User Manual – Post Processing Software For ARDC C-scan Data Files
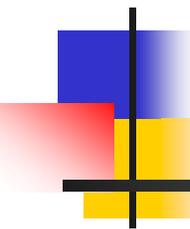
Password Verification

3DEval
Version 3.0

3DEval-Login

User Name :

Password :

Ultrasonic Image Processing

⚠ It appears that this is the first time this application is being run on this computer. The first username and password entered will be given Administrator privelages.

OK

- When the 3DEval icon is double clicked a login dialog is opened as shown. The password is validated and the program is give administrator or user privileges accordingly.

- If it is the first time the program is run a message box is shown and the first user name will be given administrator privileges.

Updating User Info
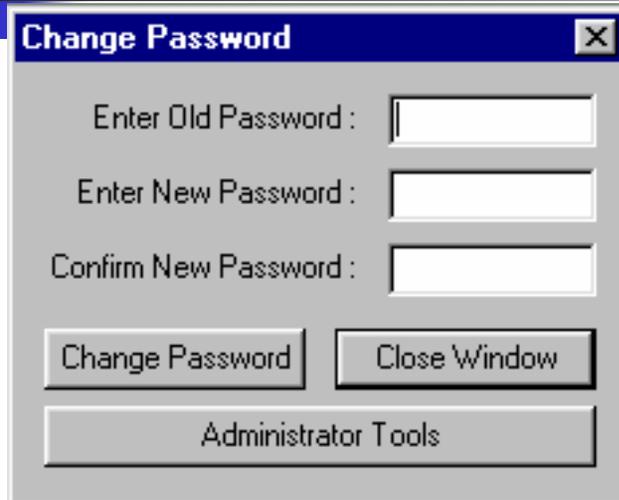
Change Password

Enter Old Password :

Enter New Password :

Confirm New Password :

Change Password   Close Window
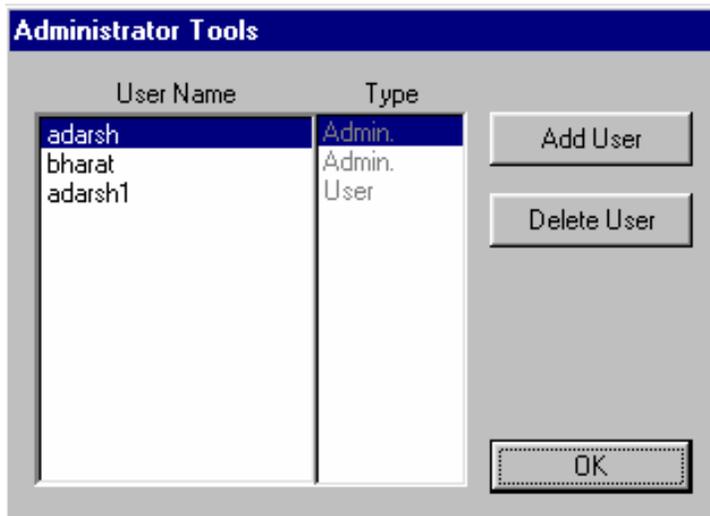
Administrator Tools

Administrator Tools

User Name	Type
adarsh	Admin.
bharat	Admin.
adarsh1	User

Add User

Delete User

OK

- Click on the tools-user Info to open the dialog box to change password.
- If the user has administrator privileges then another button called administrator tools is shown.
- A new dialog box is opened where users can be added or removed.

Opening Data Files
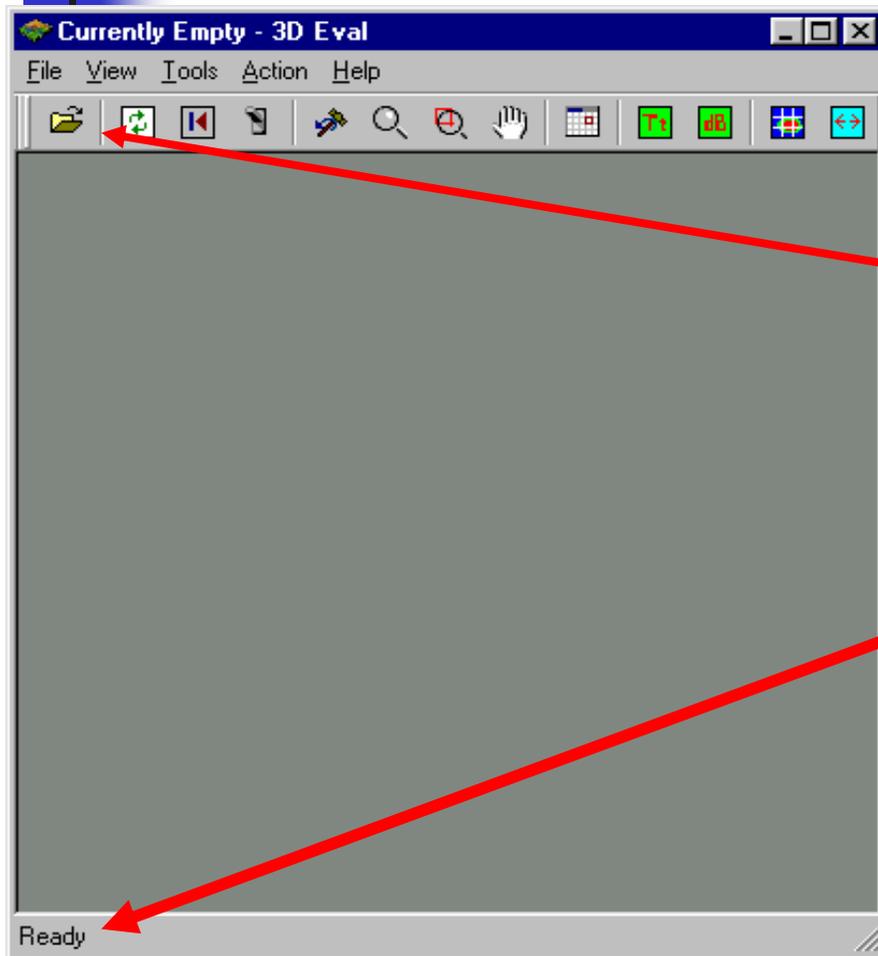
- To open a new data file, click on the open data file icon or go to <file> and select <open> menu.

