe Photoshop, and Image Surveying Station.

Name	Image Coord	3D Coordinates
TL03	X: 1773.6 Y: 838.33	X: [m] Y: [m] Z: [m]



23. Measure Image Coordinate – PP01, Set cursor on point, Measure



PP01- 07, Pass Points

Minimum of 6 points of detail, common in both images, located evenly across stereo-pair



24. Measure Image Coordinate – PP02, Set cursor on point, Measure

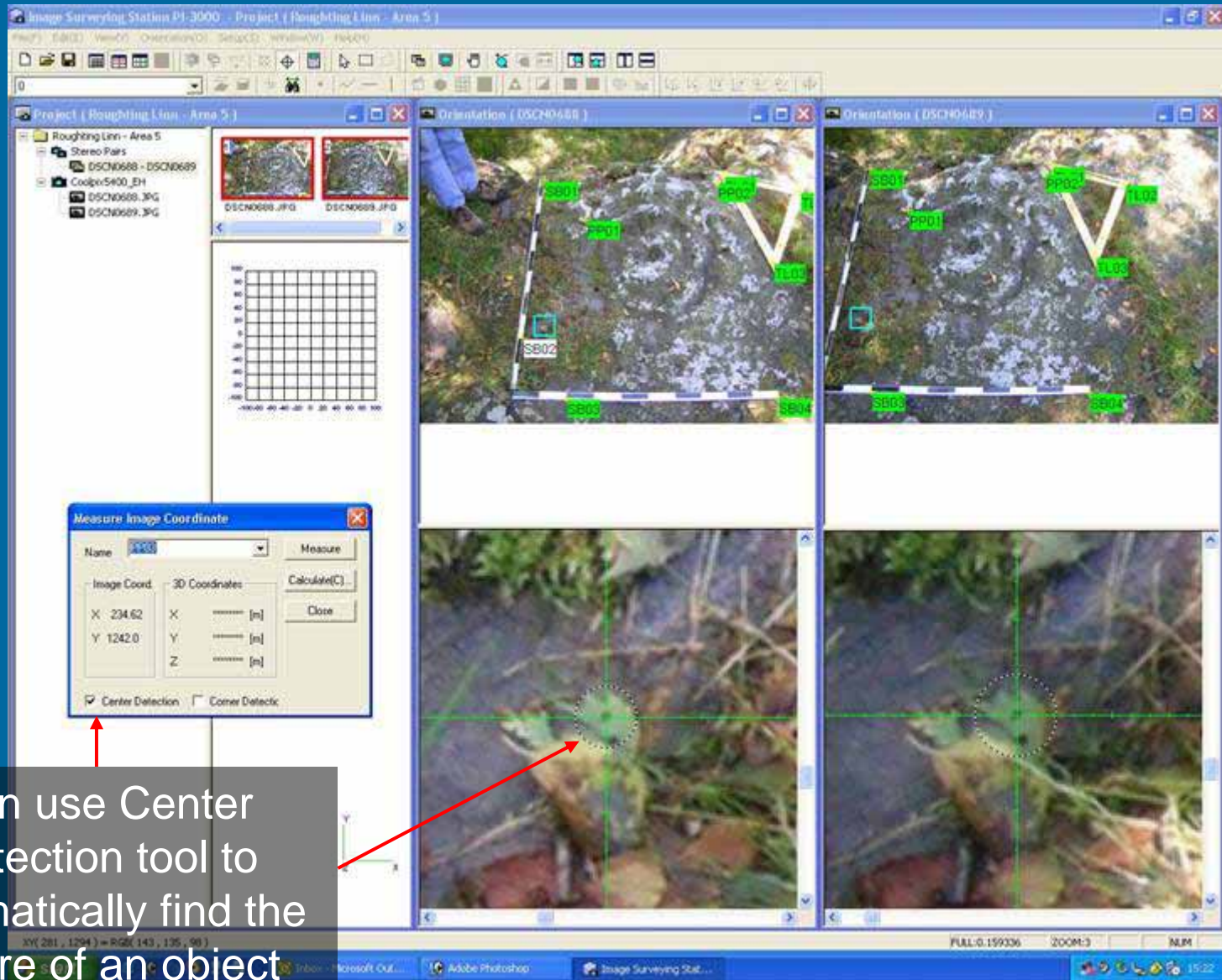
The screenshot displays the Image Surveying Station software interface. The main window shows a stereo pair of images (Orientation: DSCN0688 and DSCN0689) with several measurement points labeled: SB01, SB02, SB03, SB04, SB05, PP01, TL01, TL02, TL03, and TL04. A 'Measure Image Coordinate' dialog box is open, showing the following data:

Name	Image Coord.	3D Coordinates
PP02	X: 1443.6	X: [m]
	Y: 291.67	Y: [m]
		Z: [m]

The dialog box also includes a 'Measure' button, a 'Calculate(C)' button, and a 'Close' button. There are checkboxes for 'Center Detection' and 'Corner Detectic'. The software interface includes a menu bar, a toolbar, a project tree on the left, and a status bar at the bottom showing 'XY(2010, 409) = RGB(252, 236, 210)', 'FULL:0.159336', 'ZOOM:3', and 'NUM'. The Windows taskbar at the bottom shows the start button and several open applications: Inbox - Microsoft Out..., Adobe Photoshop, and Image Surveying Stat... The system clock shows 15:20.



25. Measure Image Coordinate – PP03, Set cursor on point, Measure



Can use Center Detection tool to automatically find the centre of an object



26. Measure Image Coordinate – PP04, Set cursor on point, Measure

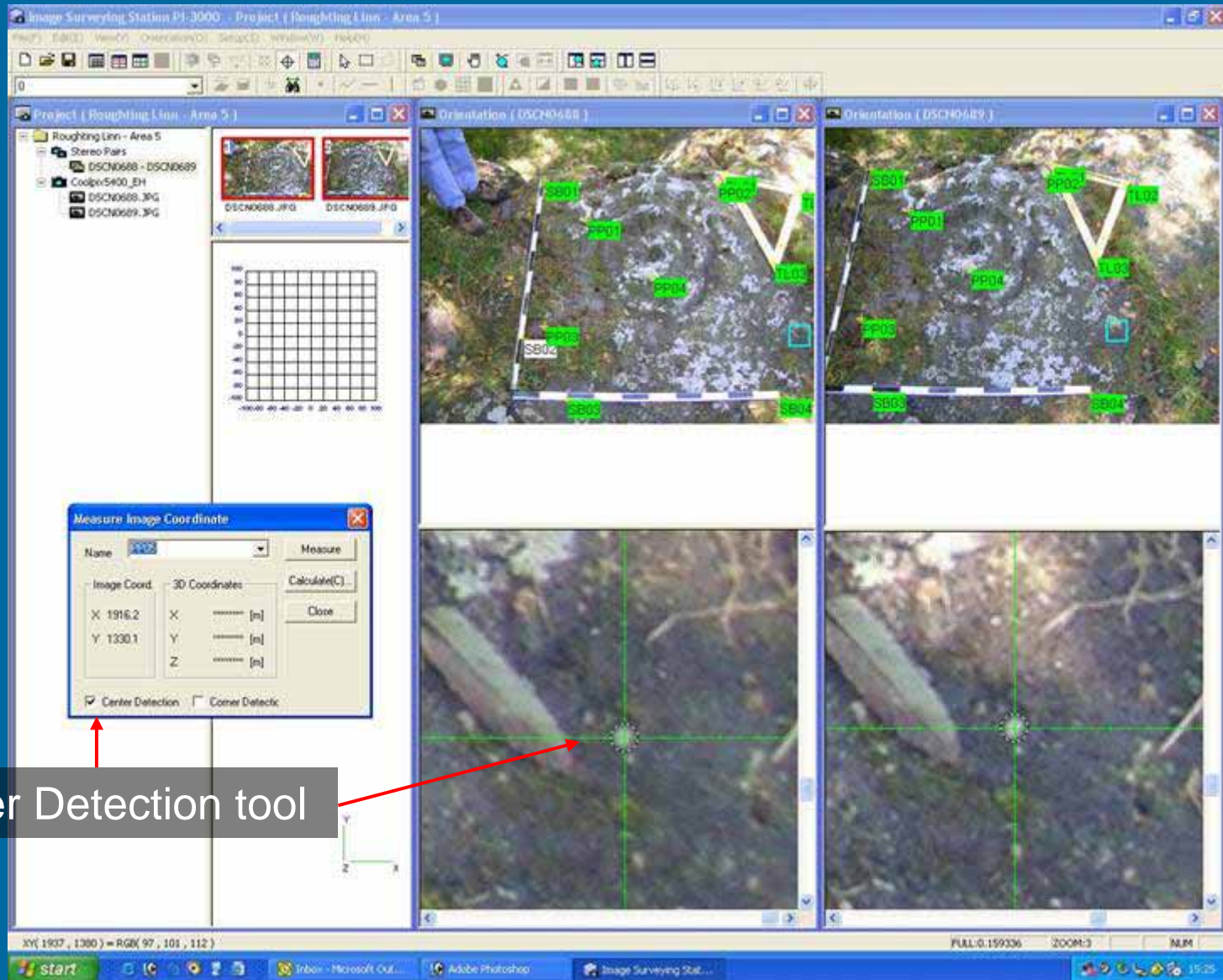
The screenshot displays the Image Surveying Station software interface. The main workspace shows a stereo pair of images from 'Orientation (DSCN0688)' and 'Orientation (DSCN0689)'. The left image has several points marked with green labels: SB01, SB02, SB03, SB04, SB05, SB06, PP02, PP01, TL02, and TL03. A blue cursor is positioned over point PP04. A 'Measure Image Coordinate' dialog box is open in the foreground, showing the following data:

Measure Image Coordinate	
Name: PP04	Measure
Image Coord:	3D Coordinates:
X: 947	X: [m]
Y: 925.33	Y: [m]
	Z: [m]
<input type="checkbox"/> Center Detection	<input type="checkbox"/> Corner Detection

The dialog box also includes 'Calculate(C)...' and 'Close' buttons. The software interface includes a menu bar, a toolbar, a project tree on the left, and a grid view below it. The status bar at the bottom shows 'XY(949 , 980) = RGB(76 , 90 , 77)', 'FULL:0.159336', 'ZOOM:3', and 'NUM'. The Windows taskbar at the very bottom shows the start button and several open applications including Inboon - Microsoft Out... and Adobe Photoshop.



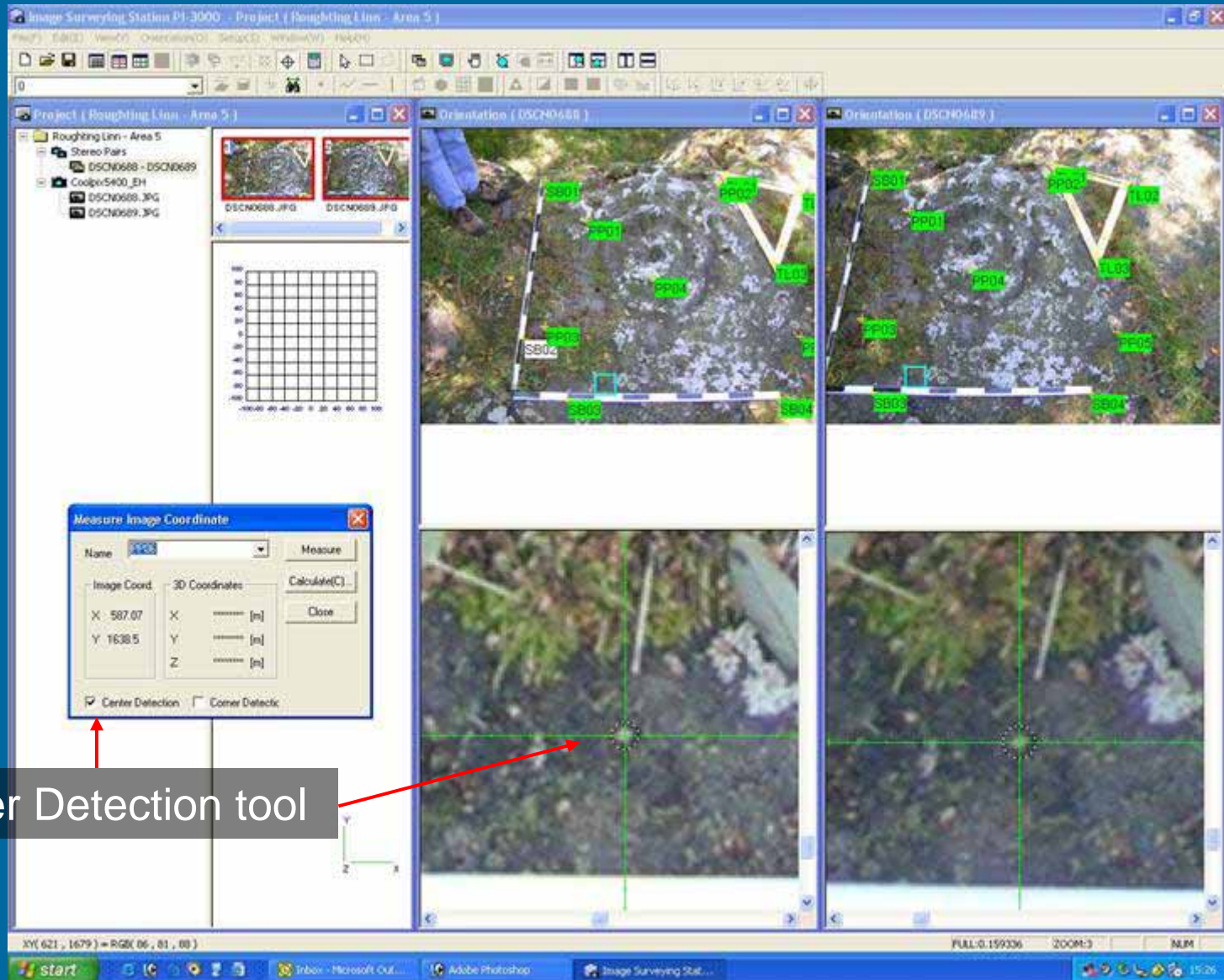
27. Measure Image Coordinate – PP05, Set cursor on point, Measure



Center Detection tool



28. Measure Image Coordinate – PP06, Set cursor on point, Measure



Center Detection tool



29. Measure Image Coordinate – PP07, Set cursor on point, Measure

The screenshot displays the 'Image Surveying Station' software interface. The main window shows a stereo pair of images with various points labeled (e.g., SB01, PP01, TL01). A 'Measure Image Coordinate' dialog box is open, showing the following fields:

Name: XY		Measure
Image Coord.	3D Coordinates:	Calculate(C)
X: 1791	X: [m]	Close
Y: 1621.7	Y: [m]	
	Z: [m]	

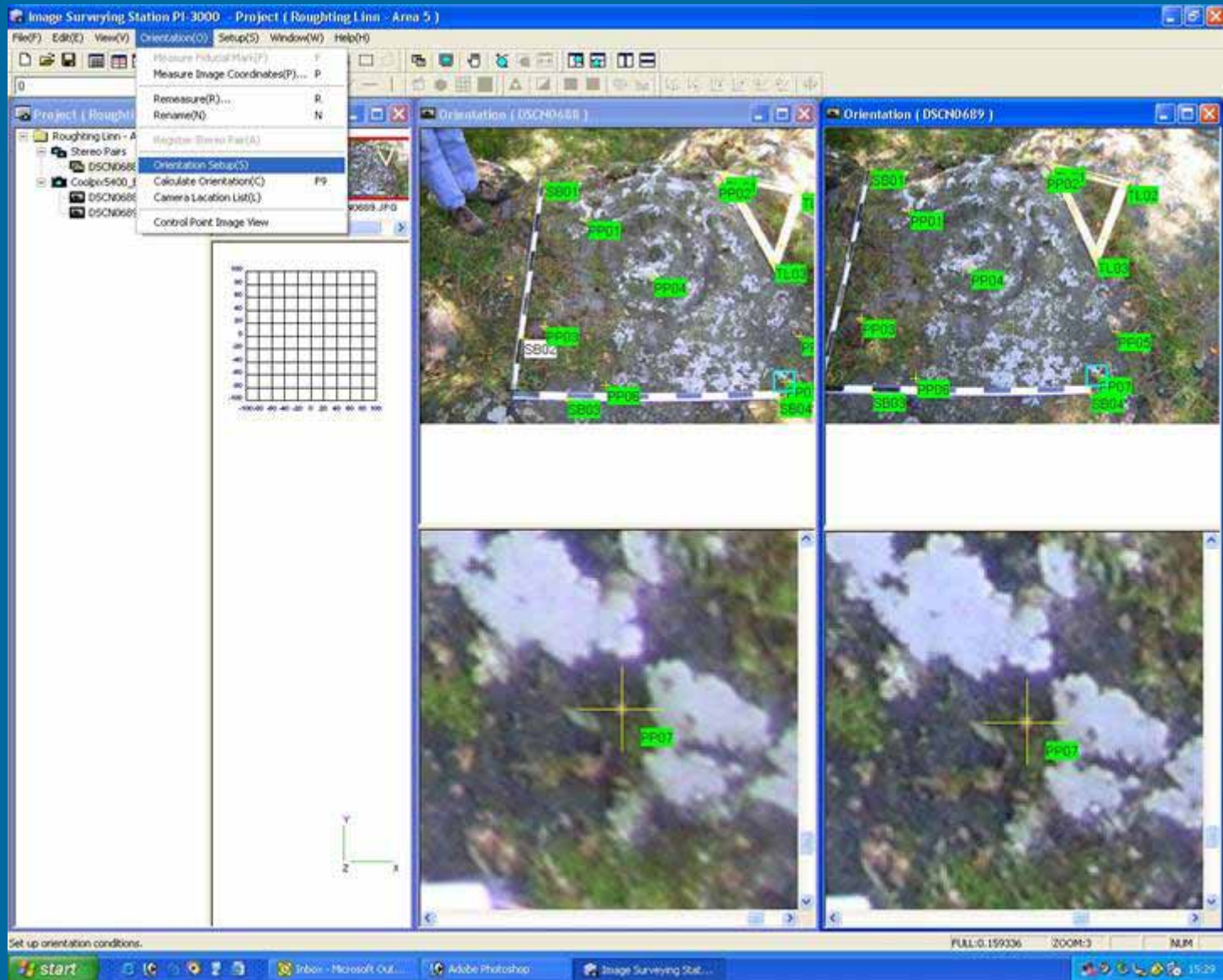
At the bottom of the dialog box, there are two checkboxes: Center Detection and Corner Detectic. A red arrow points to the 'Center Detection' checkbox. Another red arrow points to the center of the image in the bottom-right view.

At the bottom of the software window, the status bar shows: XY(1708, 1660) = RGB(159, 171, 167) FULL:0.159336 ZOOM:3 NUM

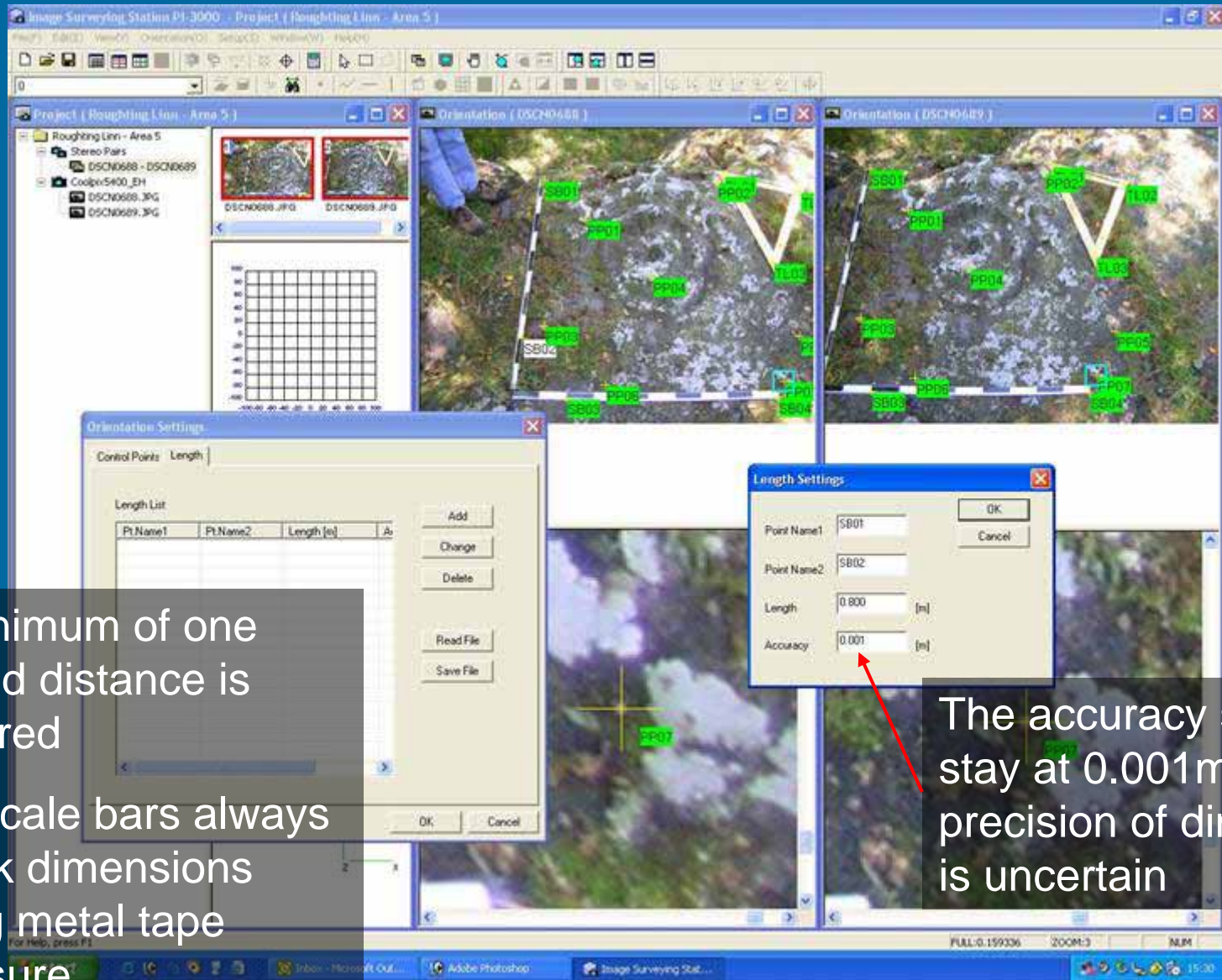
Center Detection tool



30. Orientation, Orientation Setup



31. Orientation Settings, Length, Add, SB01, SB02, 'Input length', OK



A minimum of one scaled distance is required

For scale bars always check dimensions using metal tape measure

The accuracy should stay at 0.001m unless precision of dimension is uncertain



32. Orientation Settings, Length, Add, SB03, SB04, 'Input length', OK

The screenshot displays the Image Surveying Station software interface. The main window shows a stereo image pair of a rocky terrain. Several control points are marked on the images: SB01, SB02, SB03, SB04, SB05, SB06, SB07, PP01, PP02, PP03, PP04, PP05, PP06, PP07, and TL01, TL02, TL03. A grid is visible in the top-left corner of the main window.

Two dialog boxes are open in the foreground:

- Orientation Settings:** This dialog has a 'Control Points' tab and a 'Length' sub-tab. It contains a 'Length List' table with the following data:

PT Name1	PT Name2	Length [m]	A
SB01	SB02	0.8000	0

Buttons for 'Add', 'Change', 'Delete', 'Read File', and 'Save File' are present. 'OK' and 'Cancel' buttons are at the bottom.

- Length Settings:** This dialog is for adding a new length measurement. It contains the following fields:

- Point Name1: SB03
- Point Name2: SB04
- Length: 0.900 [m]
- Accuracy: 0.001 [m]

'OK' and 'Cancel' buttons are at the bottom right.

The Windows taskbar at the bottom shows the Start button, system tray, and open applications including Inbox - Microsoft Out... and Adobe Photoshop. The system clock shows 15:32.



33. Orientation Settings, Length, Add, TL01, TL02, 'Input length', OK

NB Steps 33-35 are only necessary if a triangular or similarly proportioned scale is used alongside the standard scaling bars

The screenshot displays the 'Image Surveying Station' software interface. The main window shows a photograph of a survey site with several control points (SB01, SB02, SB03, SB04) and target points (PP01, PP02, PP03, PP04, PP05, PP06, PP07) marked. A yellow triangle is drawn between points TL01, TL02, and TL03. Two dialog boxes are overlaid on the image:

- Orientation Settings**: Shows a 'Length List' table with columns for Pt Name1, Pt Name2, Length (m), and A. The table contains two rows of data.
- Length Settings**: Shows fields for Point Name1 (TL01), Point Name2 (TL02), Length (0.350 m), and Accuracy (0.001 m).

The software interface also shows a toolbar at the top and a status bar at the bottom with fields for ANGLE, SCALE, and NUM.

For triangle, the precise measurements between targets should be clearly written on triangle sides



34. Orientation Settings, Length, Add, TL02, TL03, 'Input length', OK

The screenshot displays the Image Surveying Station software interface. The main window shows a stereo pair of images of a rocky terrain with several control points marked: SB01, SB02, SB03, SB04, PP01, PP02, PP03, PP04, PP05, PP06, PP07, TL01, TL02, and TL03. Two dialog boxes are open in the foreground:

Orientation Settings

Control Points: Length

Pt Name1	Pt Name2	Length (m)	Az
SB01	SB02	0.9000	0
SB03	SB04	0.9000	0
TL01	TL02	0.3500	0

Length Settings

Point Name1: TL02
Point Name2: TL03
Length: 0.341 (m)
Accuracy: 0.001 (m)

The software interface also shows a project tree on the left, a grid overlay, and a status bar at the bottom with the text "For Help, press F1", "ANGLE 0.000, 0.000, 0.000", "SCALE 1/5063.29", and "NUM".



35. Orientation Settings, Length, Add, TL01, TL03, 'Input length', OK

The screenshot displays the Image Surveying Station software interface. The main window shows a stereo pair of images of a rocky terrain with various control points marked. Two dialog boxes are open in the foreground:

Orientation Settings

Control Points: Length

Pt Name1	Pt Name2	Length [m]	A
SB01	SB02	0.8000	0
SB03	SB04	0.8000	0
TL01	TL02	0.3500	0
TL02	TL03	0.3410	0

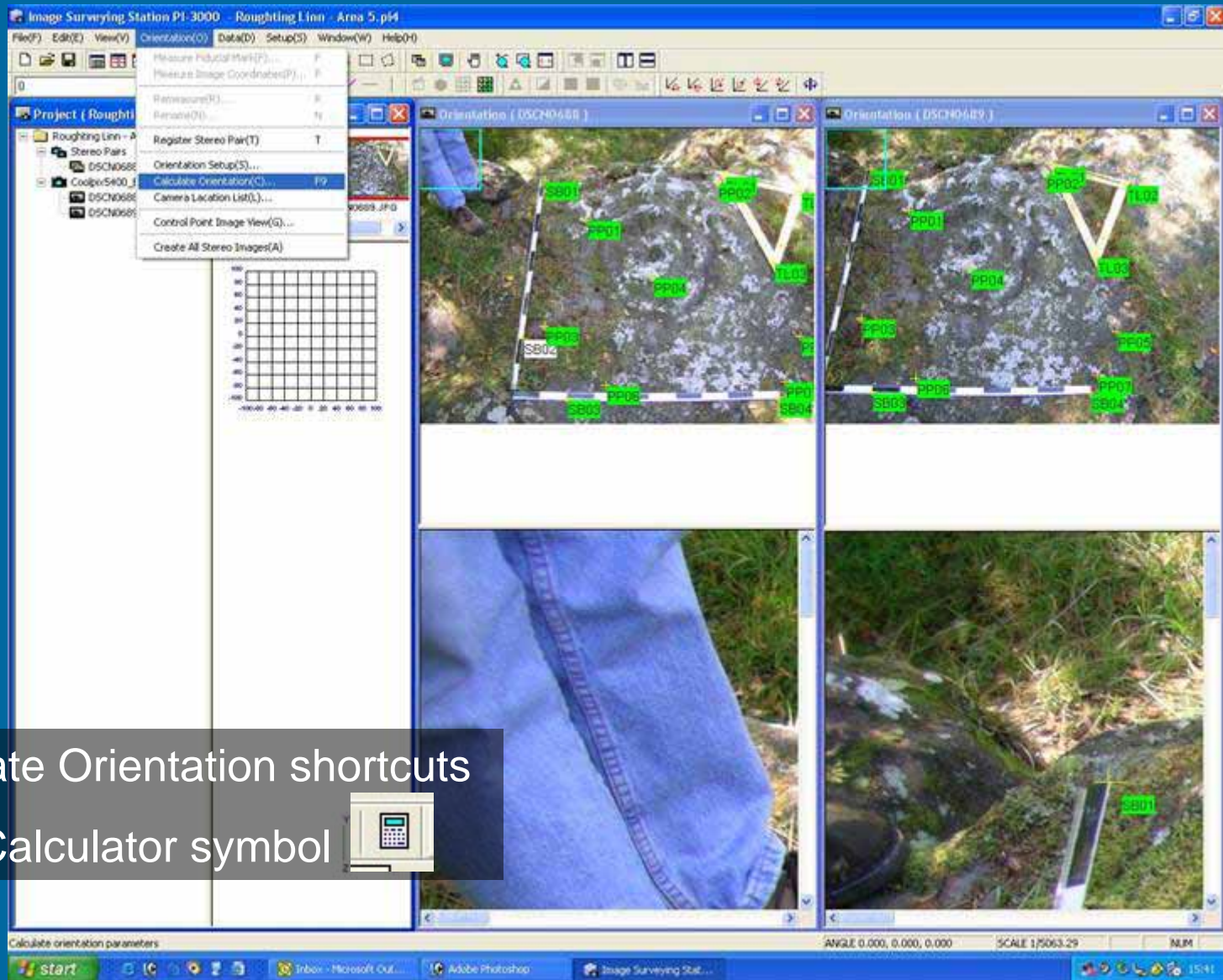
Length Settings

Point Name1: TL01
Point Name2: TL03
Length: 0.492 [m]
Accuracy: 0.001 [m]

The software interface also shows a project tree on the left, a grid overlay, and a status bar at the bottom with the text "For Help, press F1", "ANGLE 0.000, 0.000, 0.000", "SCALE 1/5063.29", and "NUM".

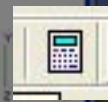


36. Orientation, Calculate Orientation

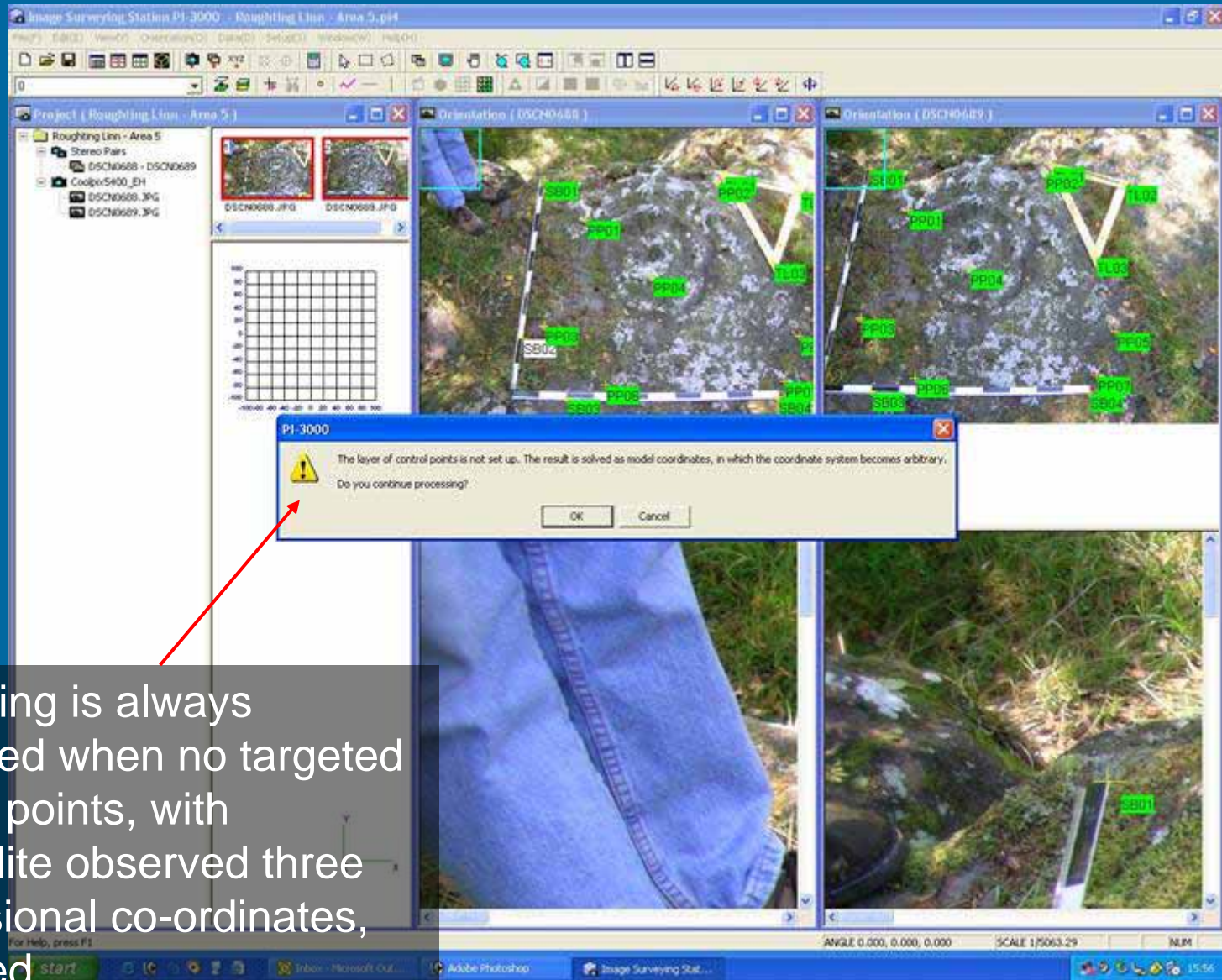


Calculate Orientation shortcuts

F9 or Calculator symbol



37. Do you continue processing?, OK



A warning is always produced when no targeted control points, with theodolite observed three dimensional co-ordinates, are used



38. Orientation Results

Orientation Results

Pair/Image Name	judge	Y-Parallax	Image Co.
DSCN0688 - DSCN0689	OK	0.49 OK	0.67 OK

Orientation Results

Pair Name	judge	y-pr[pxel]	Pass Points
DSCN0558 - DSCN0559	OK	0.49	13

Y-Parallax of Pass Point

Point Name	judge	y-pr[pxel]
SB01	OK	-0.39
SB03	OK	-0.29
SB04	OK	0.87
TL01	OK	0.34
TL02	OK	-0.12
PP01	OK	0.22

Orientation Results

Standard Deviation [m]	SX	SY	SZ

Maximum Residuals [m]	DX	DY	DZ

Orientation Results

Pt Name1	Pt Name2	L0 [m]	L1 [m]	DL [m]
SB01	SB02	0.8000	0.7979	-0.0021
TL01	TL02	0.3500	0.3486	-0.0014
TL02	TL03	0.3410	0.3433	0.0023
TL01	TL03	0.4820	0.4821	0.0001

If 'OK', the software deems the model to have been successfully orientated. However it is prudent to check the following information, by clicking on the respective tabs:



40. Orientation Results – Y-Parallax

The screenshot shows the 'Orientation Results' window with the following data:

Calculated Coordinates	Length	Camera Locations	Ground Resolution
Result List	Y-Parallax	Image Coordinates	

Y-Parallax of Stereo Image (RMS)

Pair Name	judge	y-prx[pixel]	Pass Points
DSCN0688 - DSCN0689	OK	0.49	13

Buttons: Remeasure(M), Calculate(C)..., Close

Y-Parallax of Pass Point

Point Name	judge	y-prx[pixel]
SB01	OK	-0.39
SB03	OK	-0.29
SB04	OK	0.87
TL01	OK	0.34
TL02	OK	-0.12
PP01	OK	0.22
TL03	OK	0.13

A red circle highlights the 'Y-Parallax of Pass Point' table, and a red arrow points to the 'y-prx[pixel]' column.

Parallax

“The apparent displacement or difference of orientation of an object viewed along two different lines of sight”

Check the y-prx values – if any are greater than 1 pixel they may need re-digitising to increase the accuracy of orientation



41. Orientation Results - unsuccessful

If orientation unsuccessful check what Result List states.

May simply be a scaled distance typed in incorrectly, or a badly digitised point which requires remeasuring. Also one of the scale measurements may be incorrect so try removing one and re-running.

If still doesn't set up, email (paul.bryan@english-heritage.org.uk) or ring me (01904 601959)!

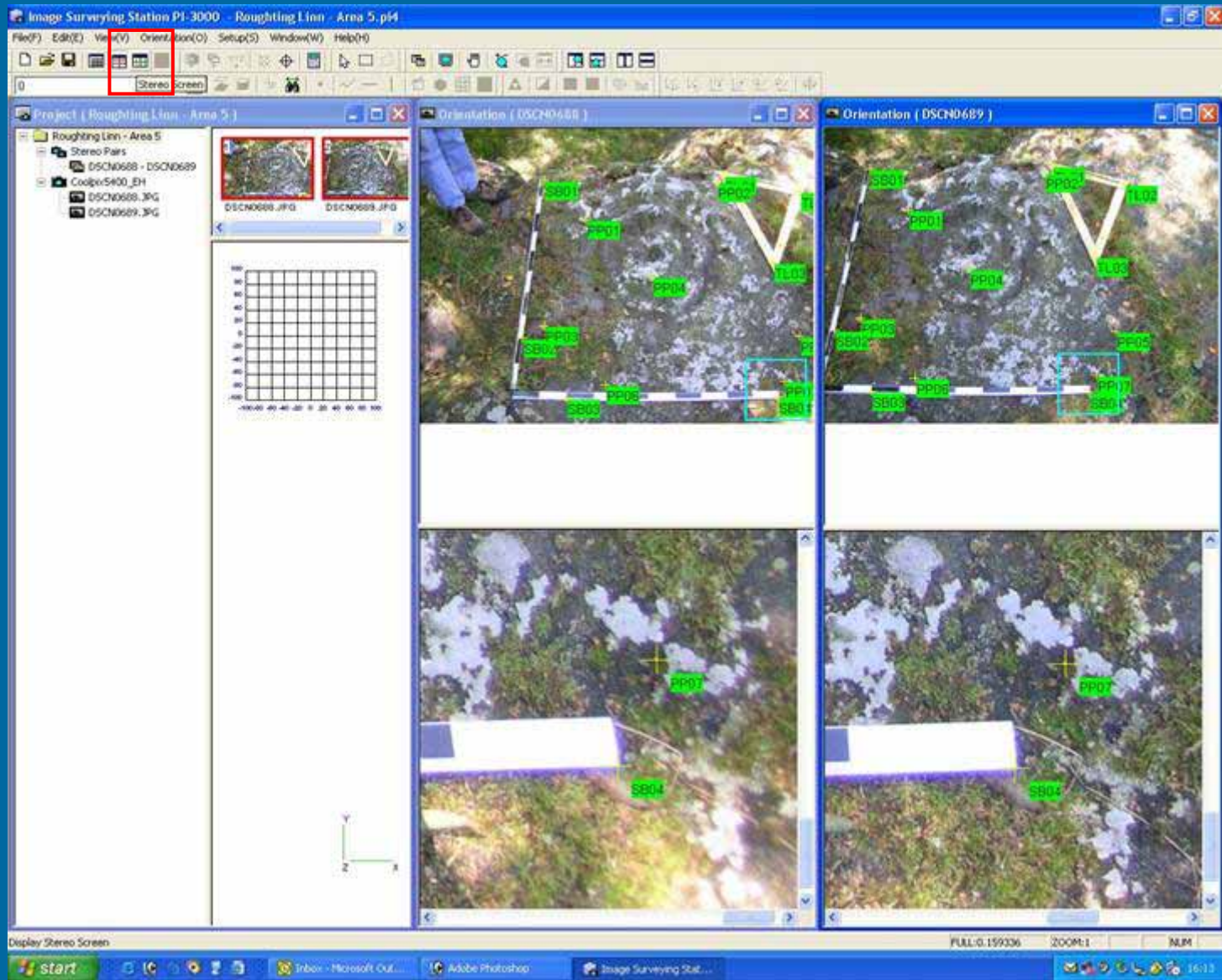
The screenshot displays a software interface for image orientation. It features several windows and panels:

- Orientation (DSCN0688)**: Shows a photograph of a stone wall with a white scale bar and several green control points labeled with names like S804, S801, S802, etc.
- Orientation (DSCN0689)**: Shows a similar photograph of a stone wall with a white scale bar and green control points.
- Orientation Results (Error)**: A dialog box with a yellow warning icon and the text: "Cannot execute orientation calculation. Please check positions of control points, pass points, or point names." with an "OK" button.
- Orientation Results (Error)**: Another dialog box with a yellow warning icon and the text: "Cannot execute orientation calculation. Please check positions of control points, pass points, or point names." with an "OK" button.
- Orientation Result List**: A table with columns for "Pair/Image Name", "Judge", "Y-Parallel", "Image Co.", and "Pass Points".
- Y-Parallel of Pass Point**: A table with columns for "Point Name", "Judge", and "y(parallel)".
- Results of Image Coordinates**: A table with columns for "Image Name", "Point Name", "ds(par)", and "sr".

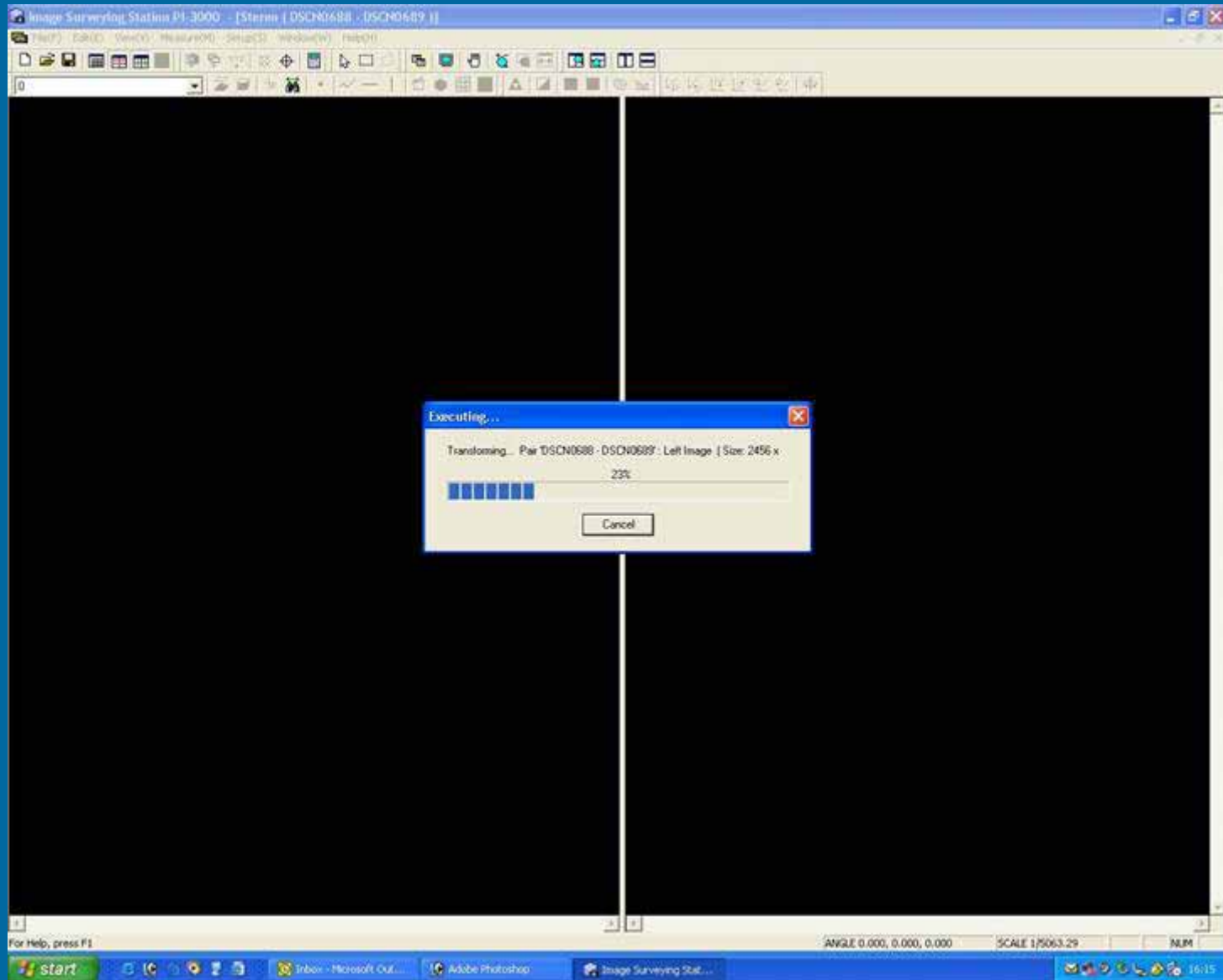
The interface also includes a "Remeasure(M)" button, a "Calculate(C)" button, and a "Close" button. The Windows taskbar at the bottom shows the "start" button, "Microsoft PowerPoint", and "Image Surveying Stat...".