- The descriptions about the icons on which the mouse is over is shown in the bottom of the main window.

Opening Data Files

- When <open> file is selected, the standard file open window will appear as shown below.
- Go to the directory that where the data files reside and select it by clicking on the open button.
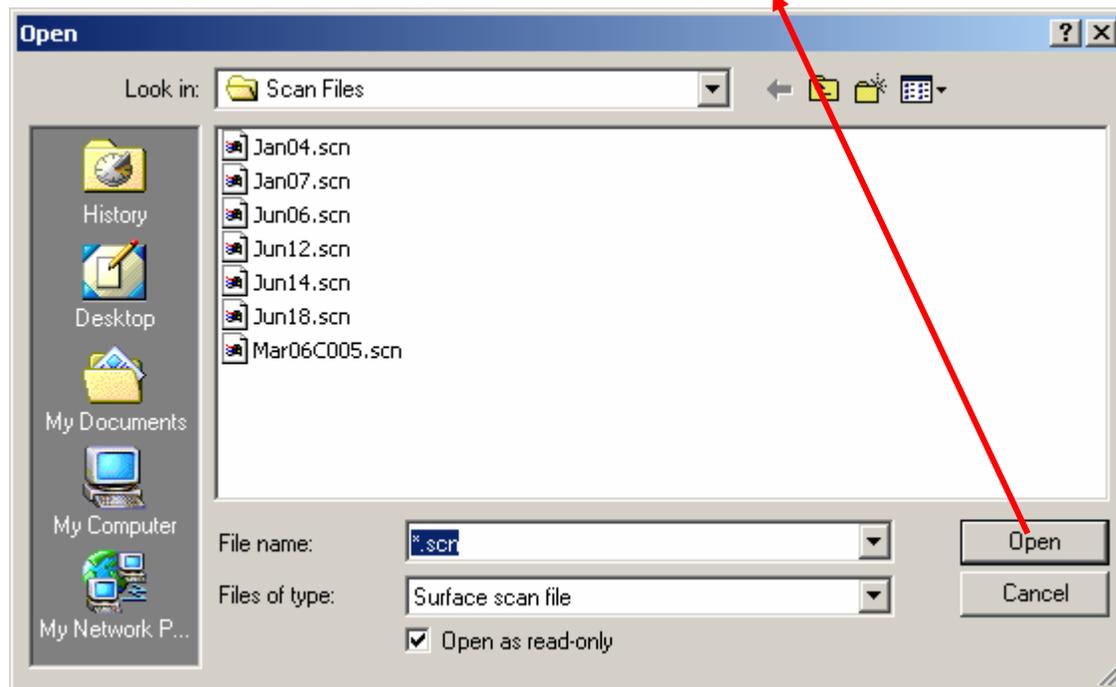
Session Restore

- Select OK if you want to restore previous session.

Enhance Image

- When a data is loaded, the image is shown. To improve the image, click on the Enhance button on the tool bar or use the <Enhance> menu in the <View>.

- The interpolation scheme is used to densify the image and the picture resolution improves as shown on the left.

- Other windows and toolbar features will be described now.
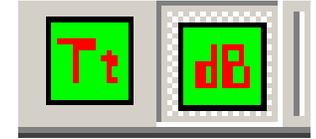
dB and Tt representation