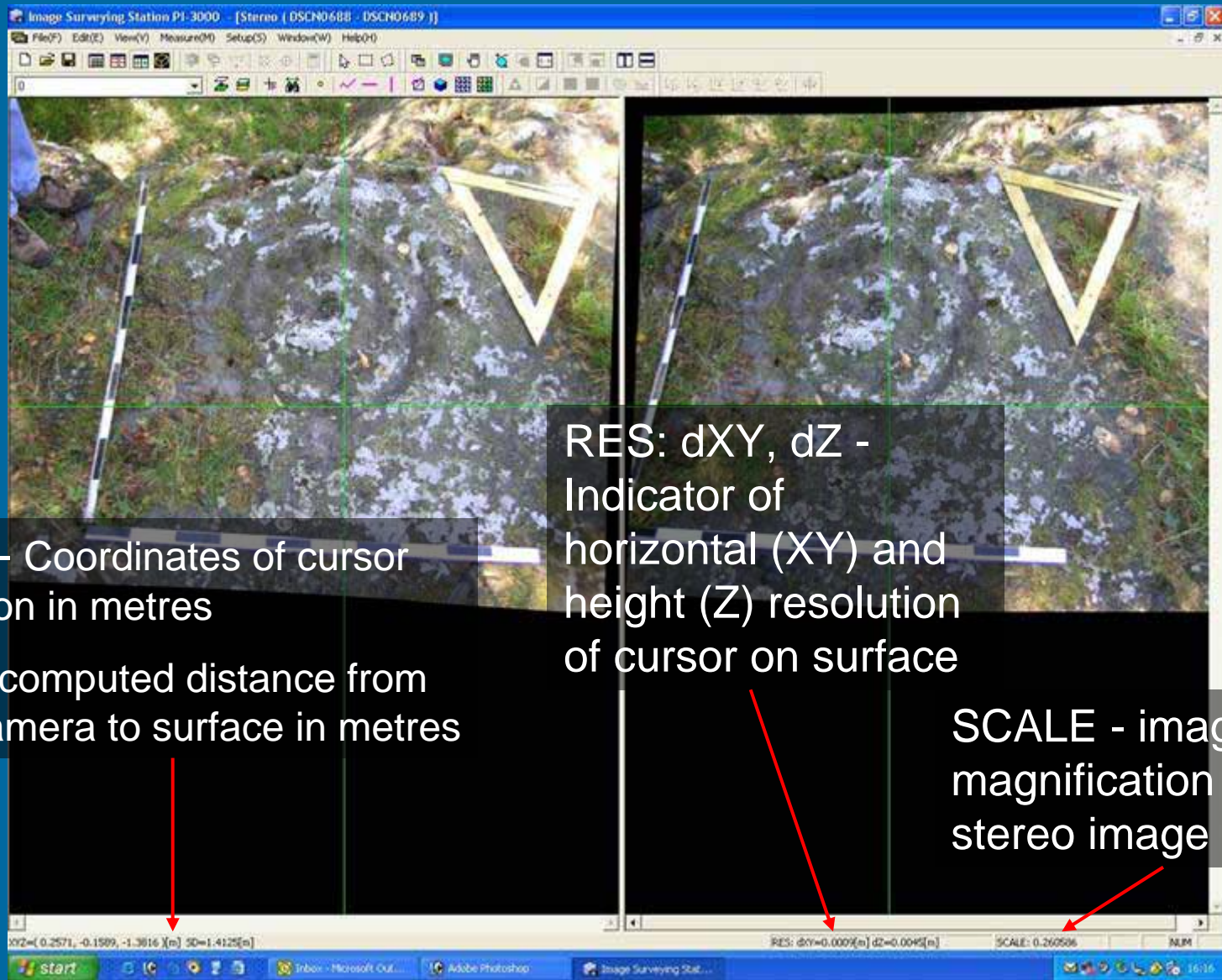
42. Stereo Screen



43. Stereo Screen, Transforming images



44. Stereo Screen



XYZ - Coordinates of cursor position in metres

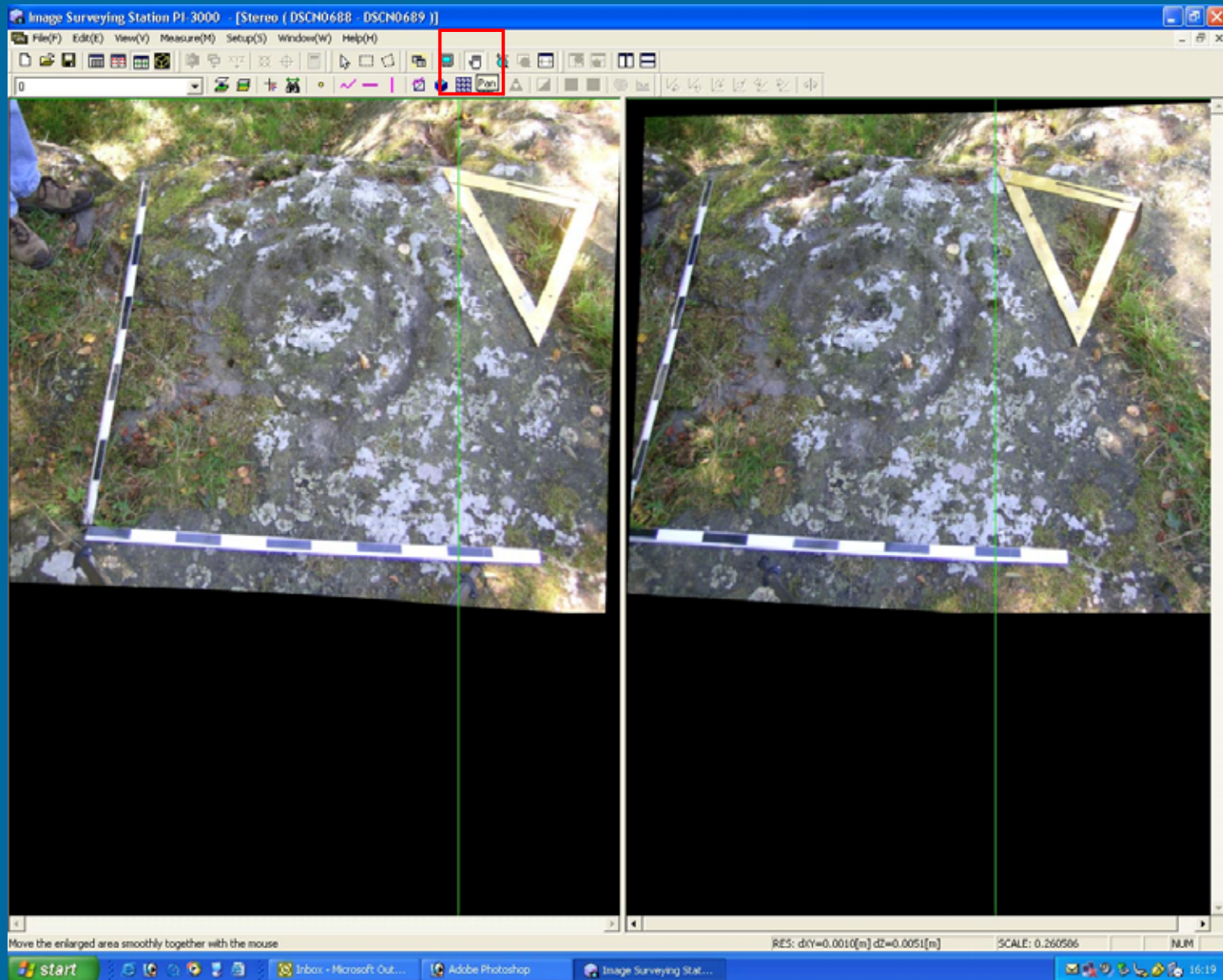
SD - computed distance from left camera to surface in metres

RES: dXY, dZ - Indicator of horizontal (XY) and height (Z) resolution of cursor on surface

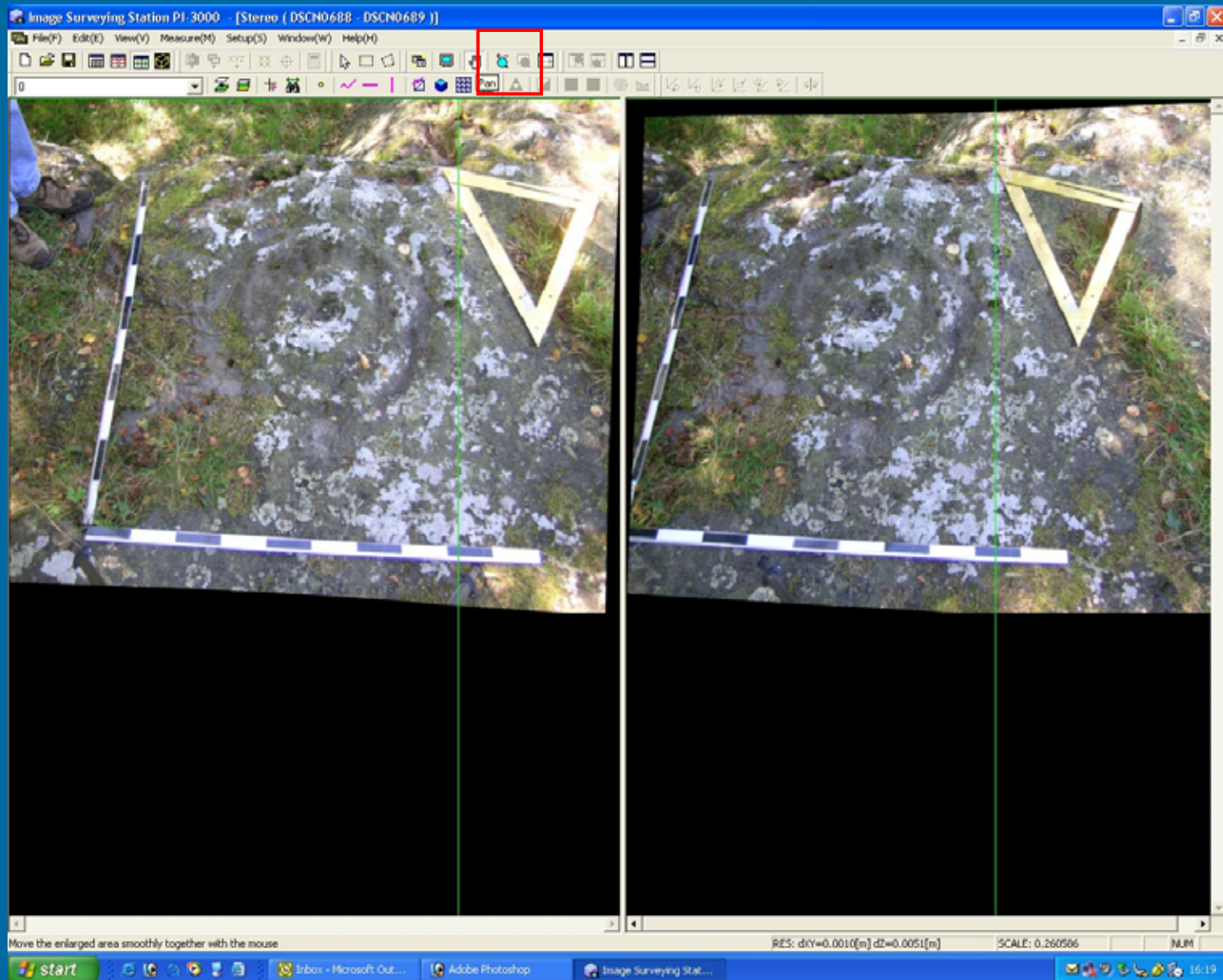
SCALE - image magnification of stereo image



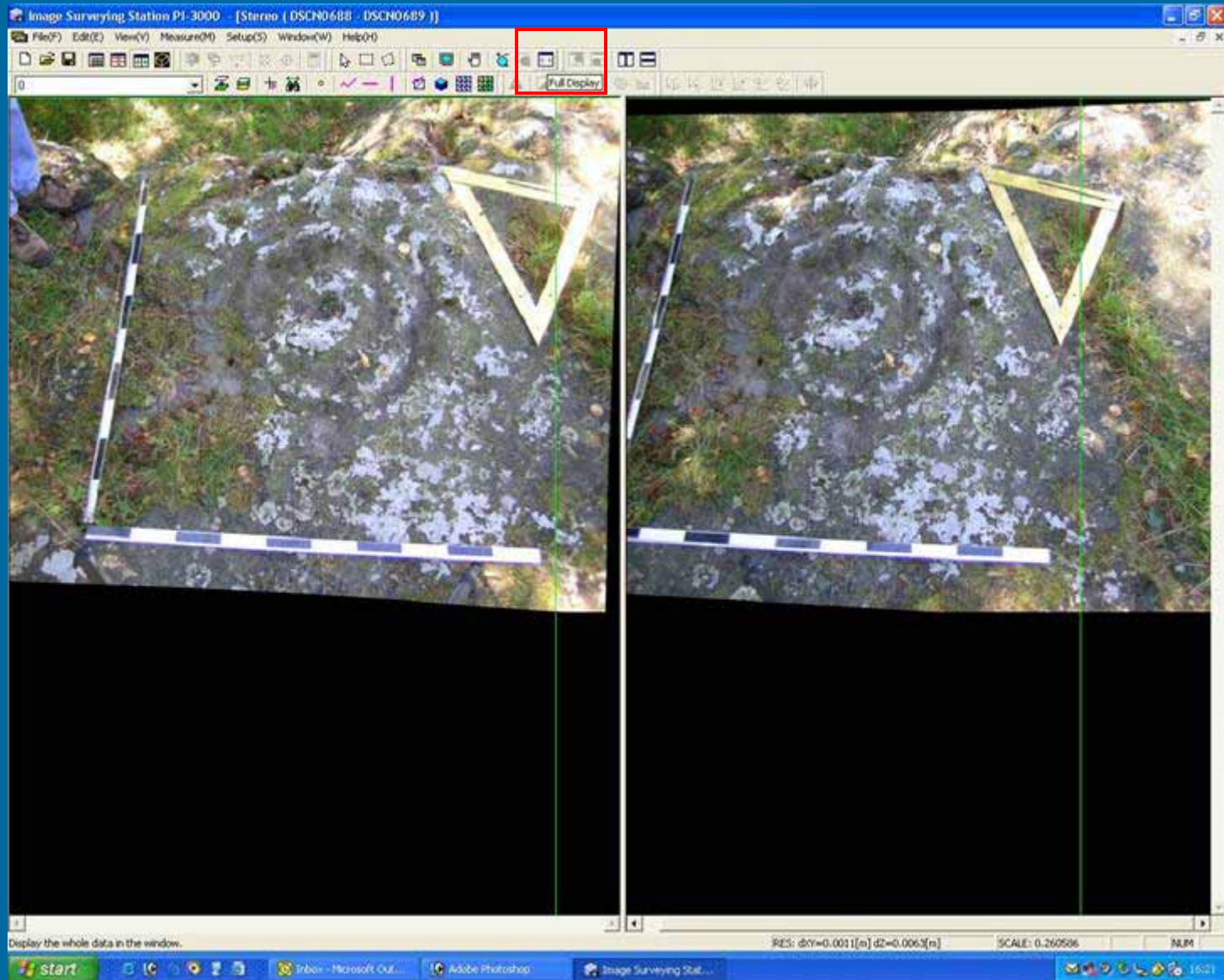
45. Pan , Shortcut M



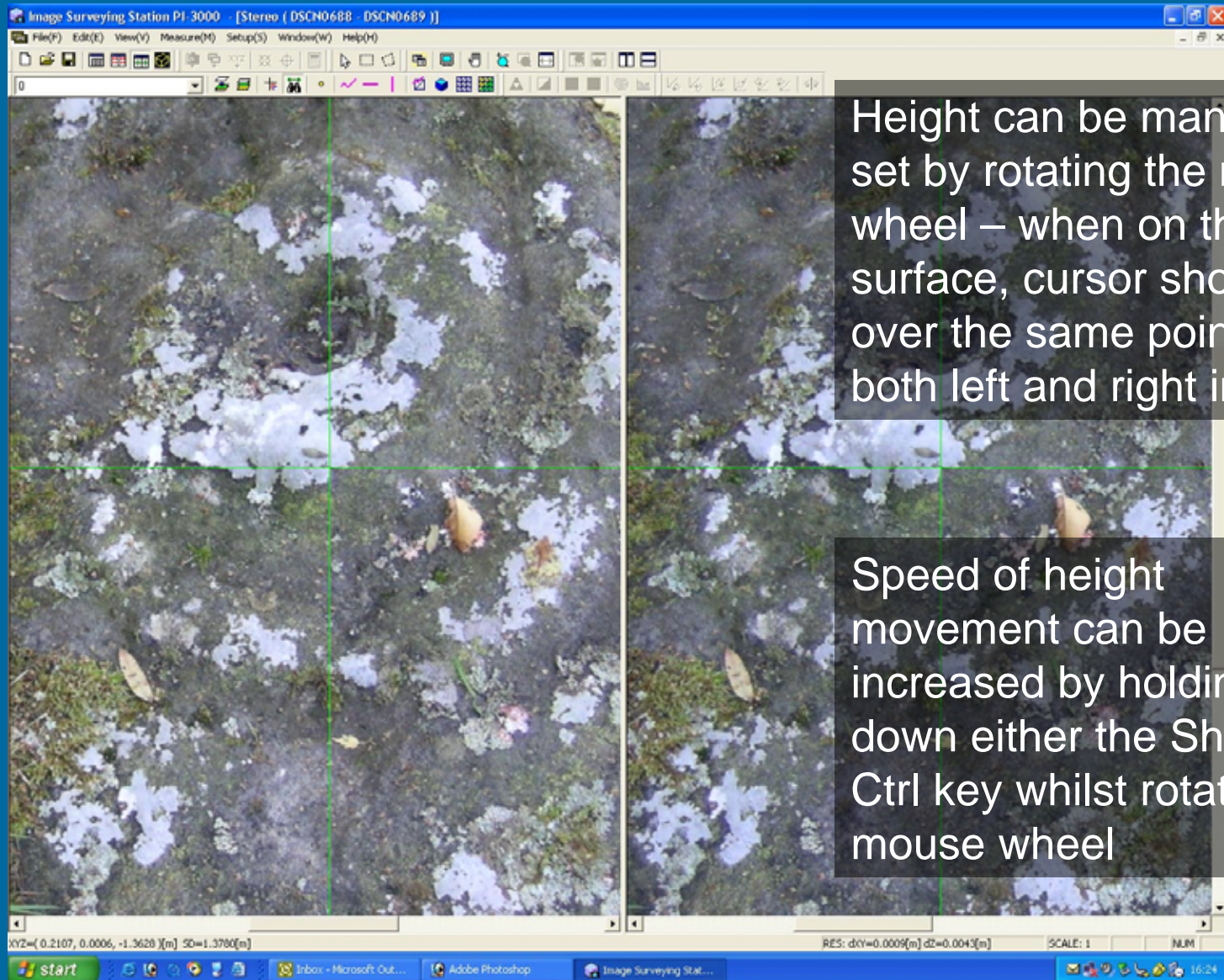
46. Zoom , Shortcut Z



47. Full Display , Shortcut W



48. Setting height with cursor

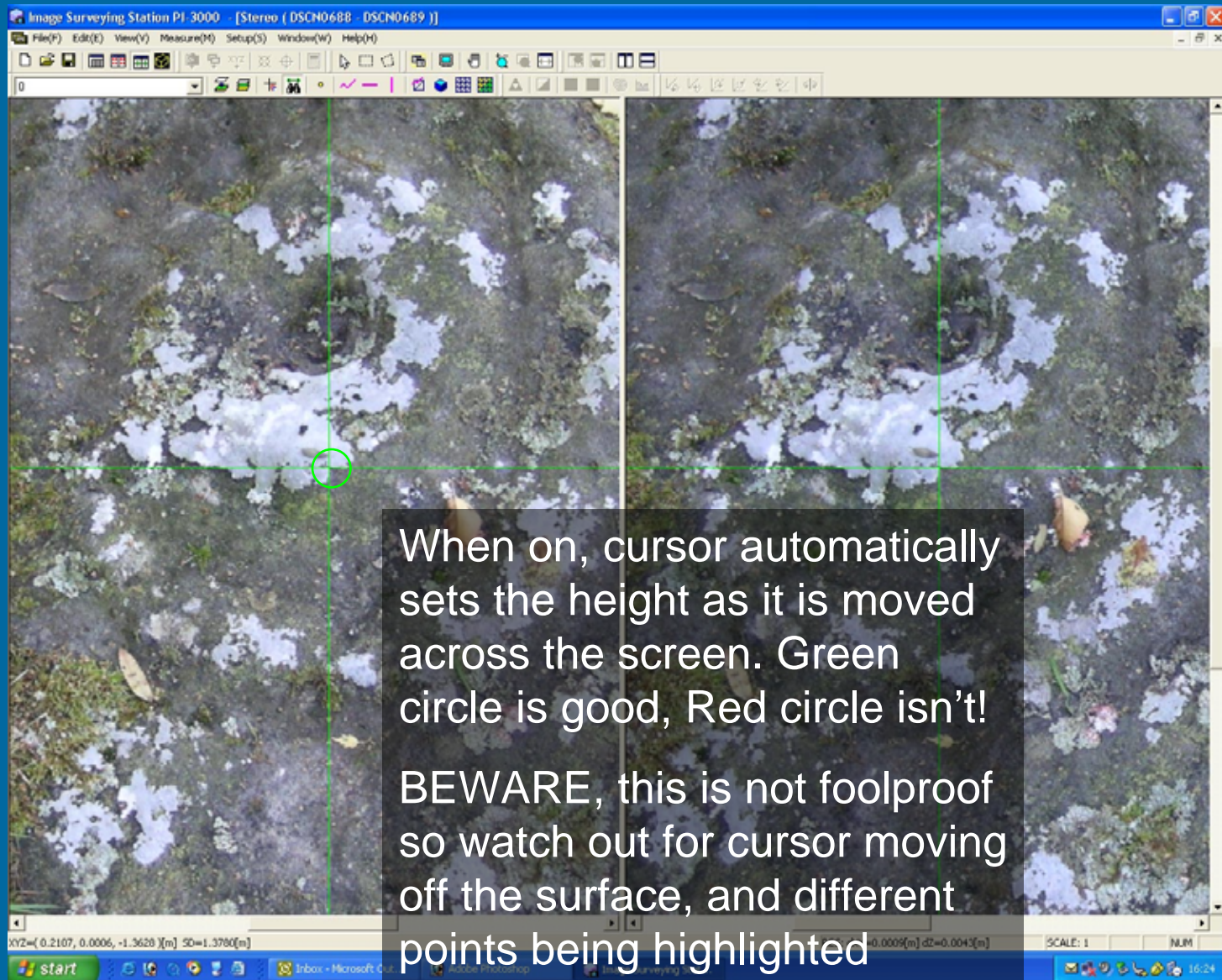


Height can be manually set by rotating the mouse wheel – when on the surface, cursor should be over the same point in both left and right image

Speed of height movement can be increased by holding down either the Shift or Ctrl key whilst rotating the mouse wheel



49. Auto correlate On/Off, A+spacebar or middle mouse button

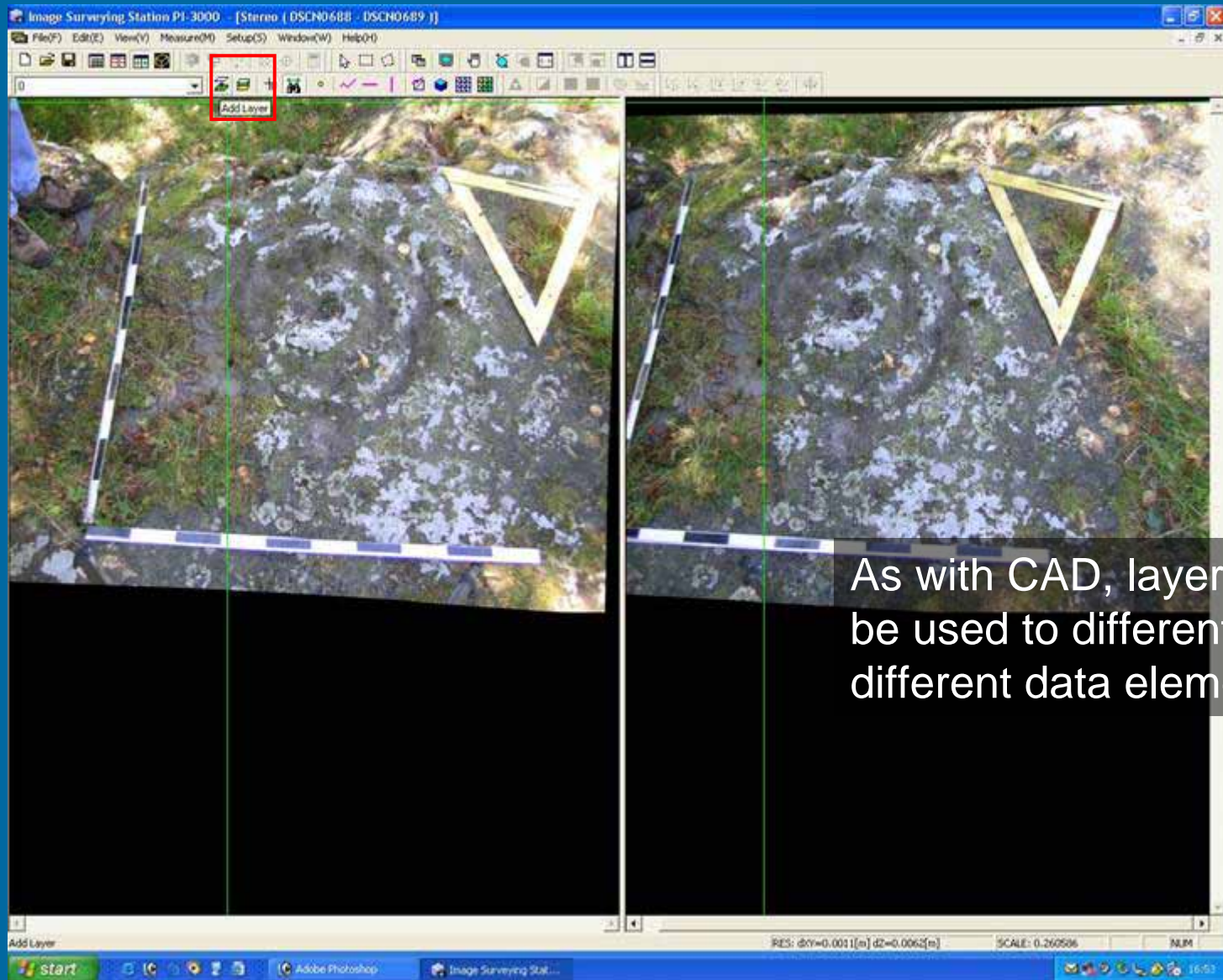


When on, cursor automatically sets the height as it is moved across the screen. Green circle is good, Red circle isn't!