- By pressing either the Tt or the dB buttons on the tool bars, the travel time or the amplitude in dB can be imaged. At one time, only one of the feature can be displayed.
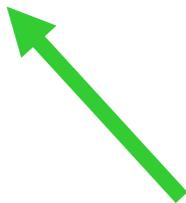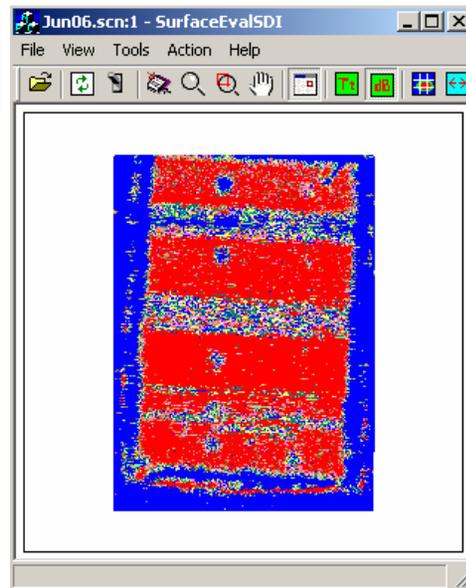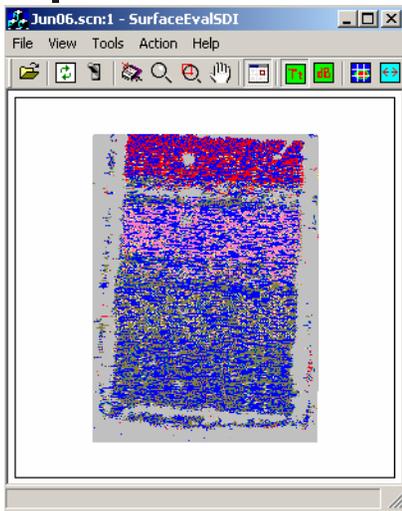
Filters
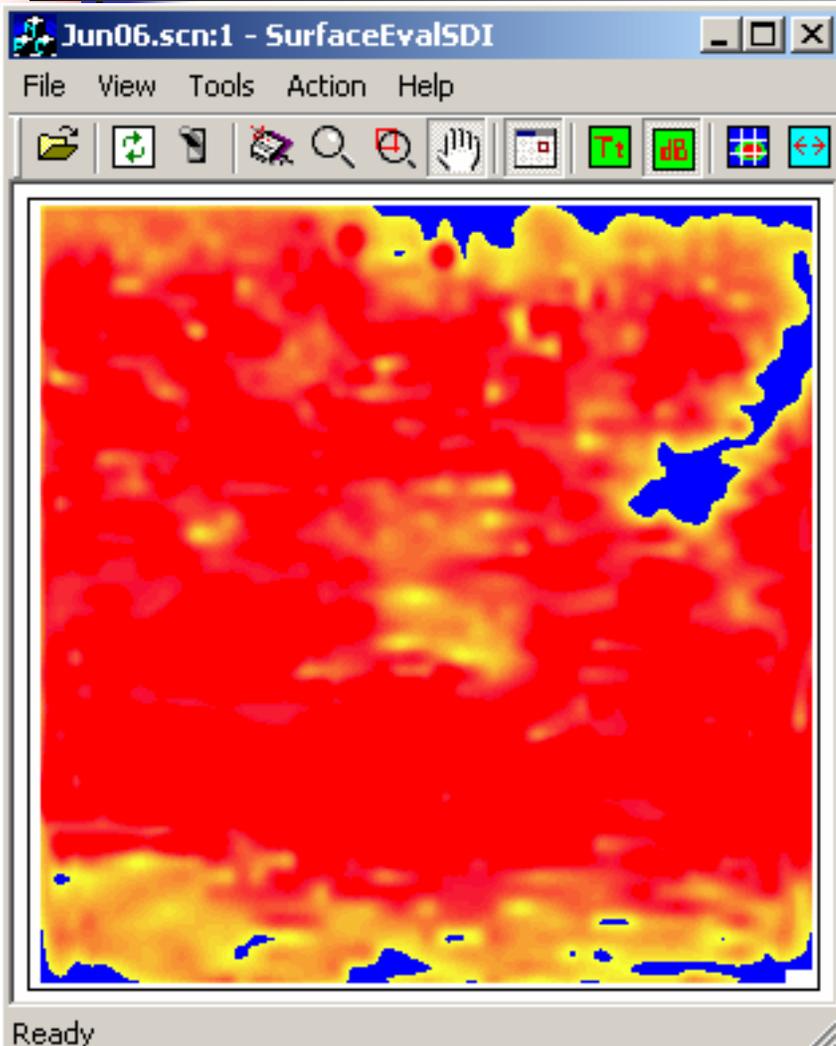
- Two types of image filters are provided to reduce speckle noise.
- The median filter with n+1, n, and n-1 algorithms.
- The mean filters of 1st and 2nd order.
- Inverse filter changes colors to inverse of the existing colors.
- Select <filters> from <view> menu.

Rotate & View
3D Projections – Side,Top Views
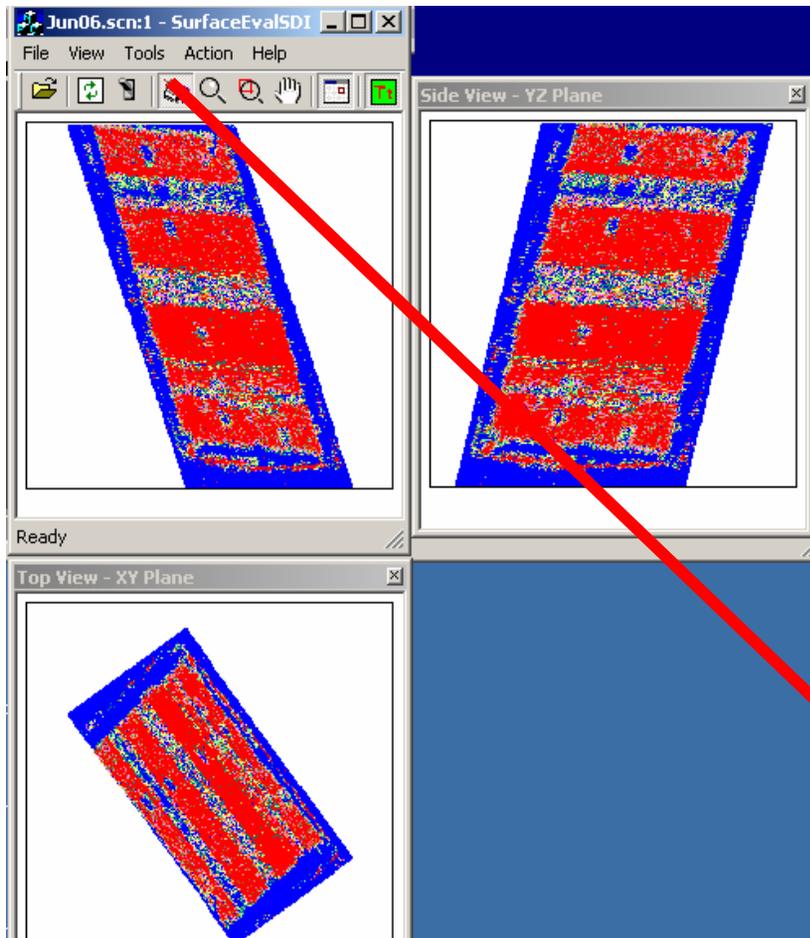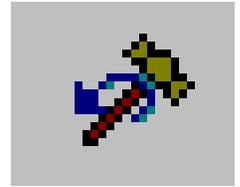
- The 3D data file is represented in the form of 3 orthographic projections. The main window represents the actual data that is analyzed while the top and the side views give the two other perspectives. The goal of the analysis must be to maximize the main window area while minimizing the other views.

- These can be turned on or off by using <frames> menu in the <view>.

- The views can be rotated using rotate button in the tool bar or by selecting <rotate> from the <action> menu.