BEWARE, this is not foolproof so watch out for cursor moving off the surface, and different points being highlighted



50. Add Layer



As with CAD, layers can be used to differentiate different data elements



51. Layer Information, Outline, OK

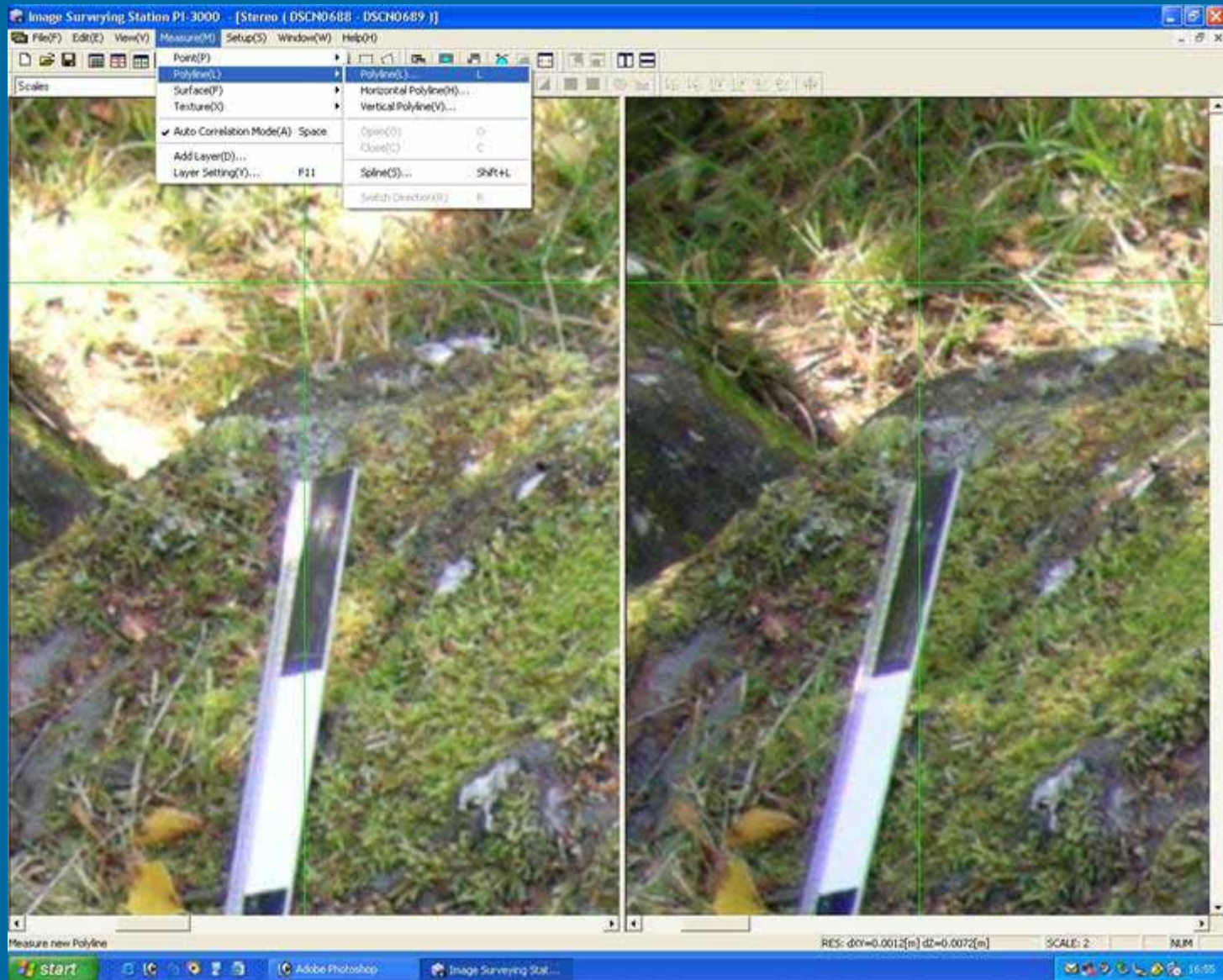
The image shows a screenshot of a software application window titled "Image Surveying Station P1-3000". The main window displays a photograph of a rocky terrain with a red and white striped pole. A "Layer Information" dialog box is open in the center, with several annotations pointing to its fields:

- Add Layer Name Outline**: Points to the "Layer Name" field, which contains the text "Outline".
- Select Colour for layer Yellow**: Points to the "Color" field, which shows a yellow color swatch.
- Select Line Style Continuous**: Points to the "Line Style" field, which is set to "CONTINUOUS".
- Select Line Width 1**: Points to the "Line Width[pt]" field, which is set to "1".
- Display layer, ON/OFF ON**: Points to the "Display" field, which has the "ON" radio button selected.

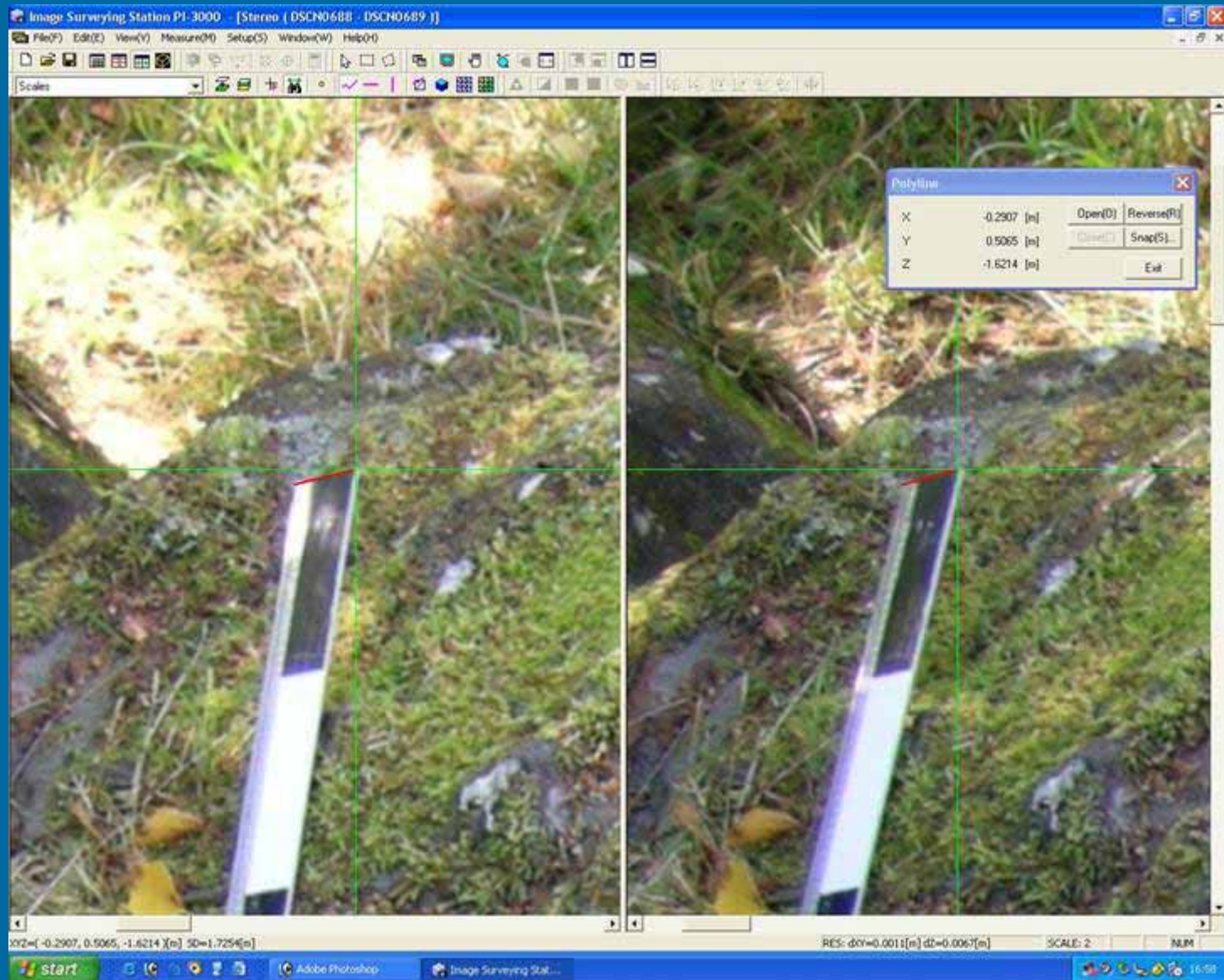
The dialog box also includes "OK" and "Cancel" buttons at the bottom. The background image shows the same terrain with a yellow outline drawn around a triangular shape.



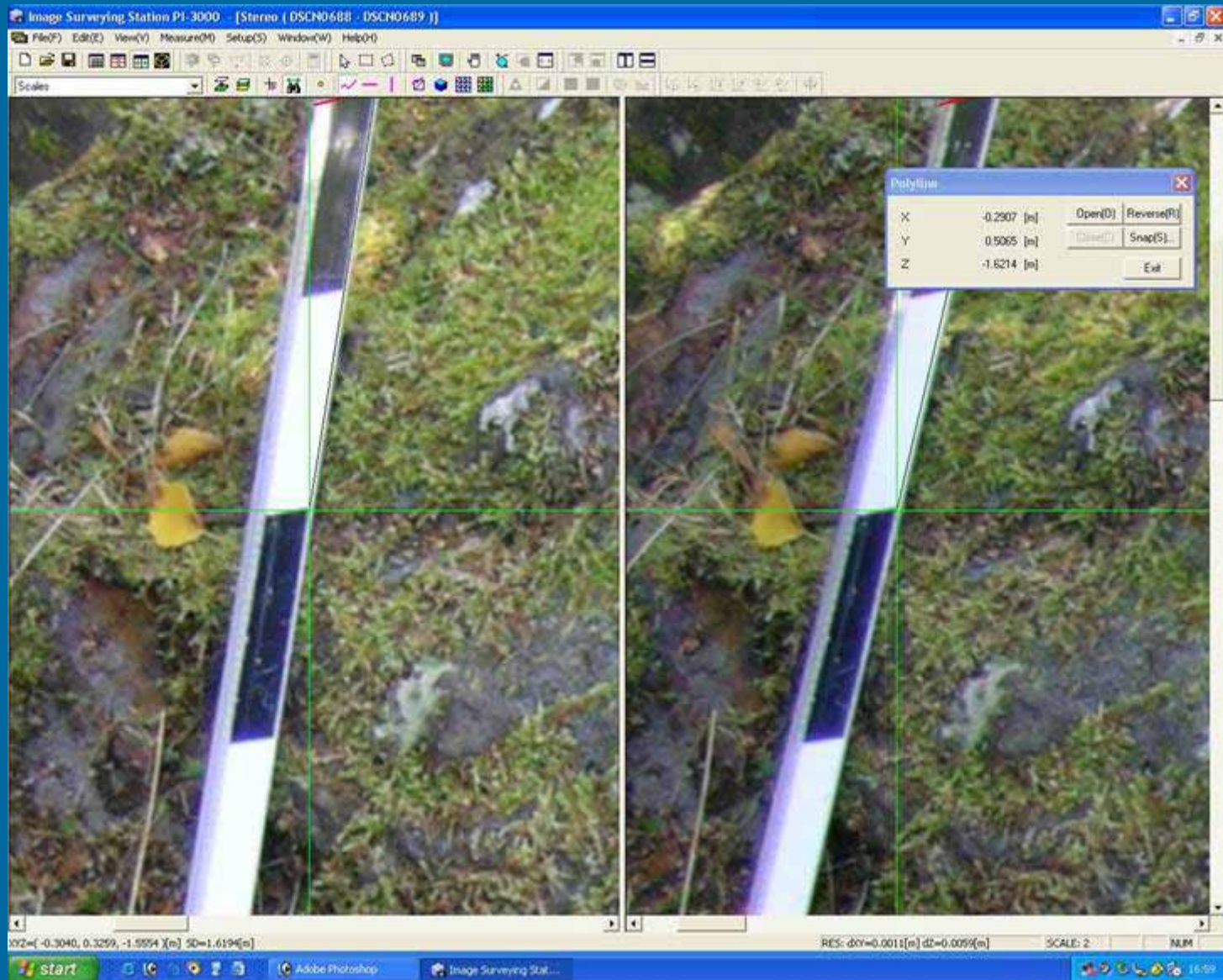
52. Measure, Polyline, Polyline



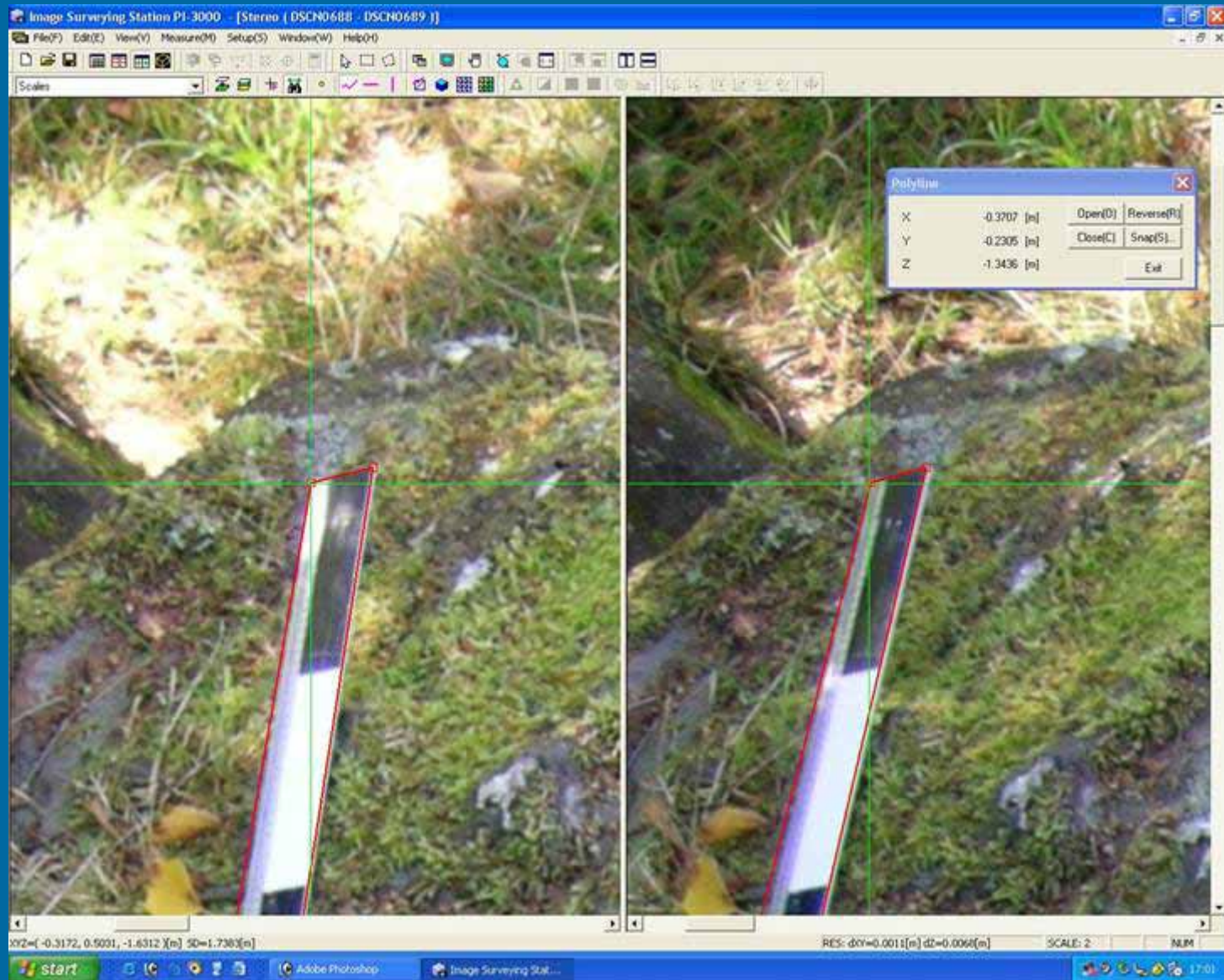
53. Digitising Polyline



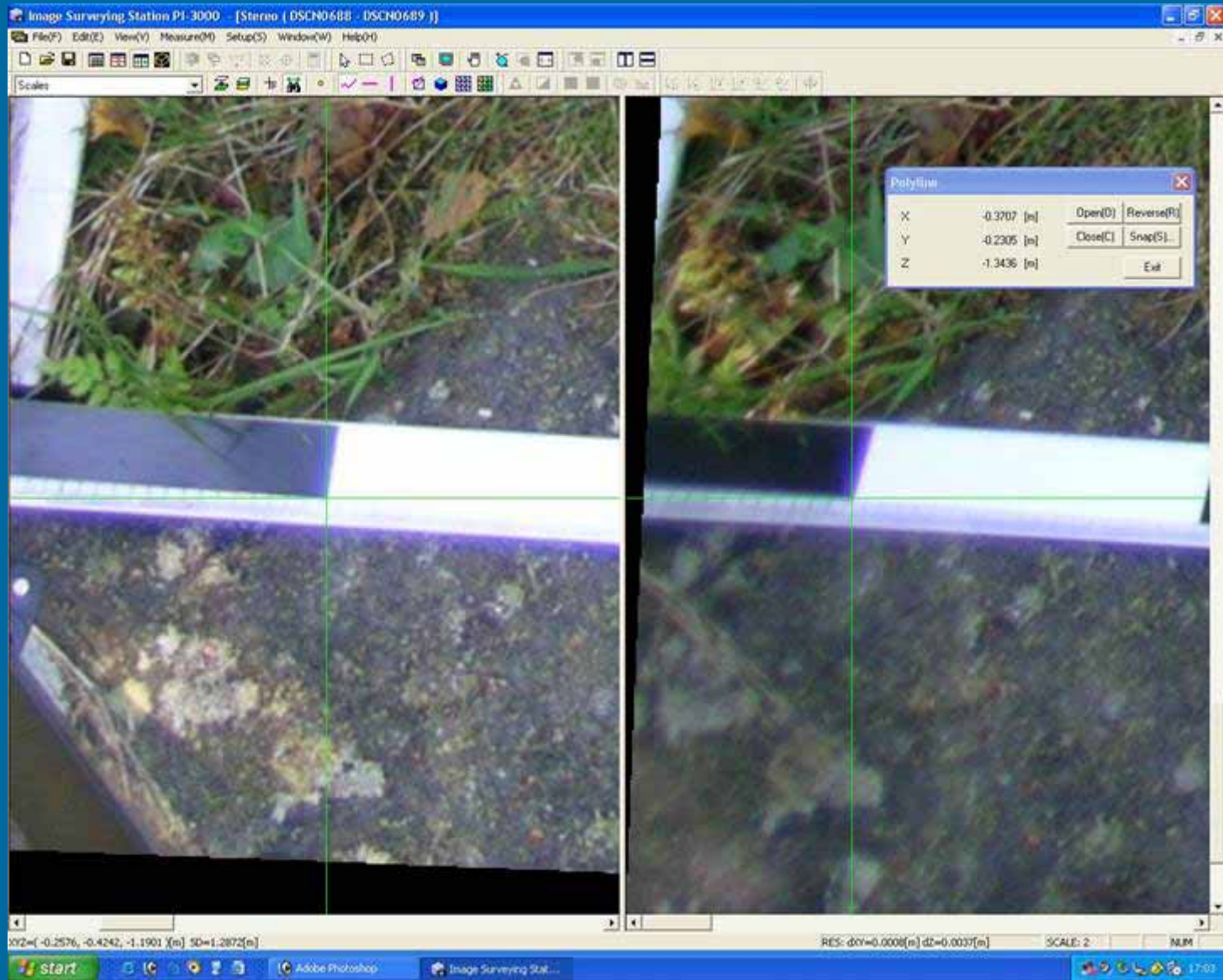
54. Use S to centre each image when Digitising



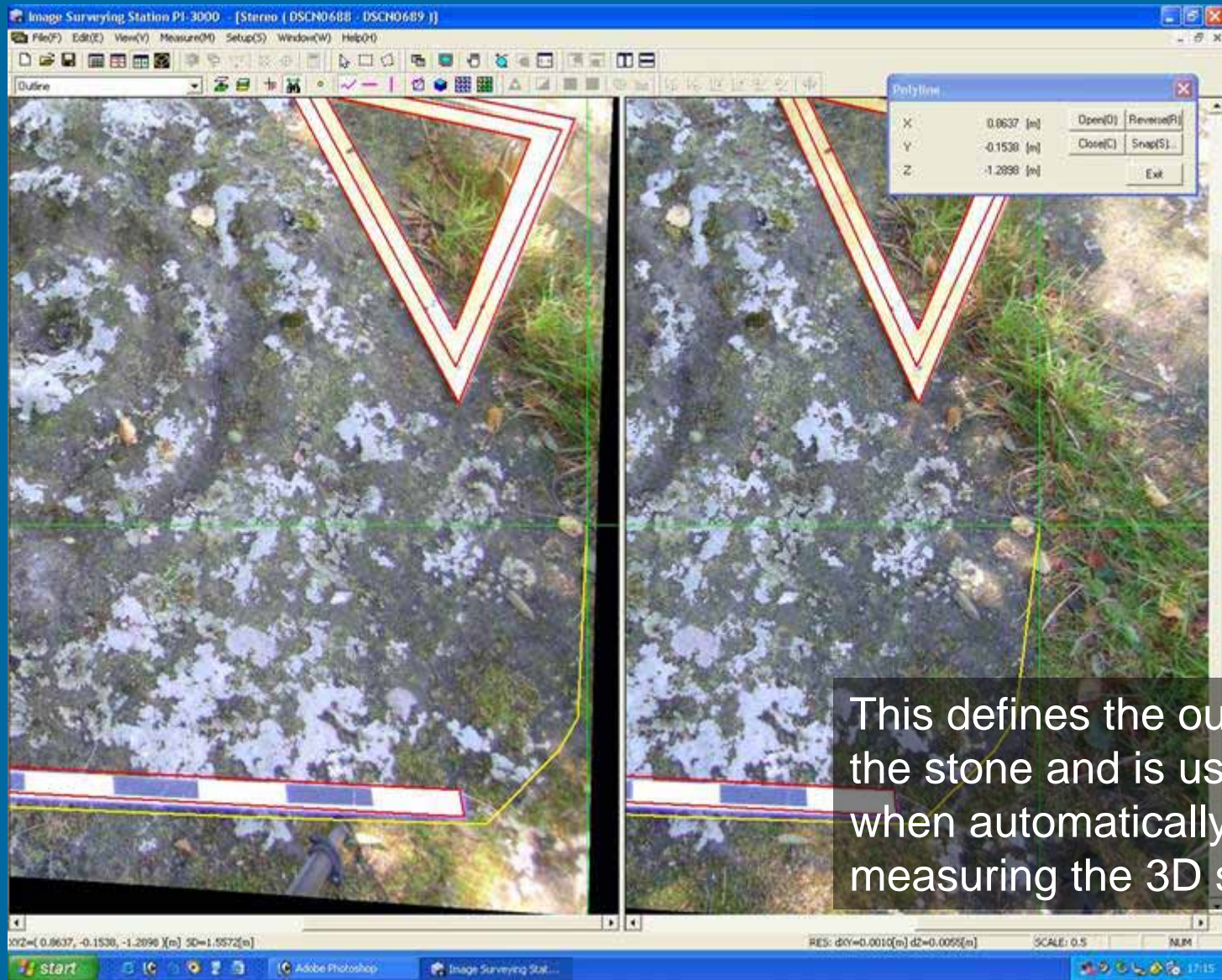
55. Use C to Close each polyline when Digitising



56. Use O to Open a new polyline when Digitising



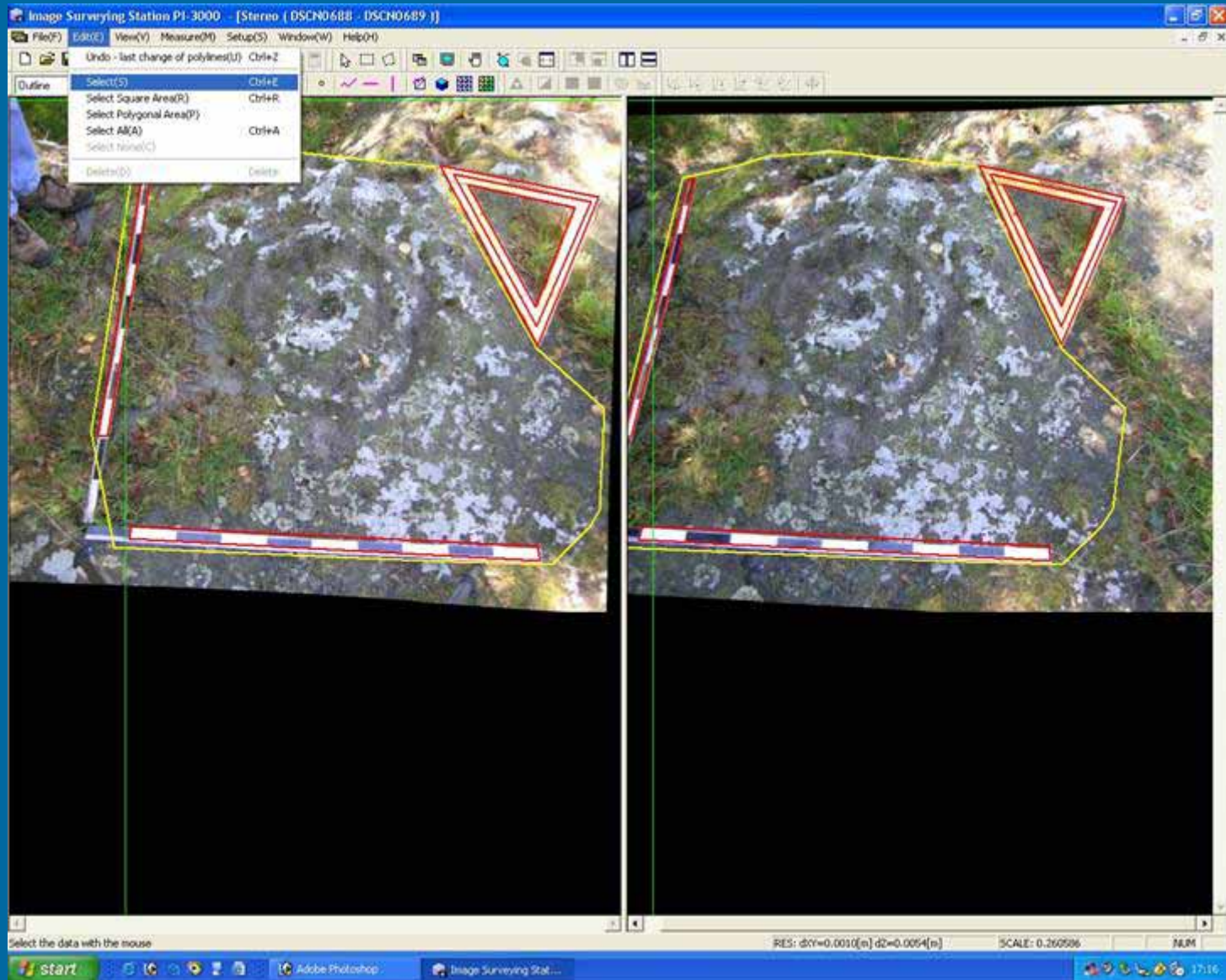
57. Digitising Polyline, outline



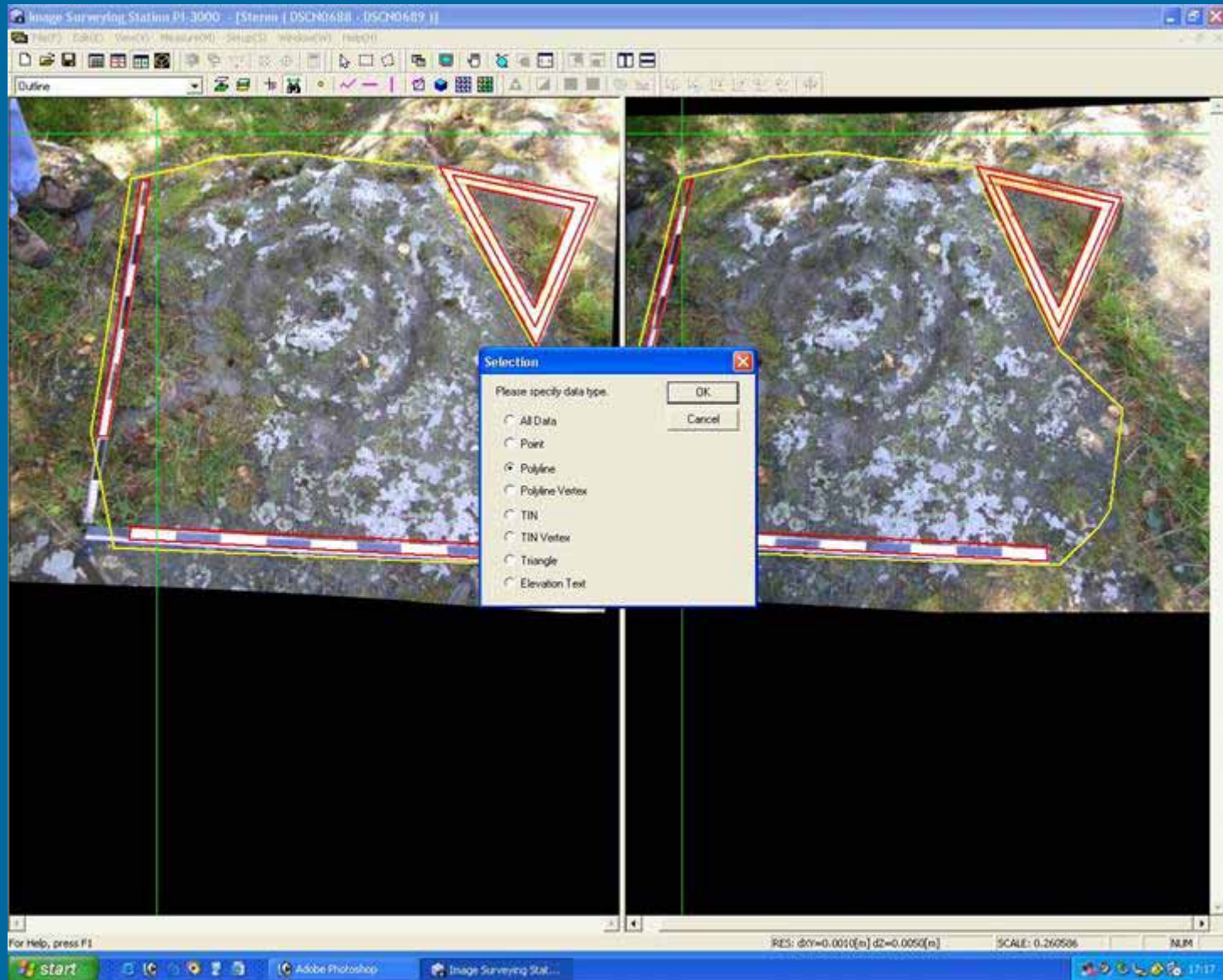
This defines the outline of the stone and is used when automatically measuring the 3D surface



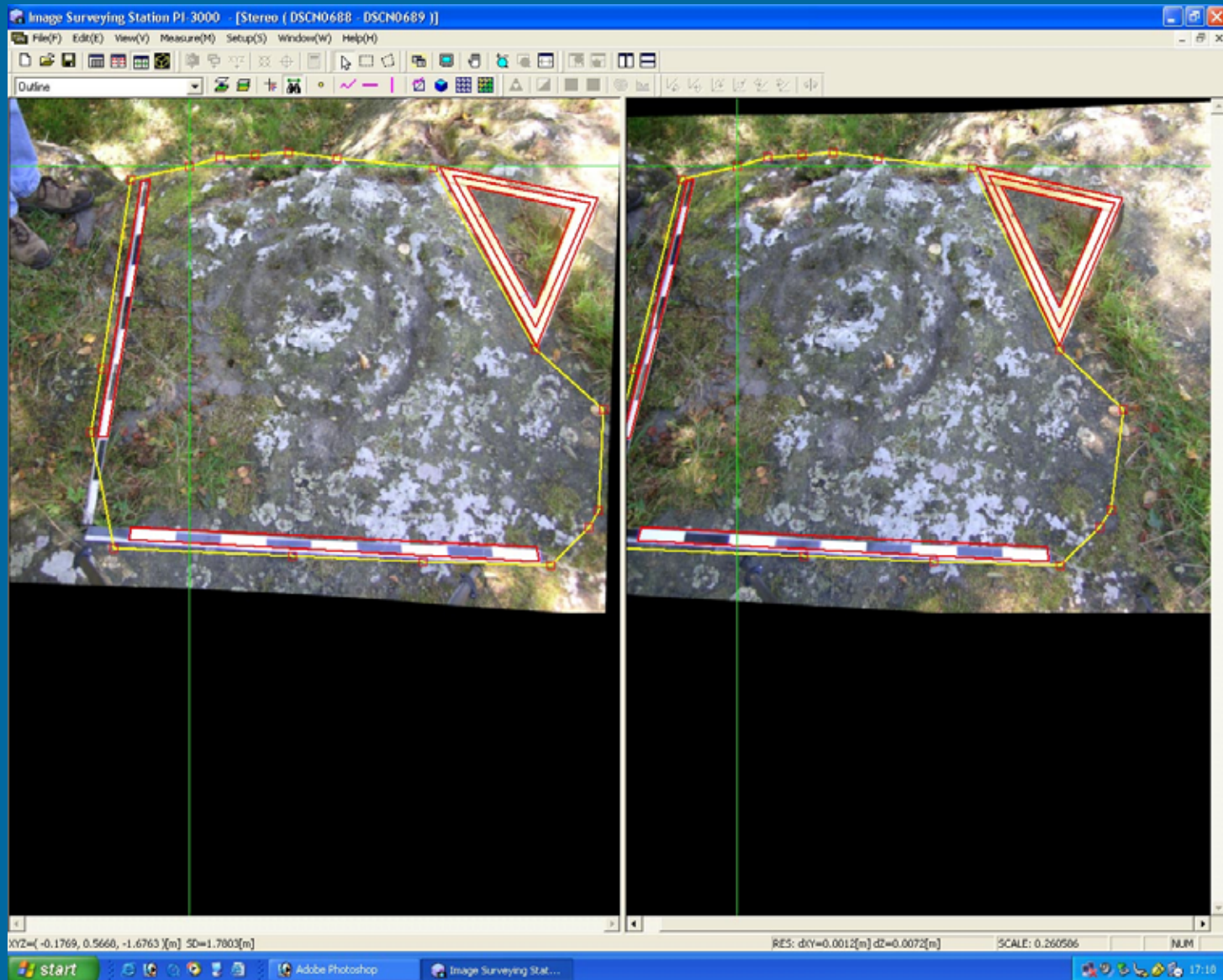
58. Selecting Outline polyline - Edit, Select



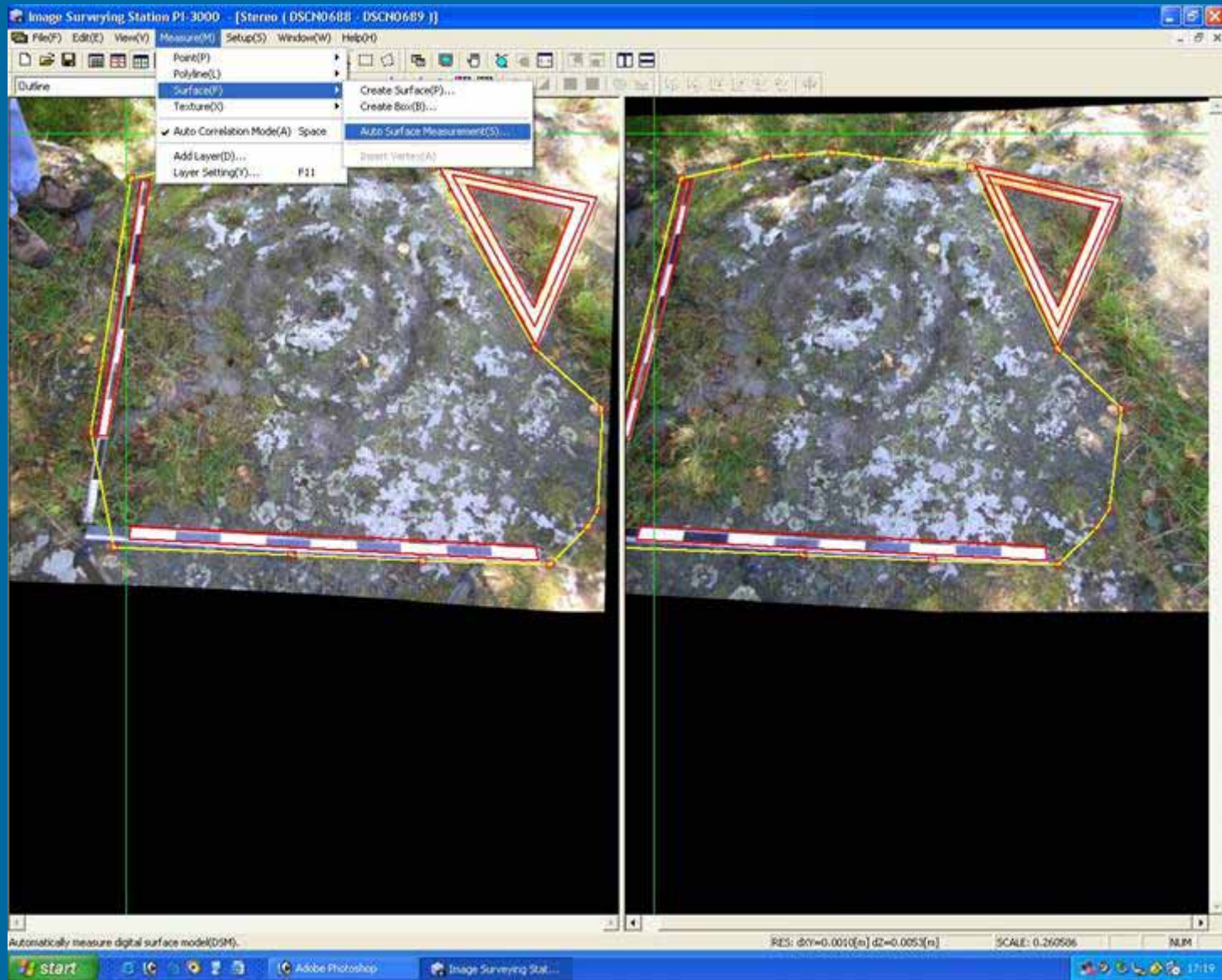
59. Polyline, OK



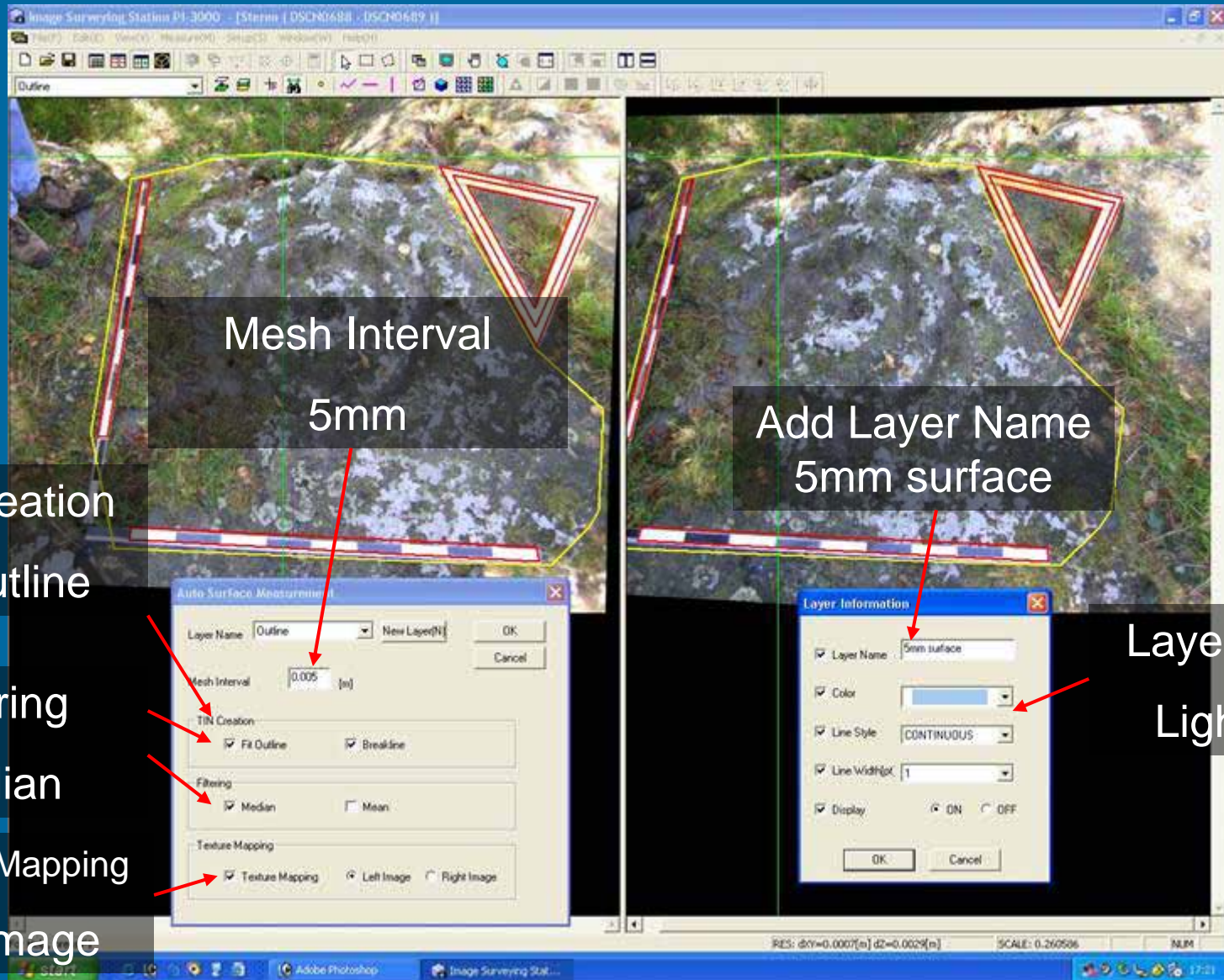
60. Hold cursor over outline, press left mouse button to select polyline