Zoom and Pan
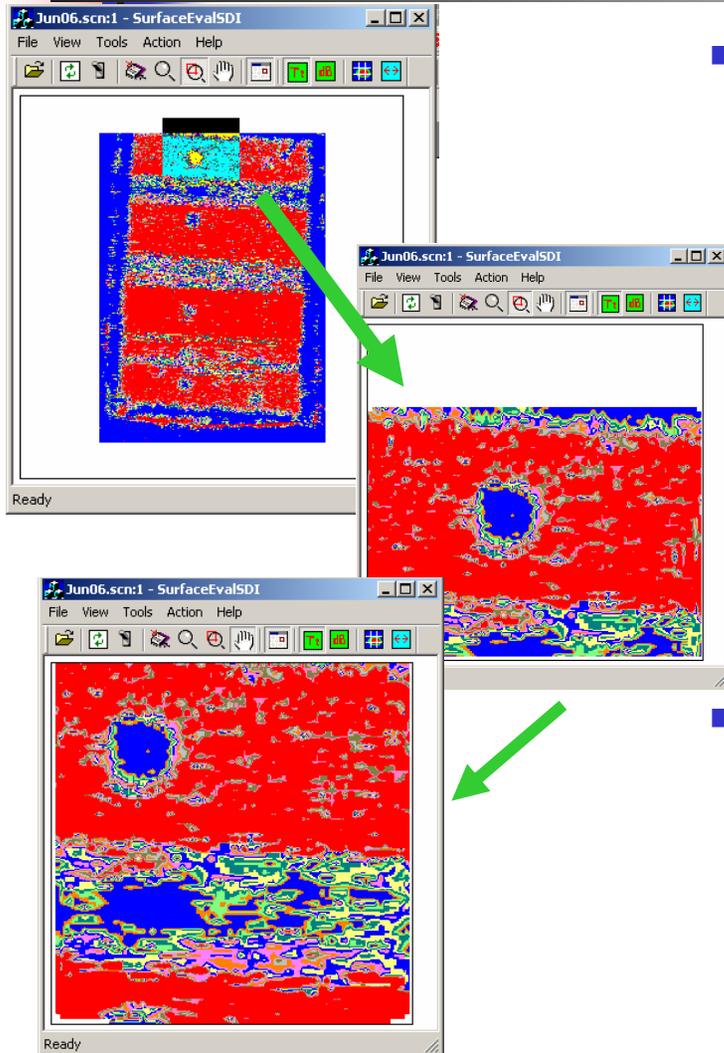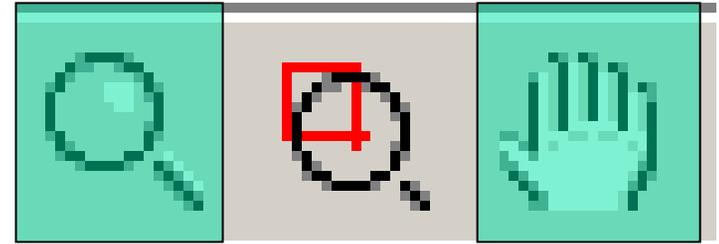
- Two types of zoom options are provided. The boxed zoom allows selection of any boxed area as shown in the left.

  The plain magnifying glass icon allows the user to magnify or de-magnify. To use it, (a) select the button, (b) move the cursor to the location of interest, (c) with the button depressed, drag the mouse to the right top corner of the screen to zoom and to the left bottom corner to un-zoom.

- To pan the image in the zoomed position, the hand button is used. Select the hand button and move the cursor to the region of interest and move freely, with the mouse button pressed, to pan the region.

Overview and Profile Windows

- The overview window provides the full view of the test part image with the zoomed region in inverse colors. To quick-zoom into any region, click on that region in the overview window and watch the image quick-zoom to that region.

- The vertical and horizontal profiles of the data (dB or Tt) is displayed as side and bottom profile windows respectively as shown in the figures in the right and bottom respectively.
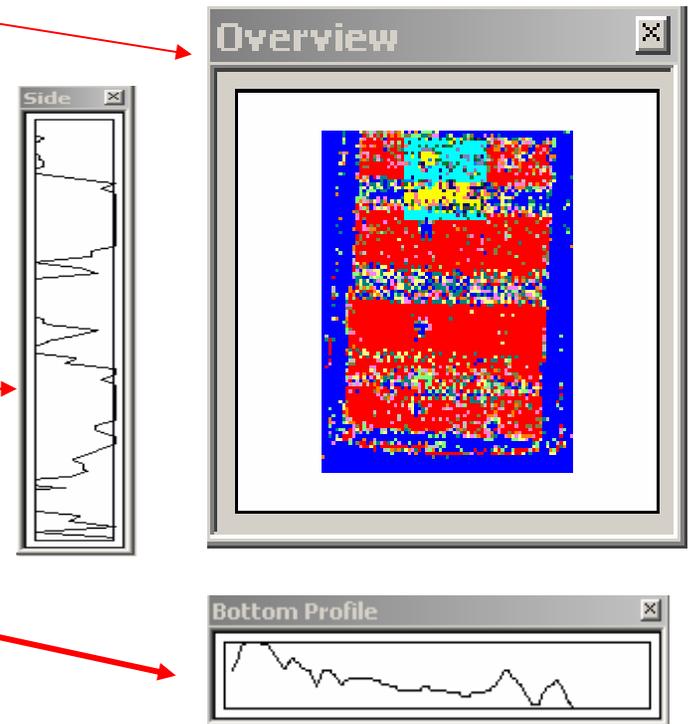
Cursor Position Window
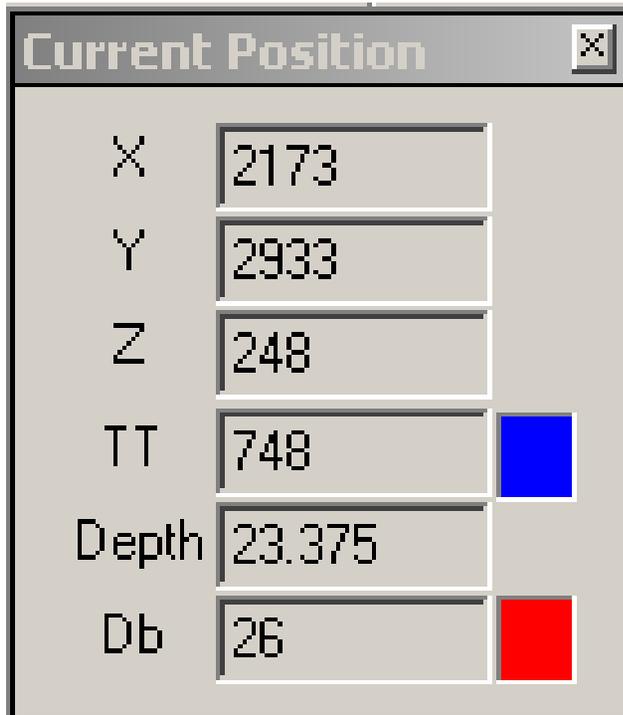
Current Position