61. Measure, Surface, Auto Surface Measurements



62. Auto Surface Measurement, New Layer, Layer Information



Mesh Interval
5mm

Add Layer Name
5mm surface

TIN Creation
Fit Outline

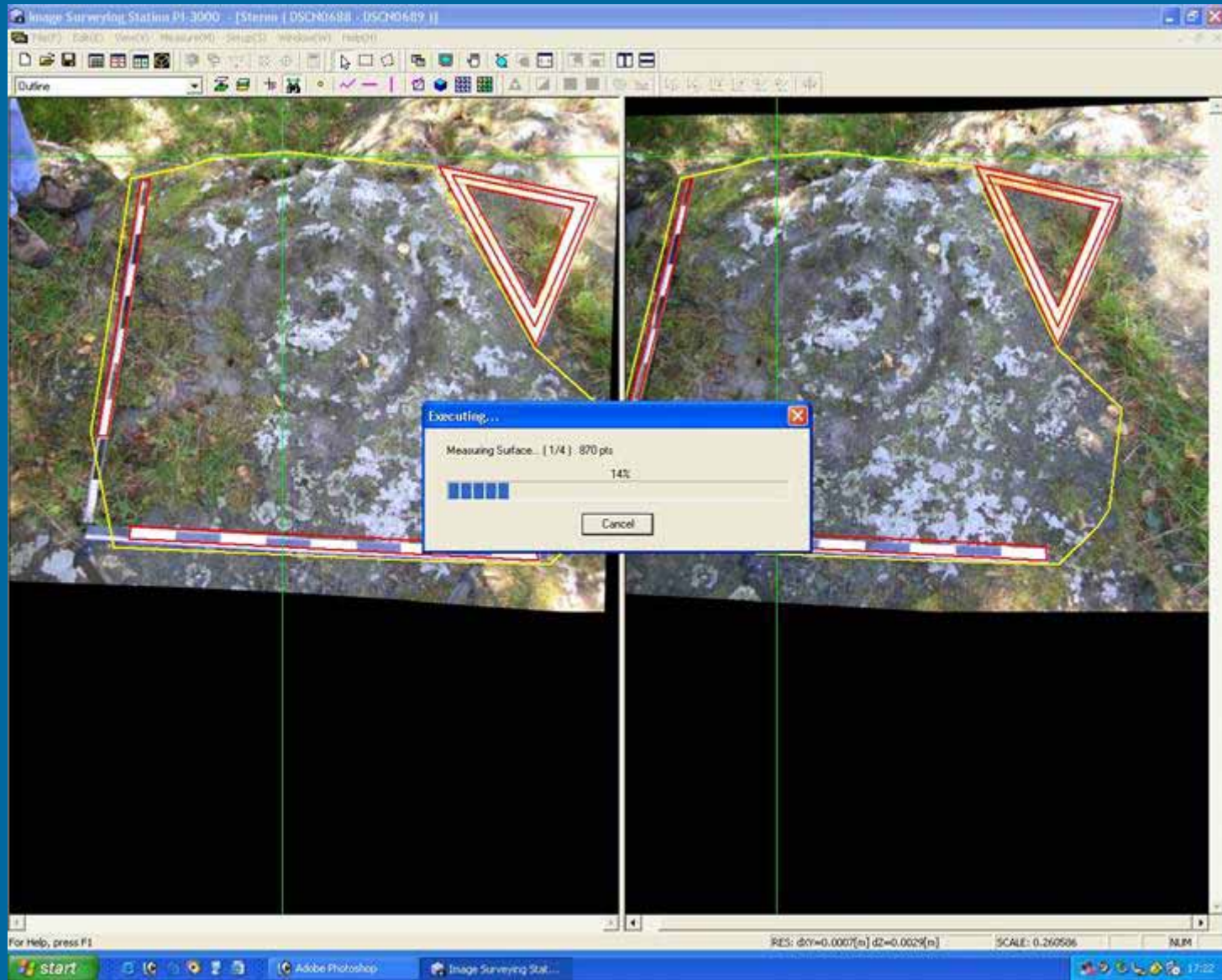
Filtering
Median

Texture Mapping
Left Image

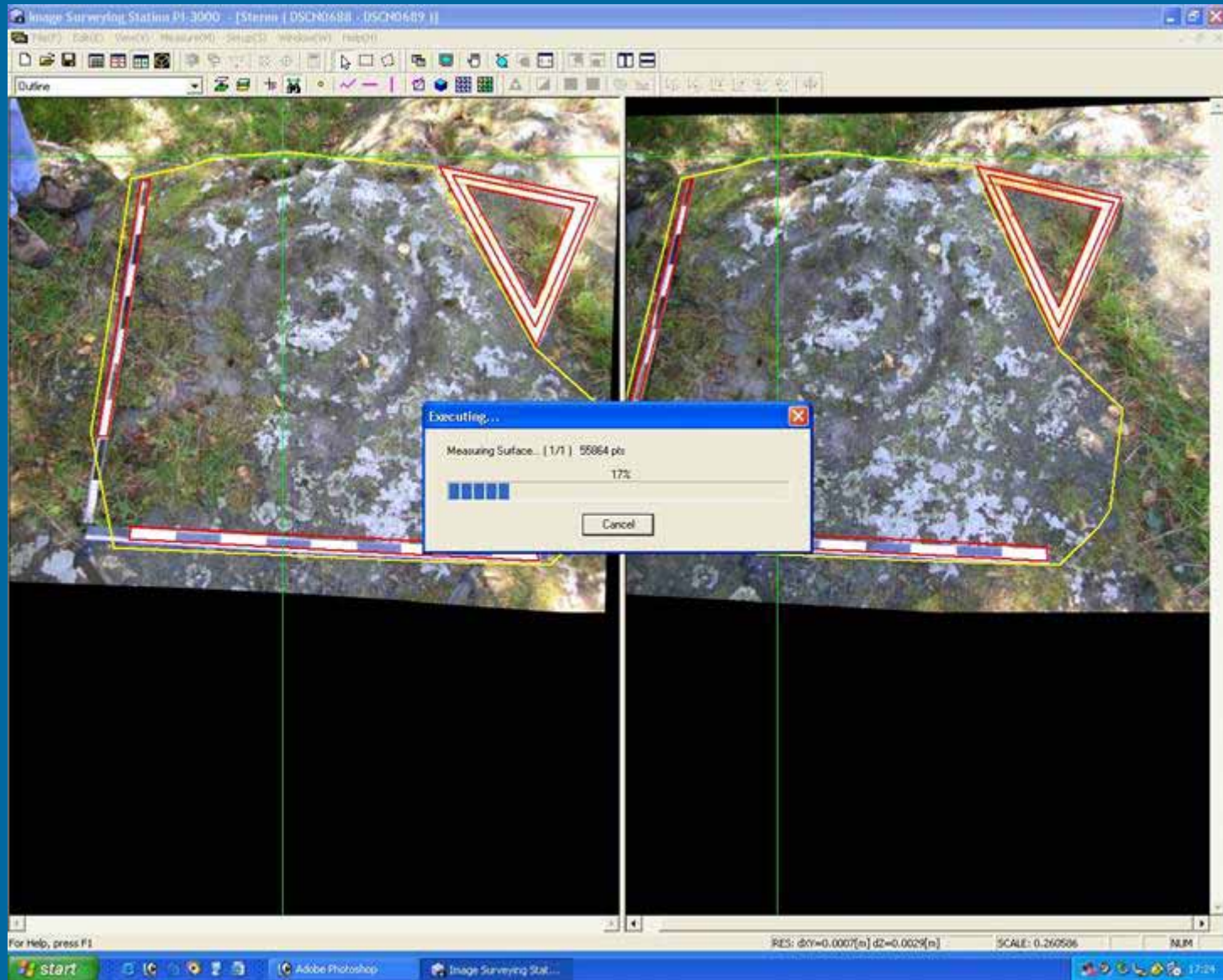
Layer Colour
Light Blue



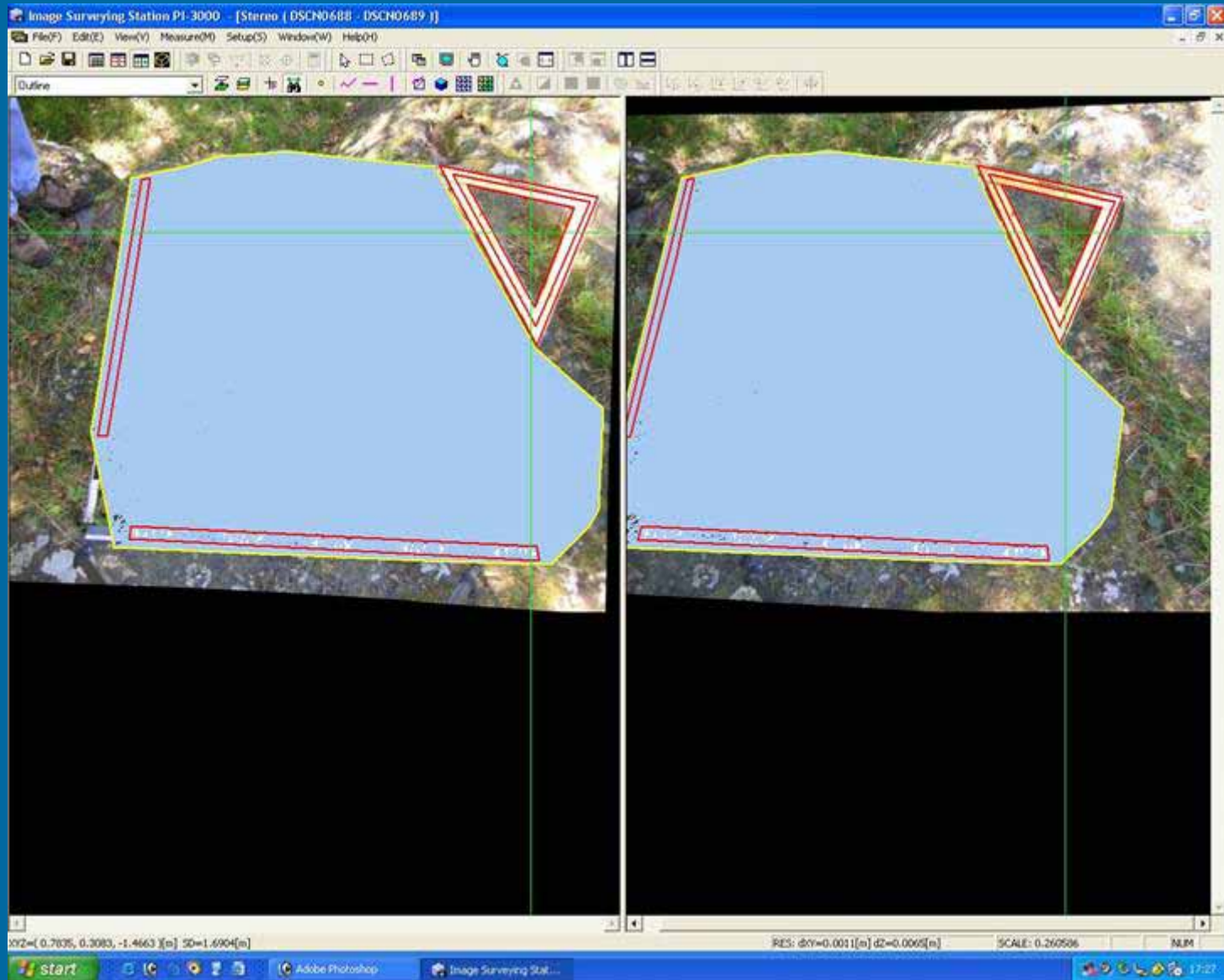
63. Measuring Surface



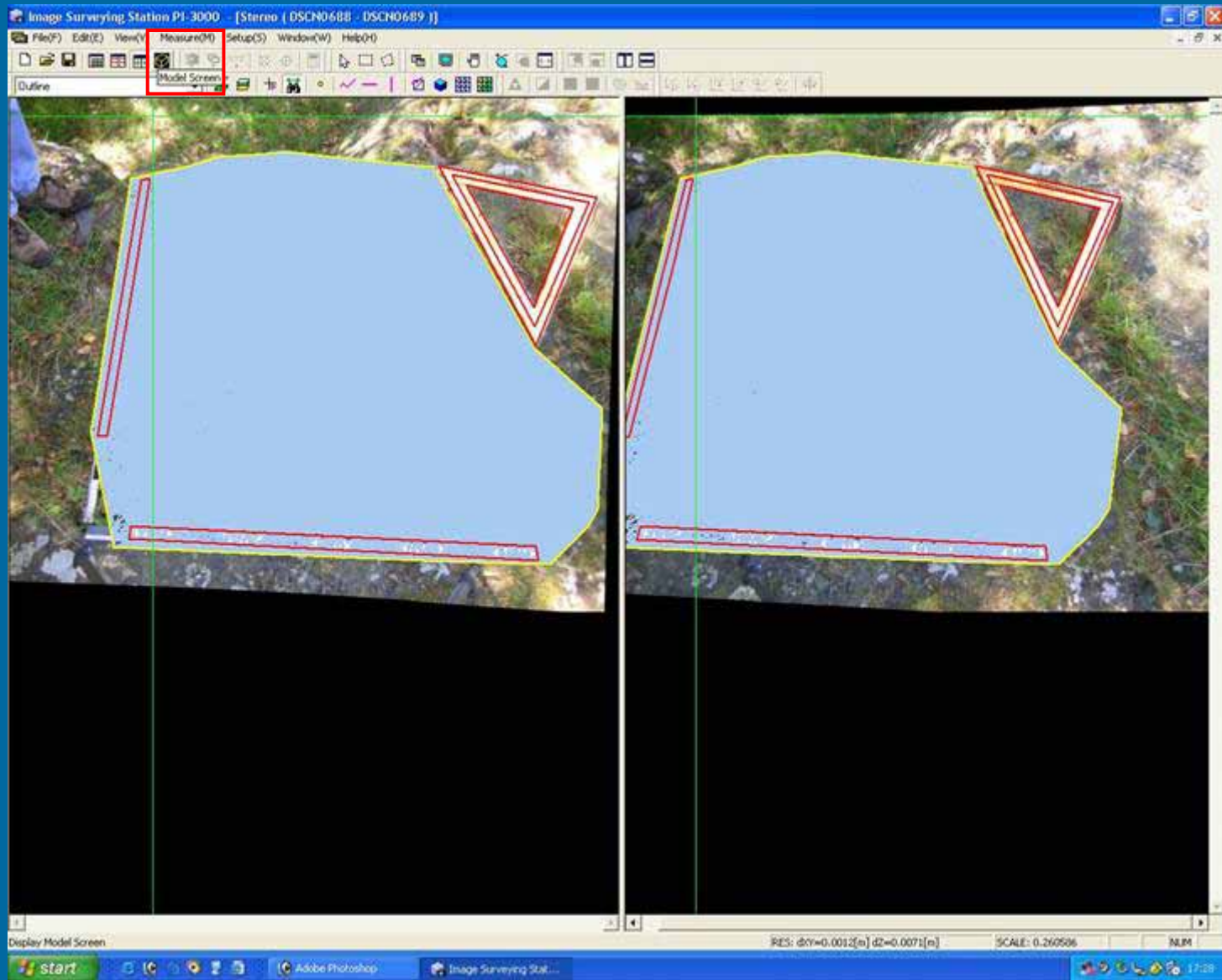
64. Measuring Surface – several passes to achieve result



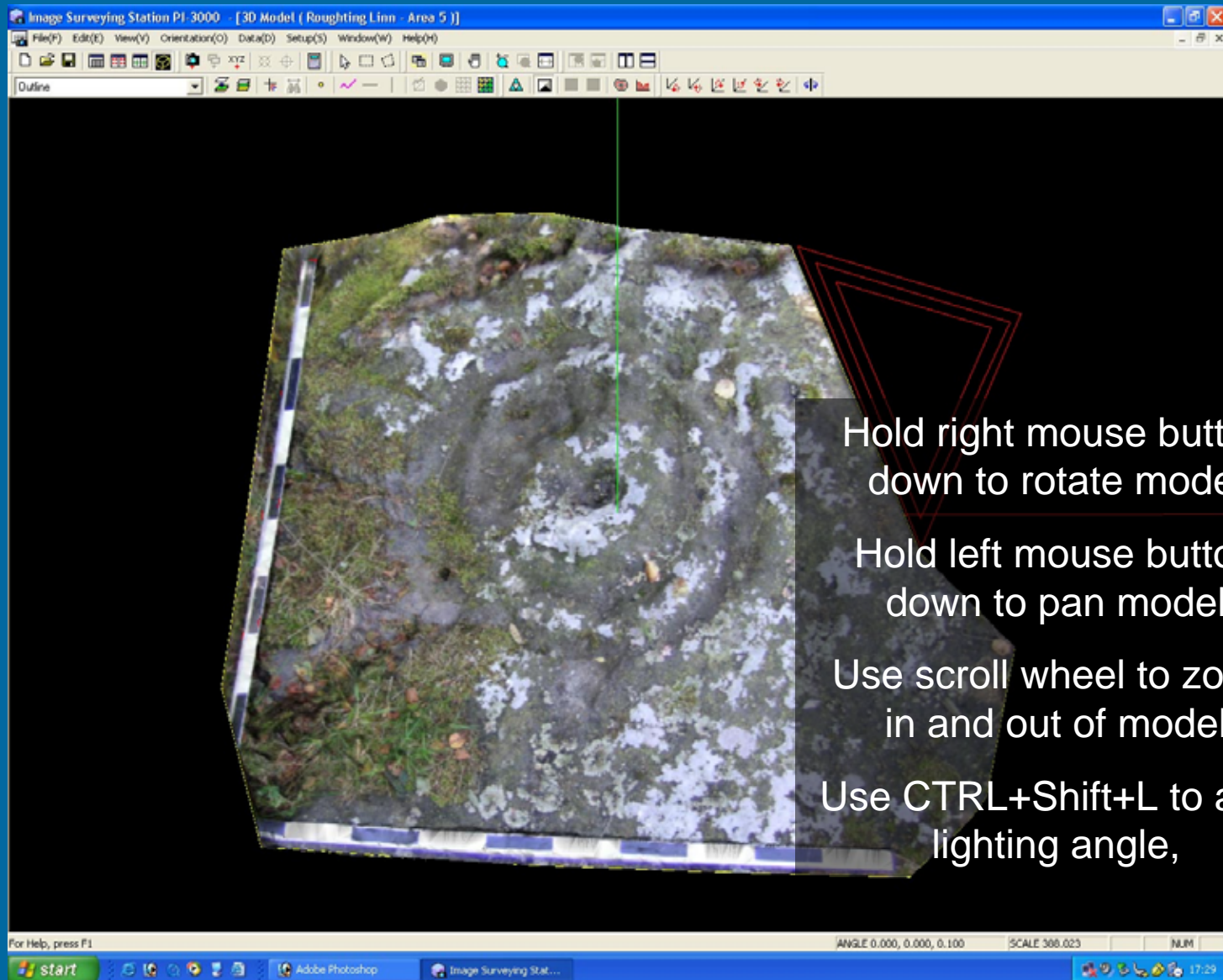
65. Measured Surface



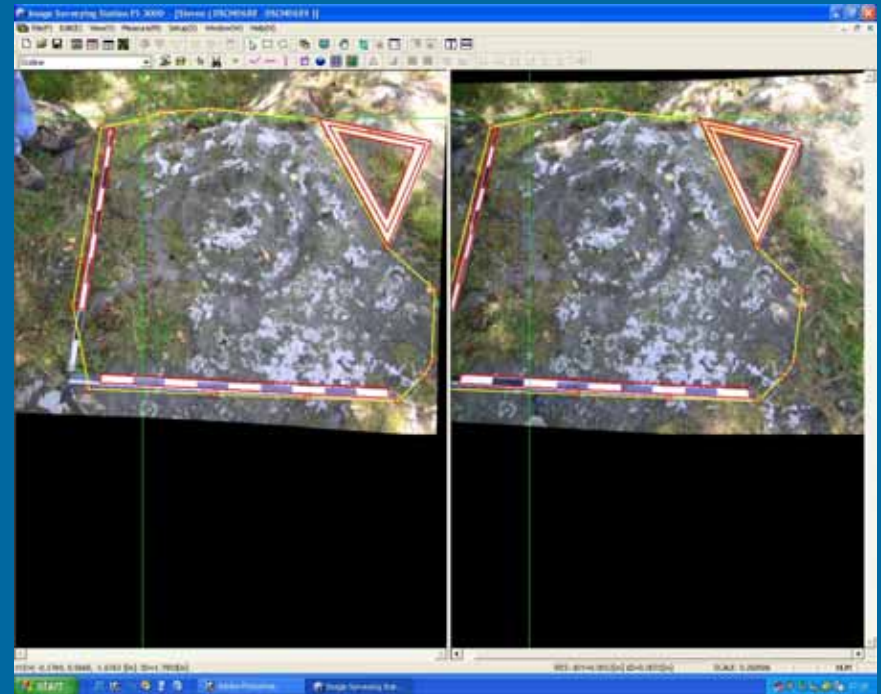
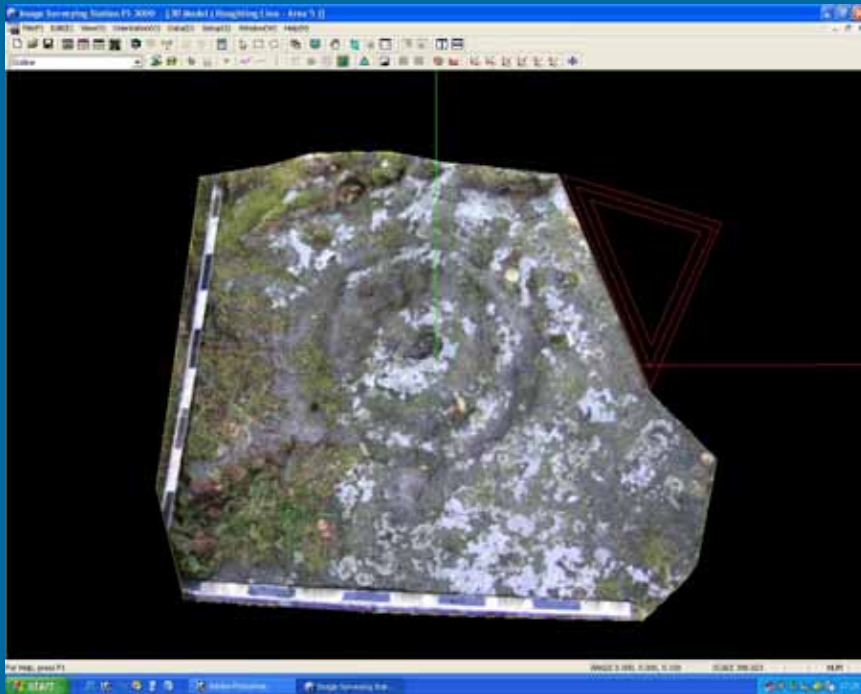
66. Model Screen



67. Model Screen , 3D model displayed



68. Digitising carved detail



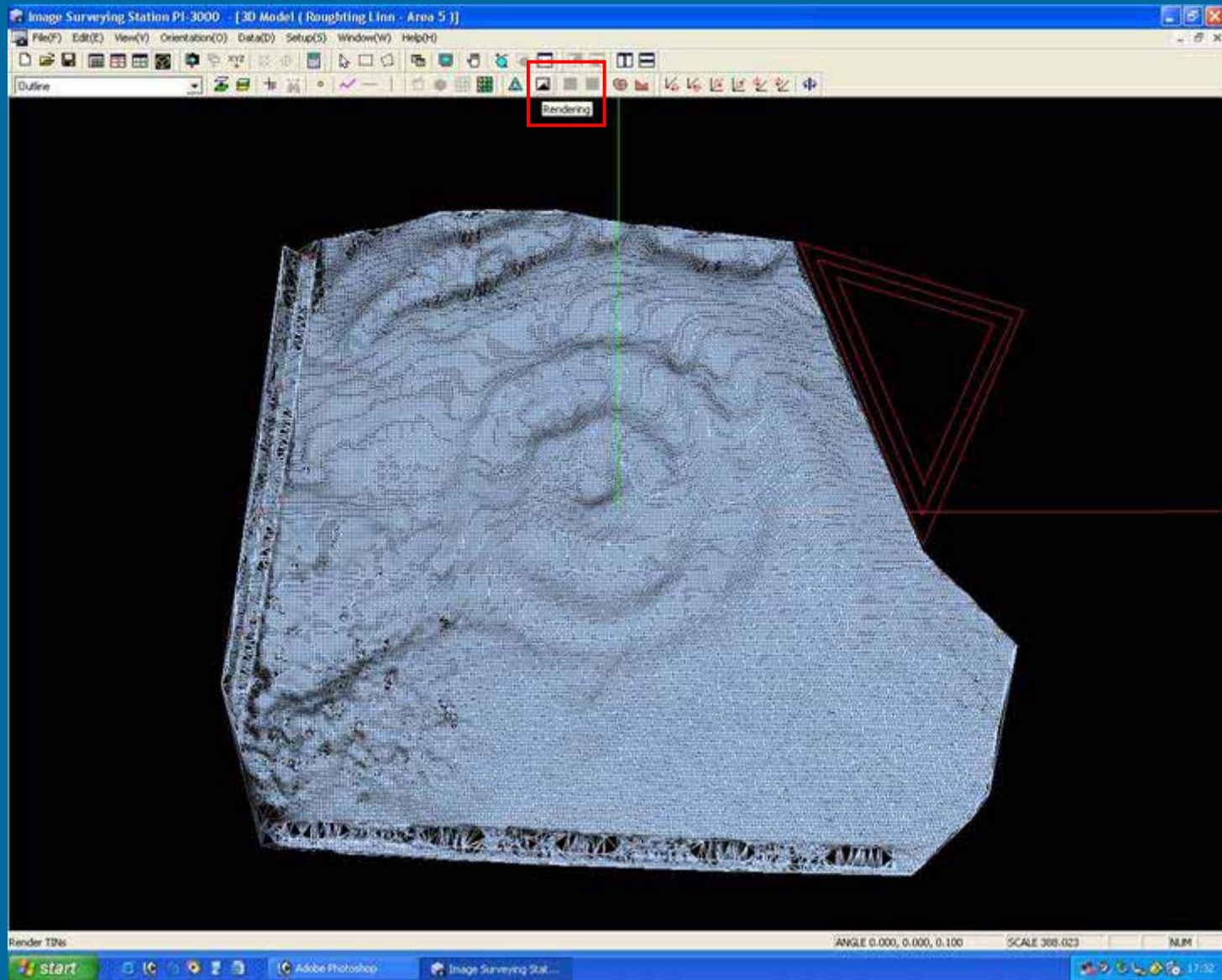
Drawings of the carved detail can be digitised in two ways:

- Directly on top of the 3D model
- Off the stereo-pair using the Stereo Screen

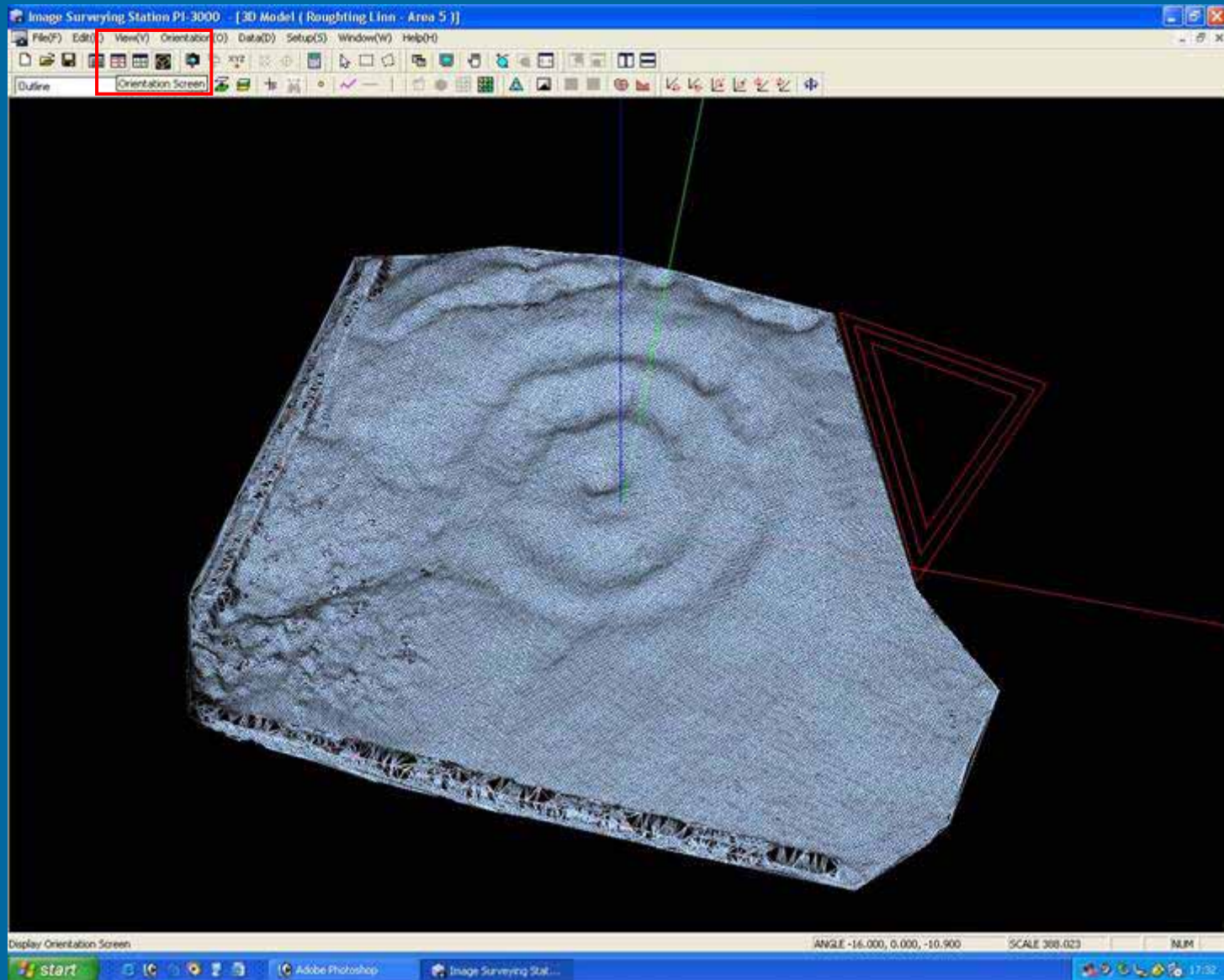
Both use the same digitising workflow previously used for outline generation



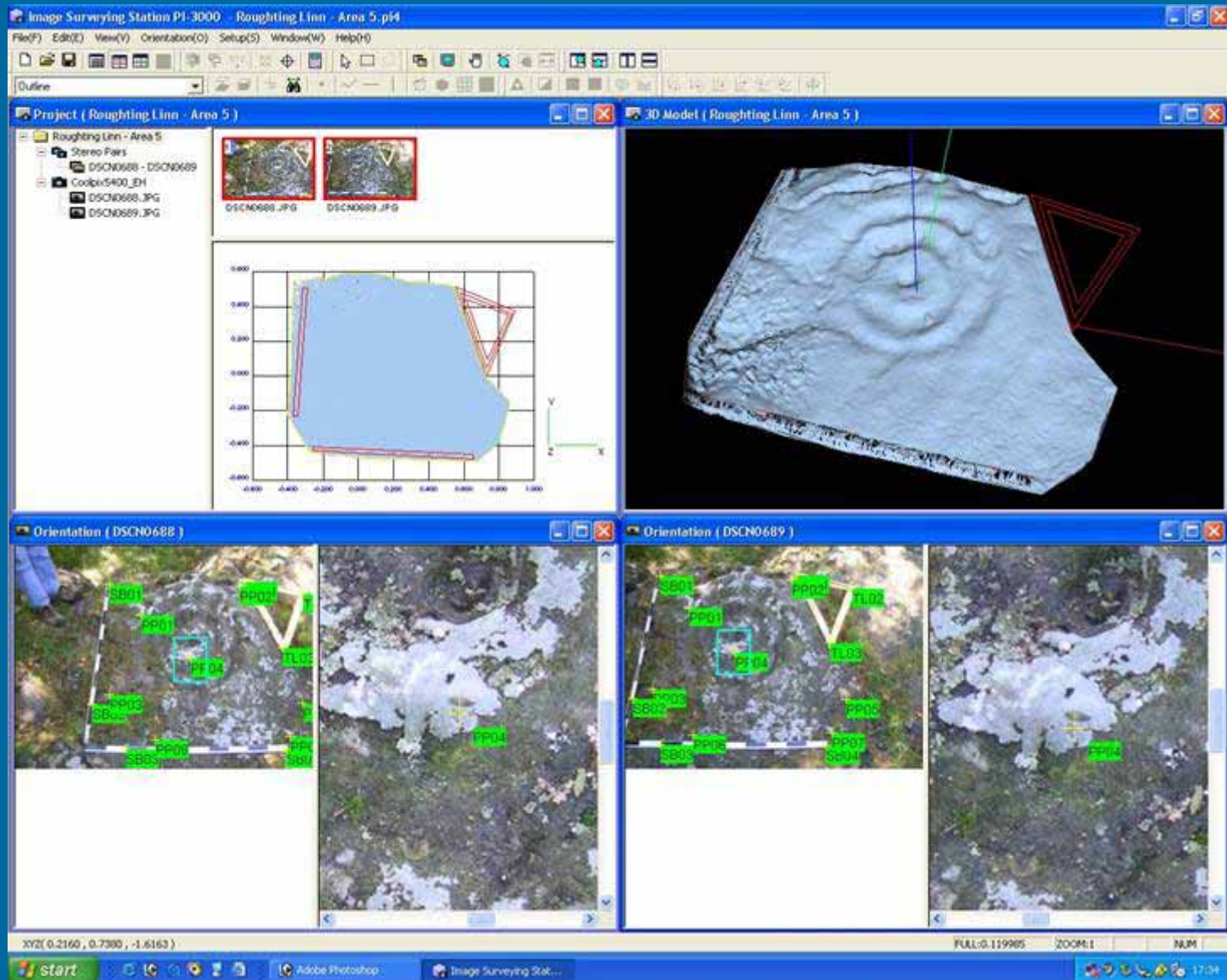
69. To view model without textured Render, 



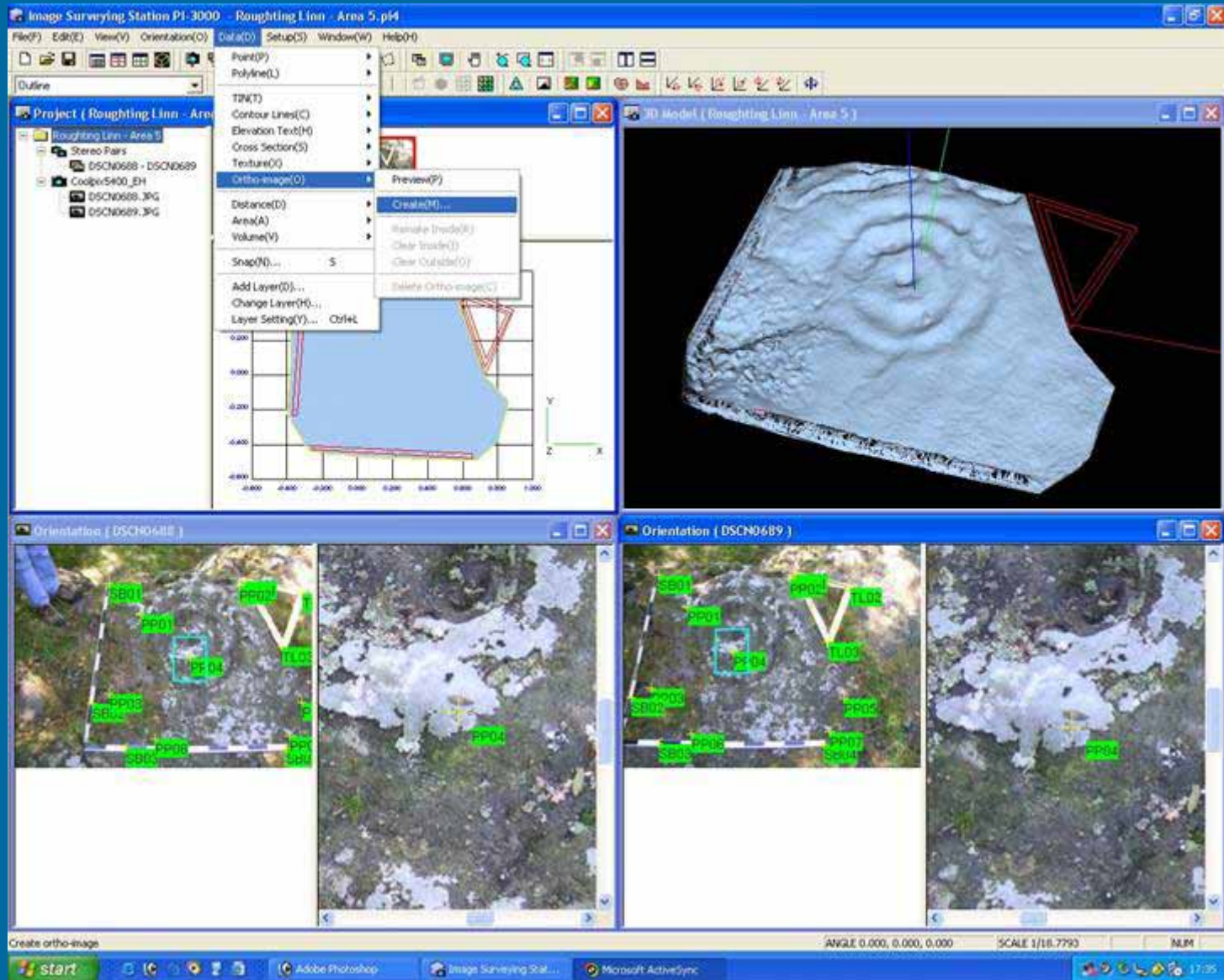
70. Orientation Screen,



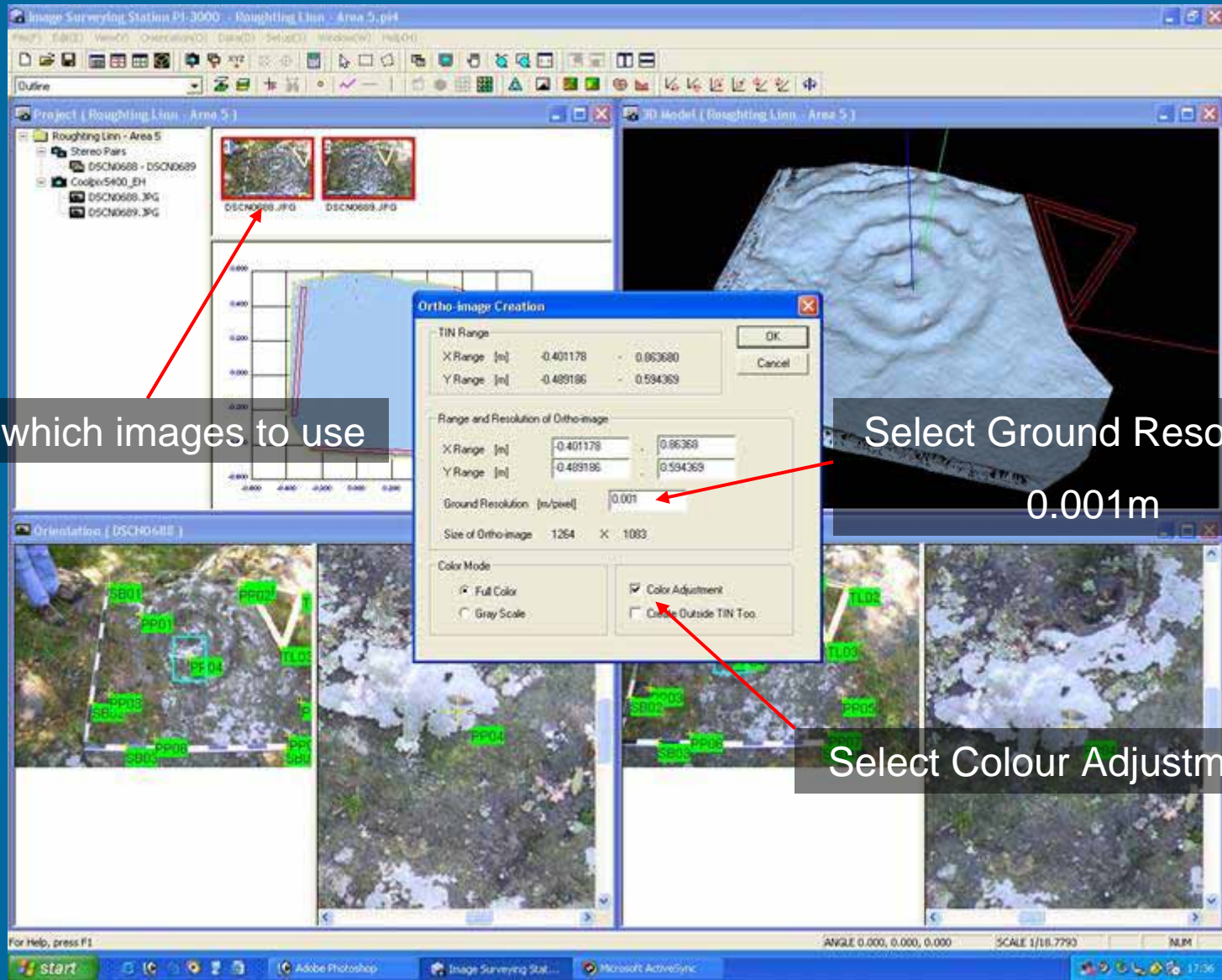
71. Multiple view ports



72. Data, Ortho-image, Create



73. Ortho-image Creation



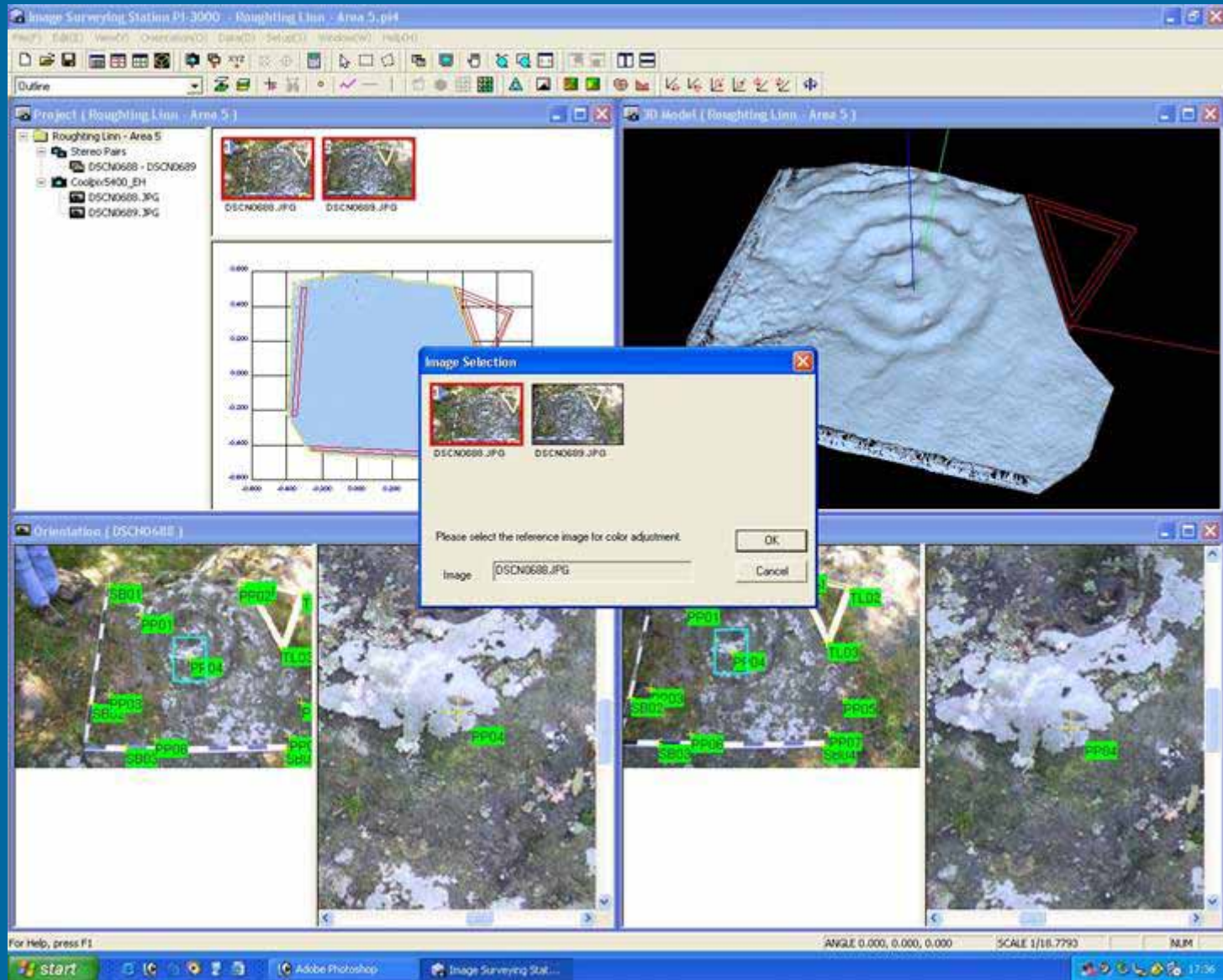
Select which images to use

Select Ground Resolution
0.001m

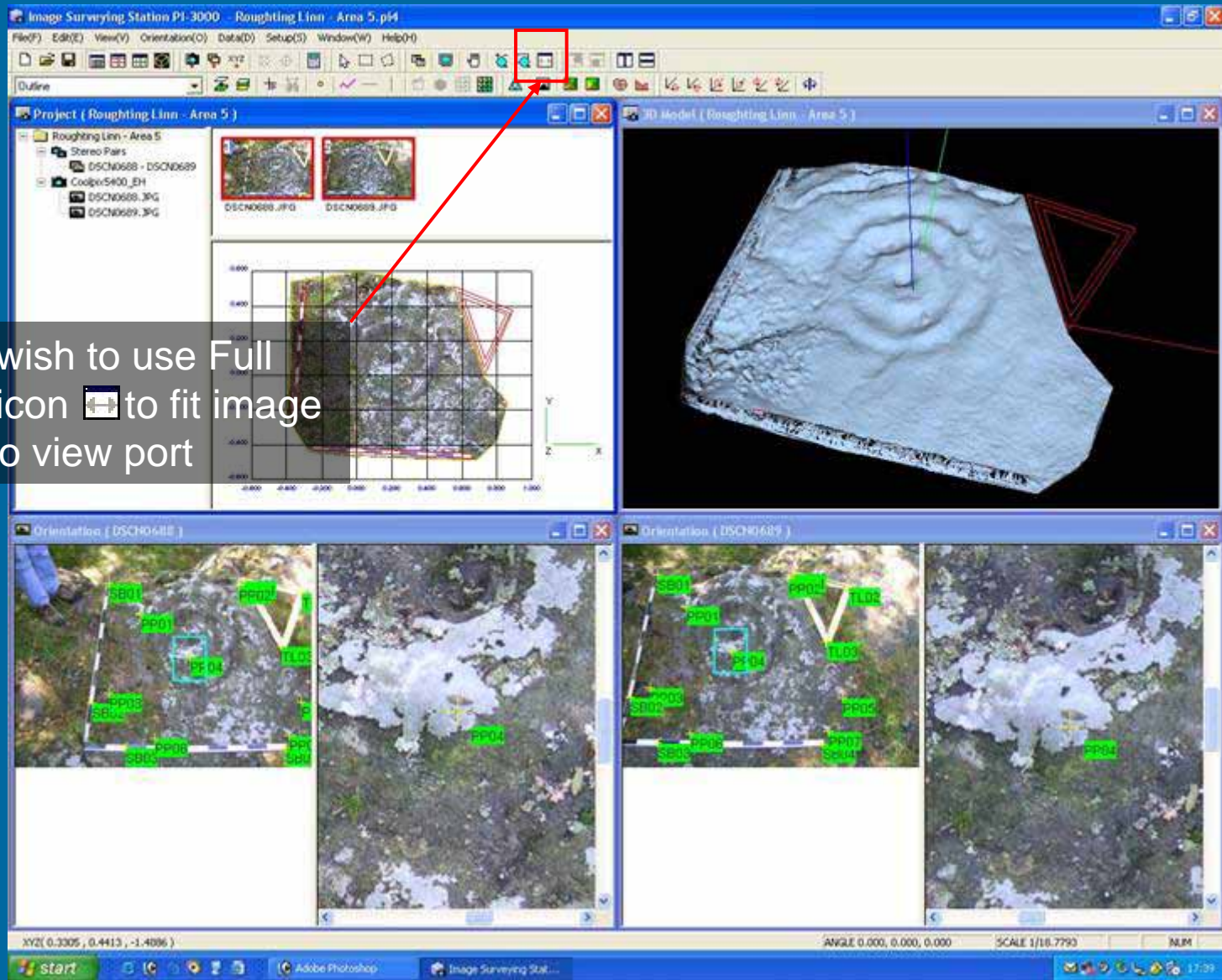
Select Colour Adjustment



74. Image Selection – reference image for colour adjustment



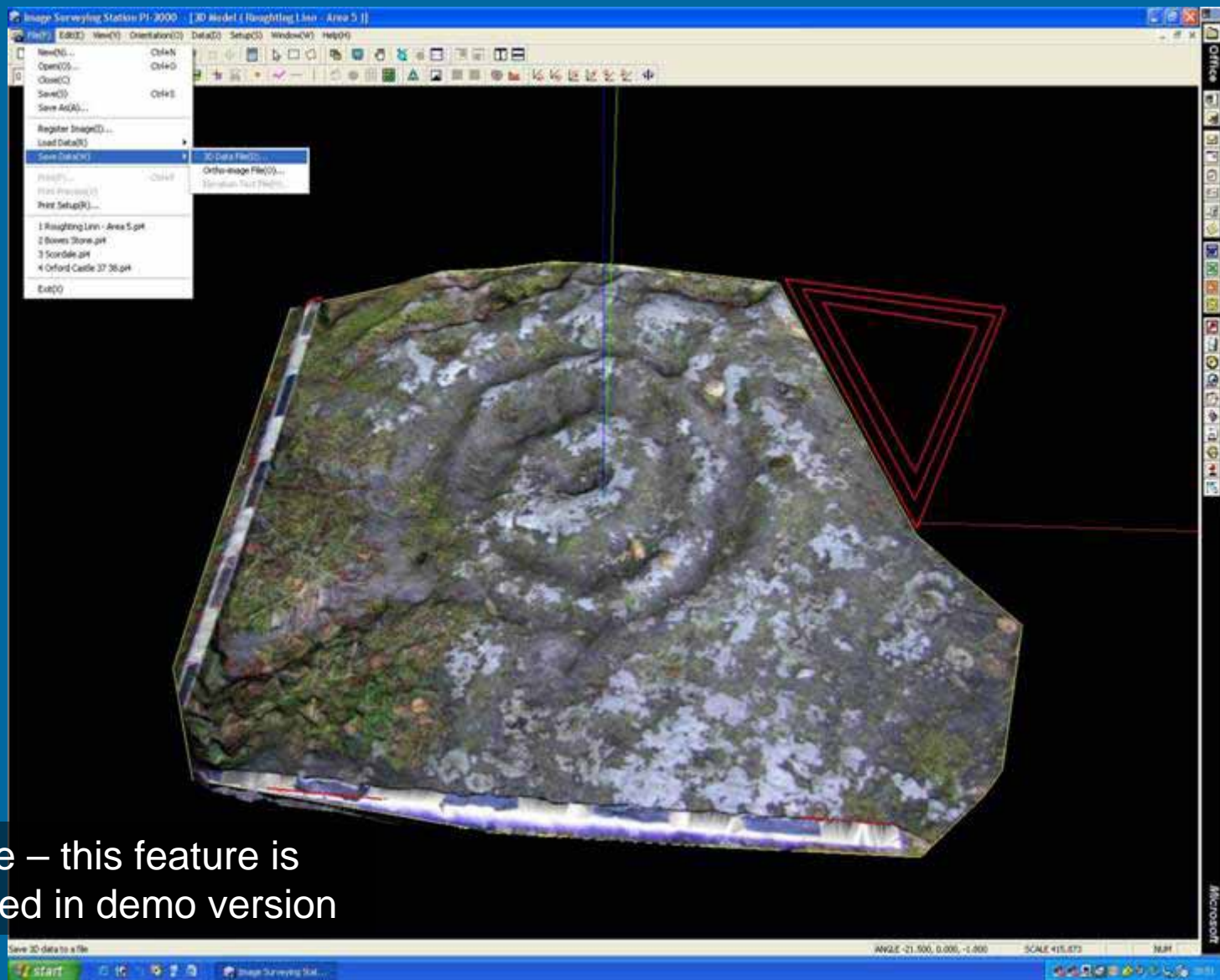
76. Ortho-image Creation – Processing complete