X	2173
Y	2933
Z	248
TT	748
Depth	23.375
Db	26

- The X, Y, and Z values in mm is displayed in the Current Position Window. The cursor must be in the main window for this.
- The corresponding TT and DB values are also displayed along with the corresponding colors.
- The Depth in mm is also shown.

Refresh and Default & Undo
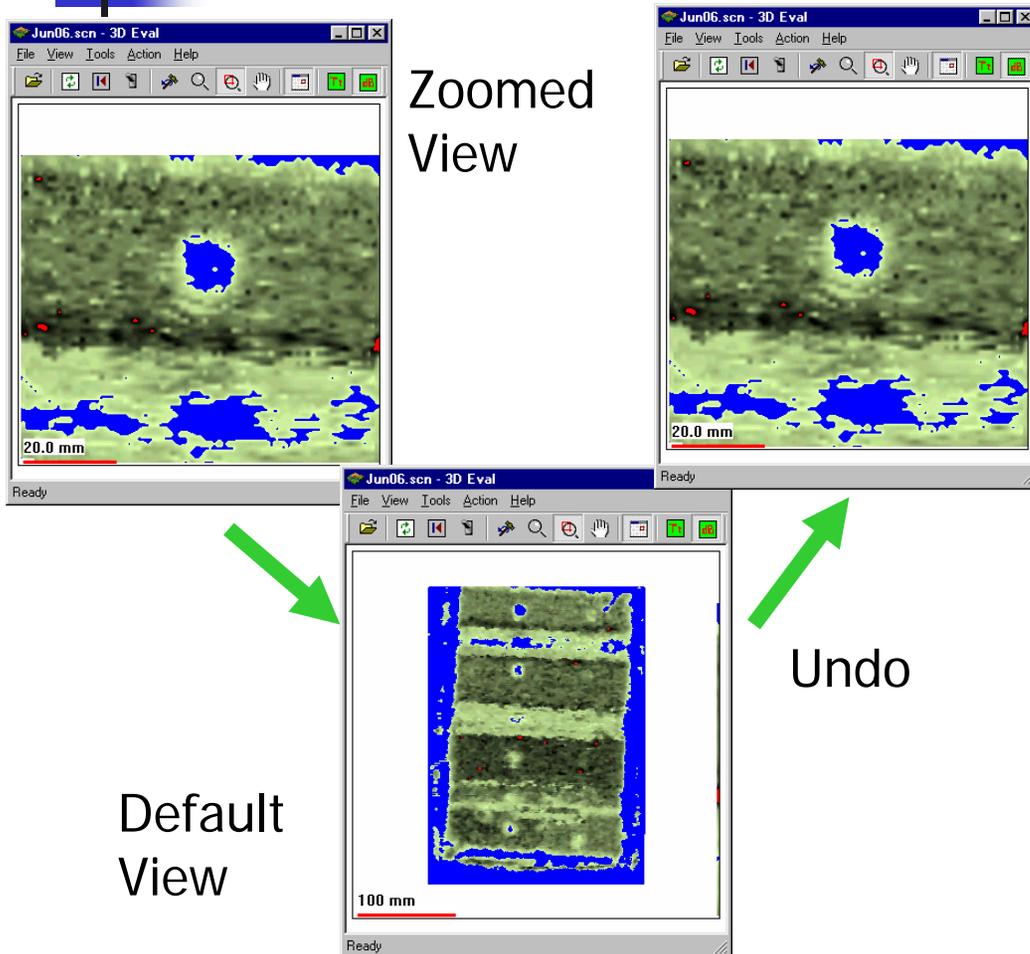
Zoomed View

Default View

Undo

- The refresh button in the tool bar will redraw the views and windows.
- You can undo any action by using the undo button.
- The default button will make the views go back to the full image from a rotated or zoomed image.
- All controls are available under <View> menu.

Data Bounds Window

- **Data Offset** – Allows the user to neglect points that are not useful either in the beginning or at the end of the data file. Just enter the number of points not to be considered.

- **The Data Bounds** - provides the size of the scan, the TT and DB average (Avg.) and Standard Deviation (SD) values are indicated for the entire data set.

- The **Min and Max values** are used to determine the color scale. These values can be manually changed by operator by entering the required value and pressing the button <Set as Default>

- For instance, if the color scale must represent 1 dB increments, then range must be 10 dB since the color scales are divided into 10 bins, i.e.. the difference between Max and Min must be 10 dB. If the scale must be in 2 dB increments, the difference must be 20 dB, and so forth.

Color Scales and Histogram
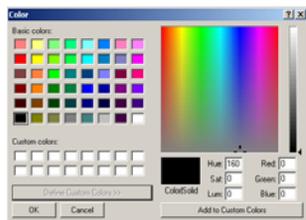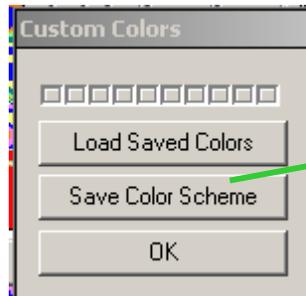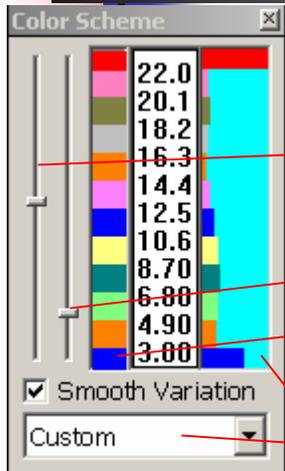
- The Color Scheme window has two slider controls. The <Left Slider> controls the scale by moving it higher or lower. The <Right Slider> controls the range of the scale.

- The 10 Color Scale near the sliders can be selected by the drop-down selector. Several standard color schemes are provided. For selecting a custom scale, choose <Custom>. This prompts the Custom Color pop-window. Here each color can be chosen by clicking on the window and selecting from the standard color palette. If the <smooth> box is checked, the color scale is gradual and not discrete. This works only on standard color schemes.

- The Histogram of the data is shown in the right.

- The color scale range can also be controlled by manually entering the values in the Min and Max boxes in the bounds window and pressing <Set as Default>

Re-size Main Window
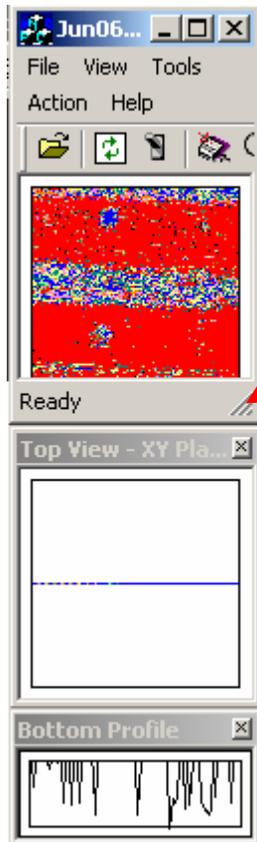
- In order to either increase or decrease main window, move the cursor to the right-bottom of the main window, press and drag up to decrease window size and down to increase the size.

- All other windows will re-position accordingly.

- The views and the profiles windows will also automatically resize and reposition accordingly.

- Some of the tool bar buttons can go out of range if the size is reduced less than default size. If so, use the menu.
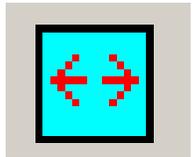
Distance/Size Measurement
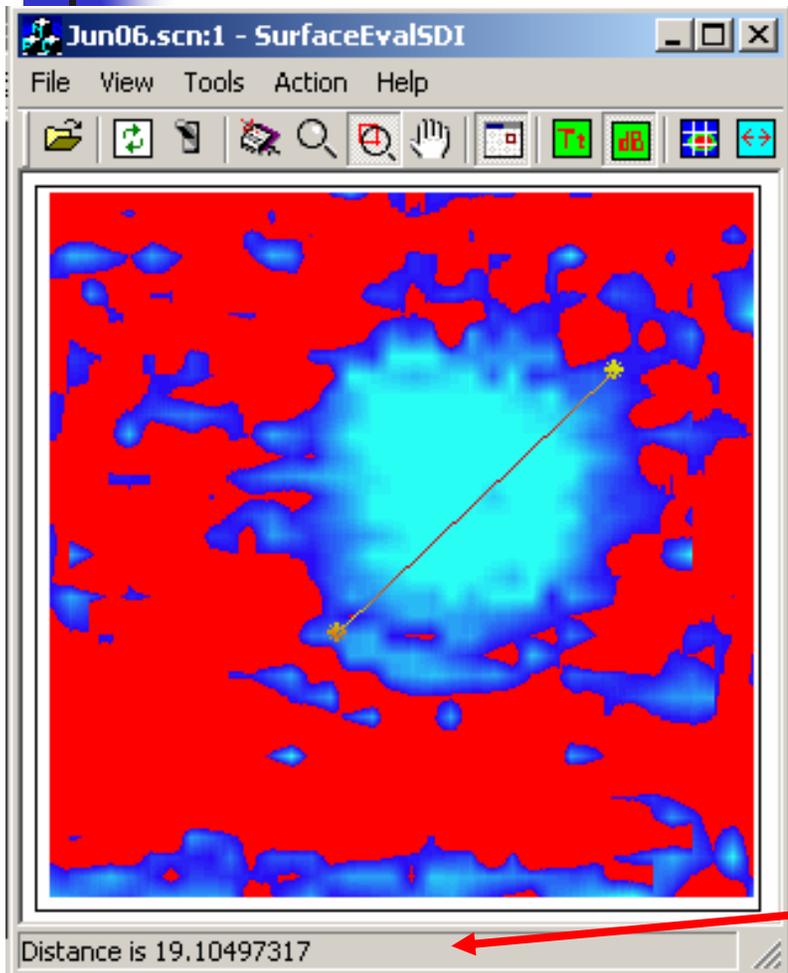
- Use **<Distance>** button to **measure linear distances/sizes** in the images in mm.
- Select **<Distance>** button or from **<Tools>** menu.
- Then **Click** any point on the main window image.
- Then **Click** again on any other point.
- The **distance/size** between the two selected points is provided in the bottom of the window in mm.