May wish to use Full display icon  to fit image to view port



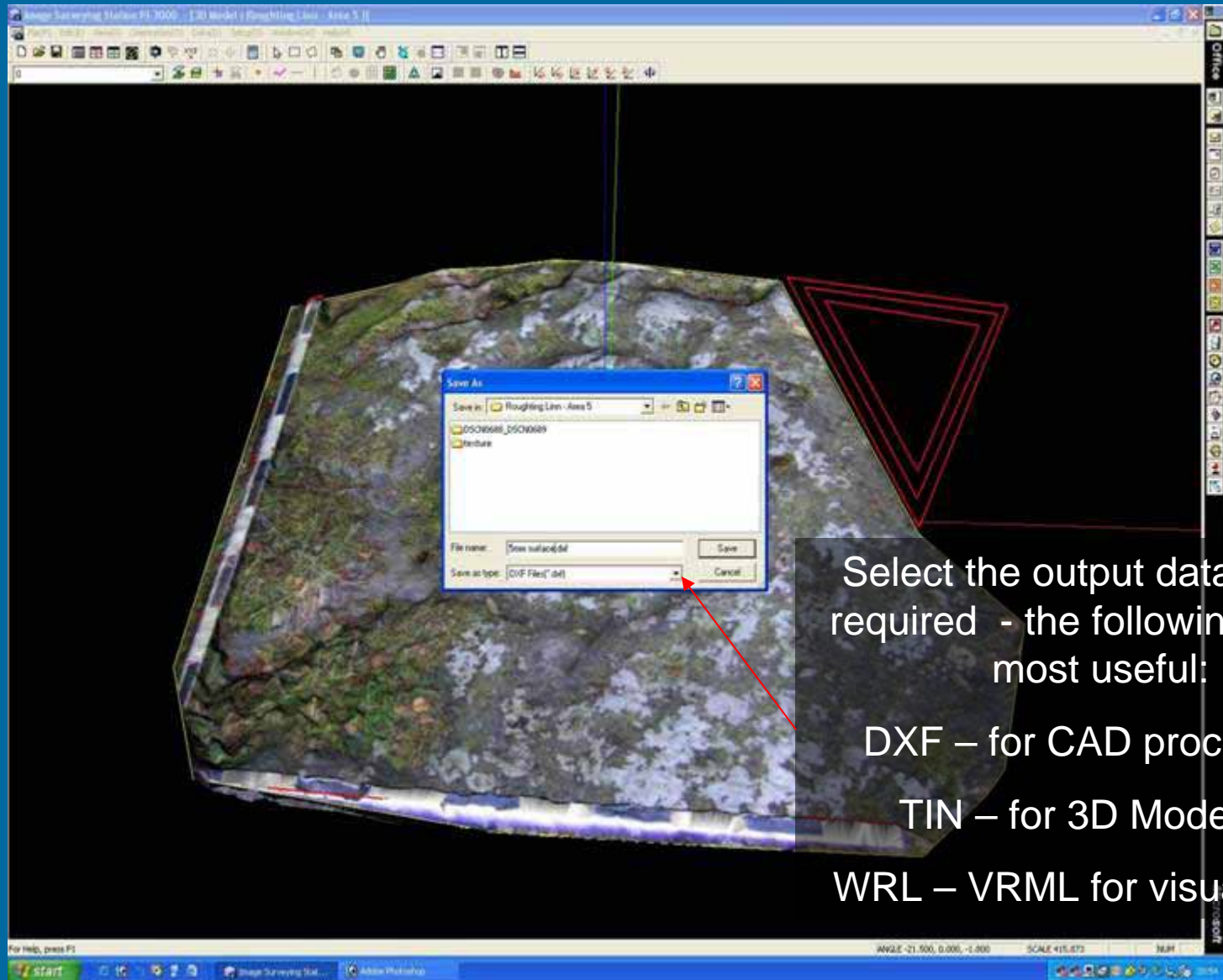
77. Model Screen, File, Save Data, 3D Data File



Note – this feature is disabled in demo version



78. Save As, WRL (VRML) File, Save



Select the output data format required - the following will be most useful:

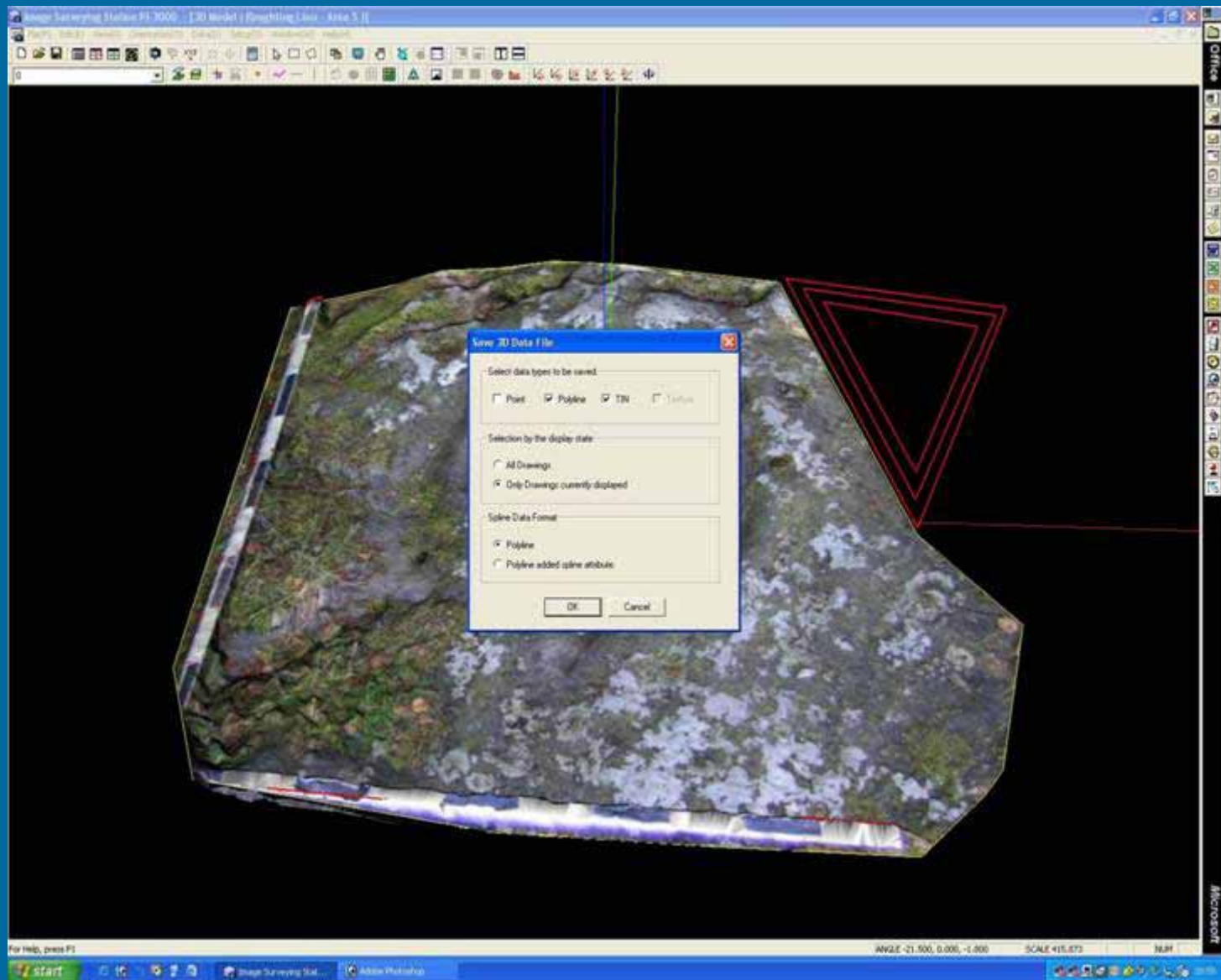
DXF – for CAD processing

TIN – for 3D Modelling

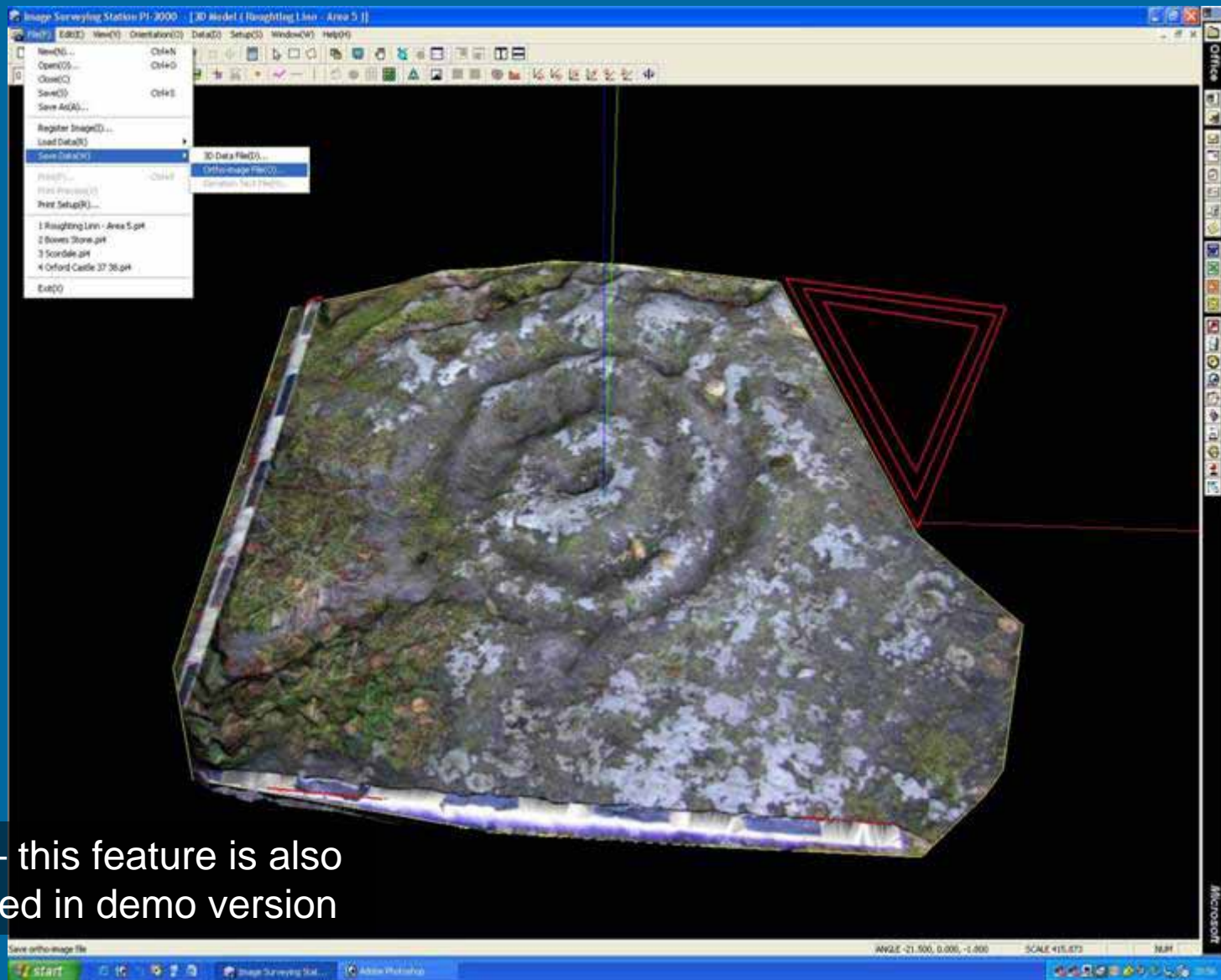
WRL – VRML for visualisation



79. Save 3D Data File, OK



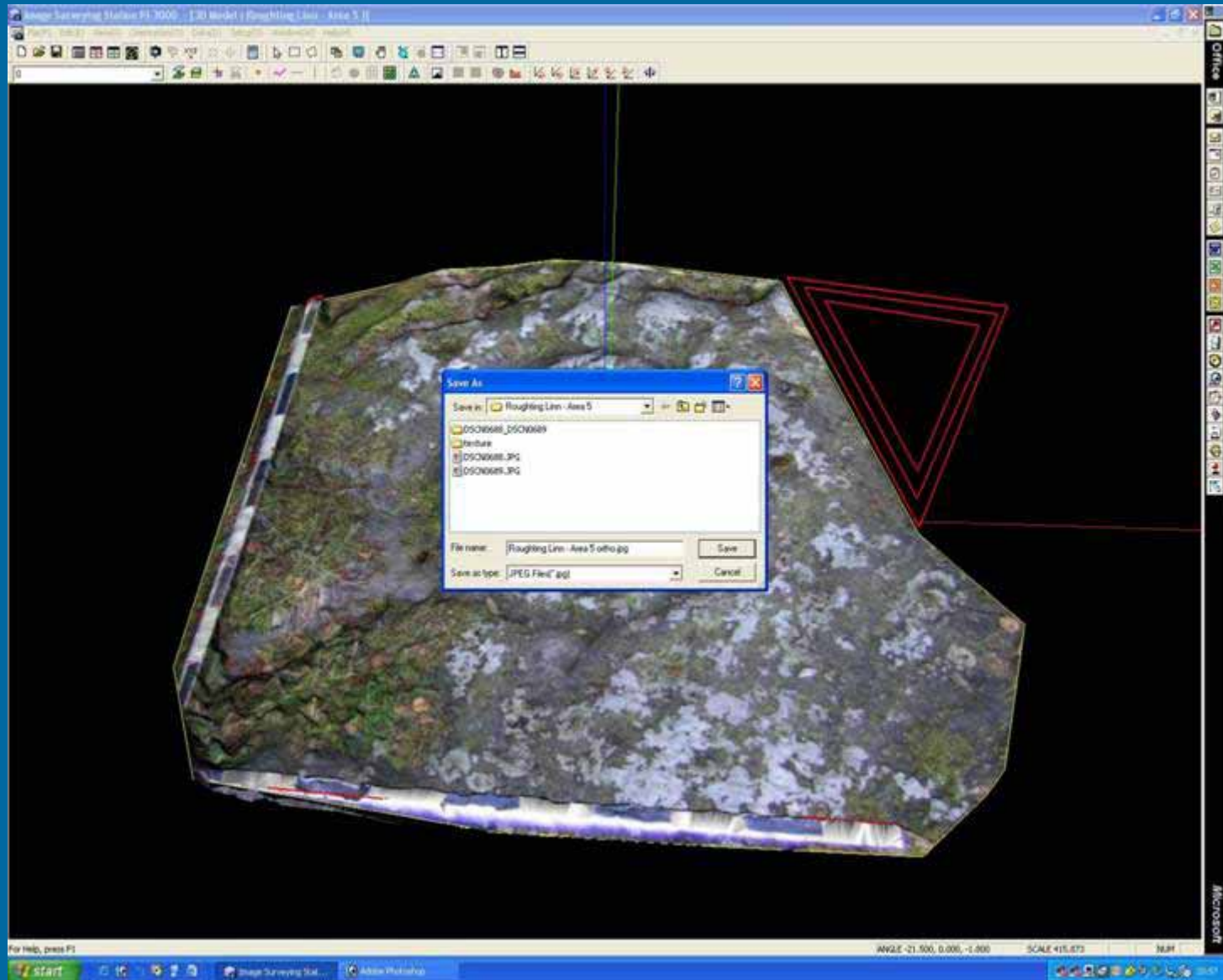
80. File, Save Data, Ortho-image



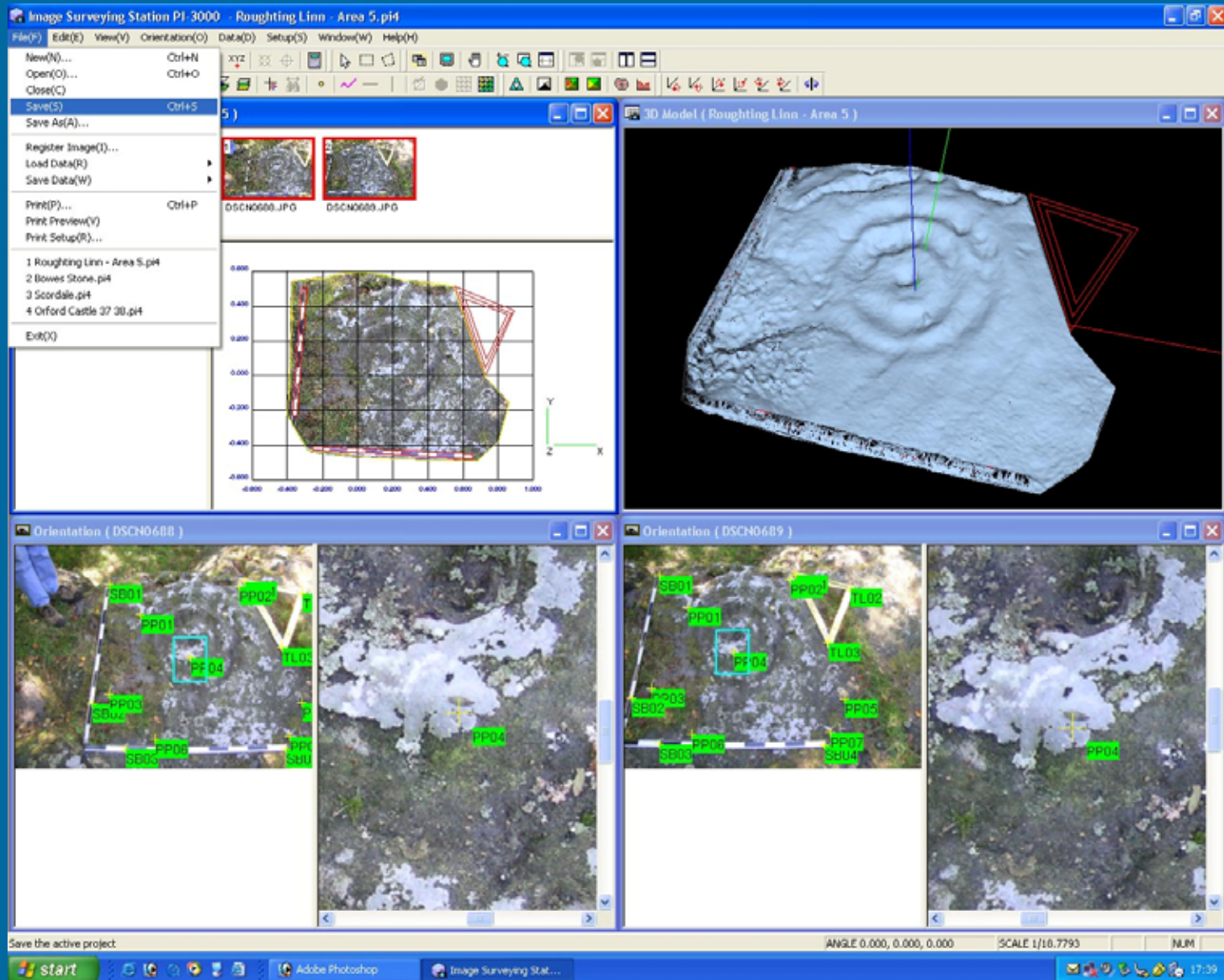
Note – this feature is also disabled in demo version



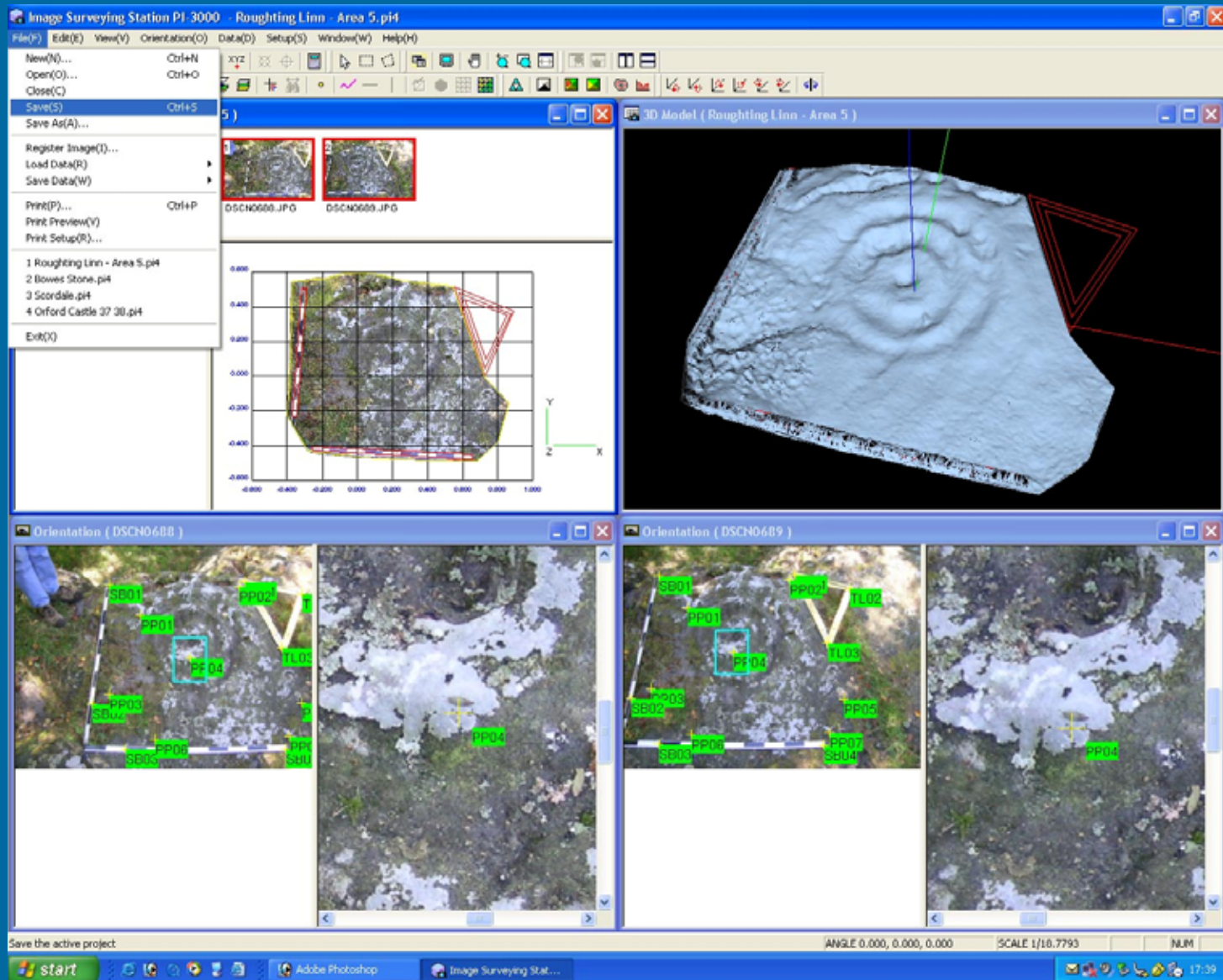
81. Save As, JPEG File, Save



82. File, Save – to save project



83. File, Close then Exit - to exit software





Good luck!