Jun06.scn:1 - SurfaceEvalSDI

File   View   Tools   Action   Help

Distance is 19.10497317

Analyse – Select Grid.
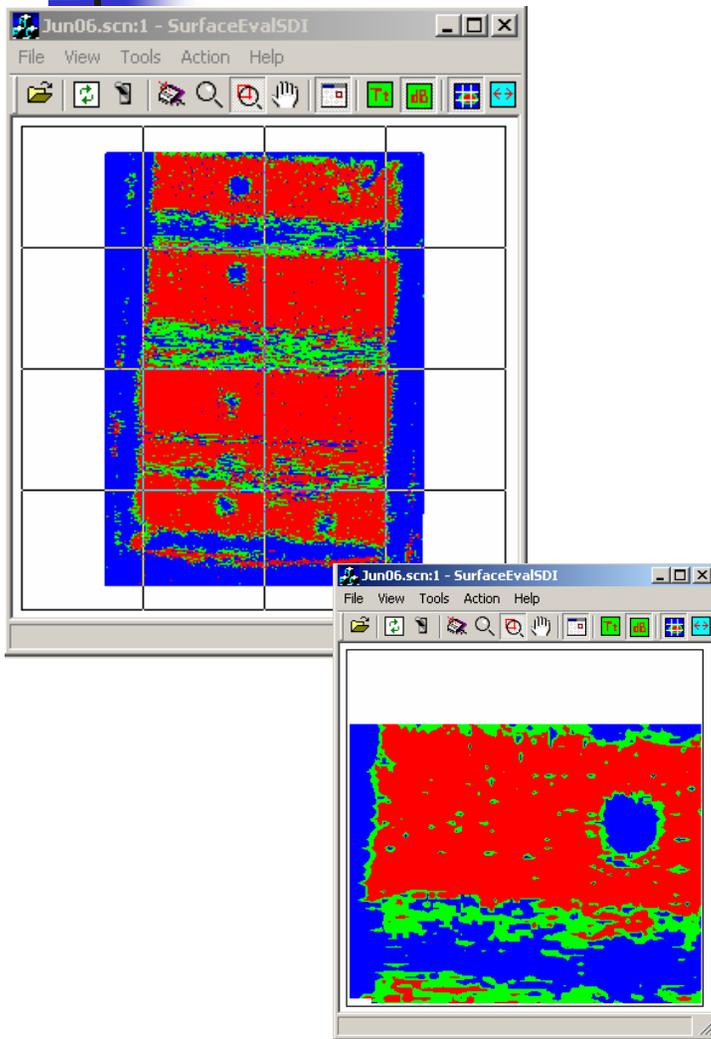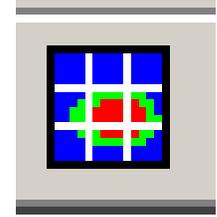
- The **Analyse button** in the tool bar is used to **search, mark, and size flaws** and other features such as **bolt holes**.
- Press the **Analyse button** or select **<Analyse>** from the **<Tools>** menu.
- The main window will show a 4x4 **Grid** and the color will change to a **3 color scale**.
- **Click** on any of the Grids to **Zoom** into this grid as shown here on the left.
- Pressing **<space-bar>** key will **switch** the Zoomed area from one Grid to the next adjacent Grid.
- It is not necessary to select a Grid. The entire window can be analysed. Pressing **<shift> and Click** will take you to unzoomed position.
- **Zoom, Pan, dB, Tt buttons are deactivated** during this operation.

Analyse – Threshold Flaws
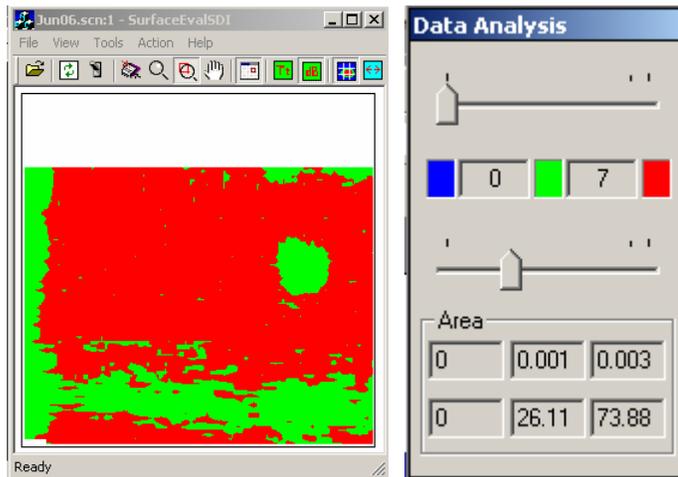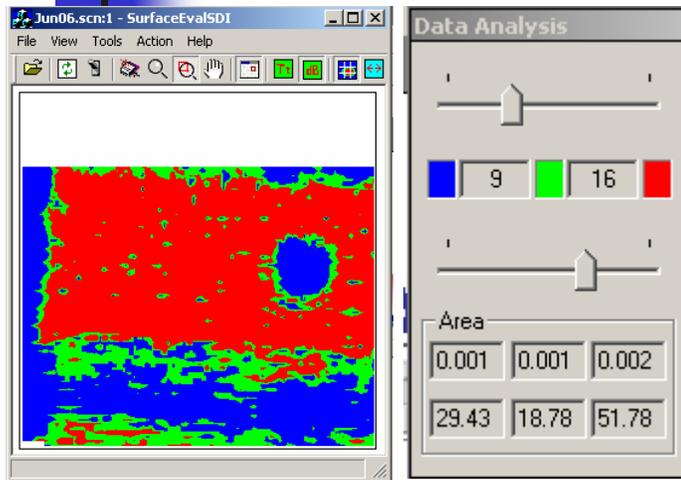
- The Data Analysis window is used to threshold flaws.
- The middle color represents flaw values.
- The extreme colors represent non-flaw values.
- Change Min and Max range values from the Color Scheme or Bounds windows such that the value in the flawed region is in within the middle range.
- Move the upper and lower sliders in the Data Analysis Window such that the flaw is shaded in the middle color as shown in the left.
- The default colors are Green for Flaw and Blue and Red for extremes. These colors can be re-selected by clicking on the color boxes in the Data Analysis Window and selecting from the Color Palette.

Analyse – Select Flaws
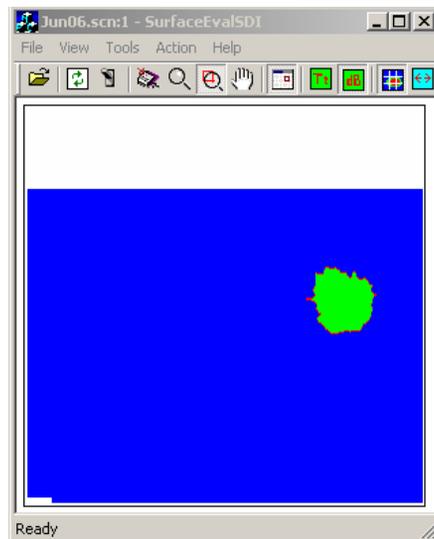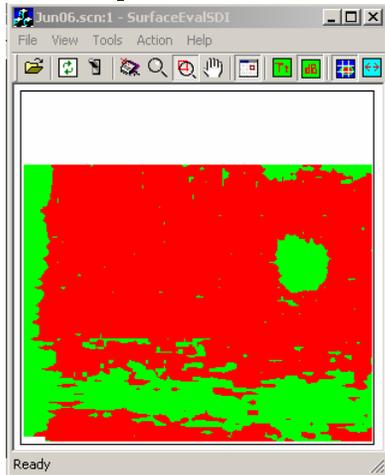
- Once the flaw is thresholded such that the middle color fills the flaw region, the flaw must be isolated and selected.
- Move the cursor to any point within the flaw region.
- While pressing the <Ctrl> button, press the click button in the mouse.
- Using a unique "water flow algorithm", the defect region will be isolated and the rest of the region will take the bottom extreme color as shown in the left.
- If the cursor is not on a pixel that is in the middle color region, a error window appears. In such a case, Press OK and reposition the cursor and again <ctrl>click.

Analyse – Save Flaws/Holes
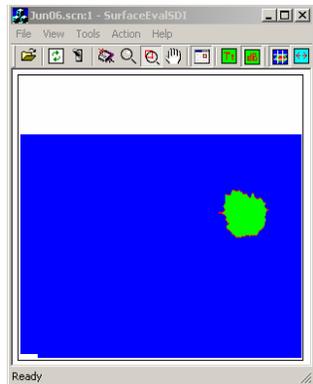
Flaw-Hole Detection

Type
- ⦿ Flaw   ○ Hole

Properties

	Min	Max	Cen
X	2192	2207	2198
Y	2916	2930	2922
Z	248	248	248

Max Length	16.1245
Area	134.336
Avg. Depth	30.5655

OK   Cancel

- Once the flaw is isolated and selected, the flaw information must be saved.
- The **Flaw-Hole Selection Window** shown on the left will pop up.
- The properties of the **Flaw/Hole** is shown. The **Min, Max**, and **Centroid** of the flaws are noted in all three axes.
- The **Maximum Length** of the flaw, the **area** and the **average depth** of the flaw are also calculated and displayed.
- The information can be categorized as a flaw or a hole (for all designed part feature).
- Click **<OK>** to accept for **SAVING** information or **<Cancel>** to proceed without saving.
- If **<OK>** is pressed, the flaw information is stored in a data file that ends in ***.flw**. This allows the user to take breaks and log off and **resume analysis**. Also, if the program crashes, the flaws selected are saved.

View Flaws
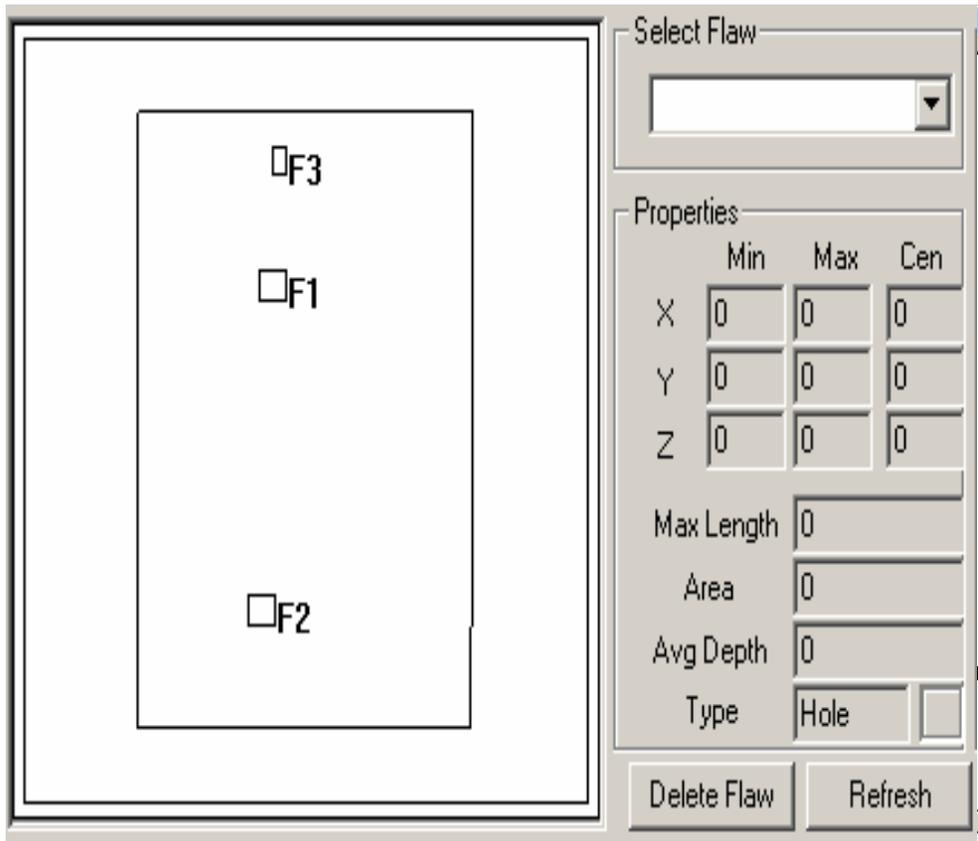
- The flaws can be view in the Summary window by selecting <View Flaws> in the <Tools> menu.
- This view combines report features and the flaw database.
- The Select Flaw menu allows the user to view the properties of each flaw.The <up-down-arrow> buttons allow scrolling from one flaw to another. A maximum of 30 flaws can be chosen.
- The chosen flaw/hole is highlighted by color.
- Use <Delete Flaw> button to remove any flaw/hole from database.

Acceptance Standards

- The ADS-32 standards can be viewed using the <View Tables> in the <Tools> menu.
- The Part Type can be selected by using the appropriate tab and the Grade can be selected using drop-down menus.
- New values can be entered using <Set Values>.
- The ADS-32 standards can be restored using <Restore Default> button.

Go/No-Go Evaluation Report
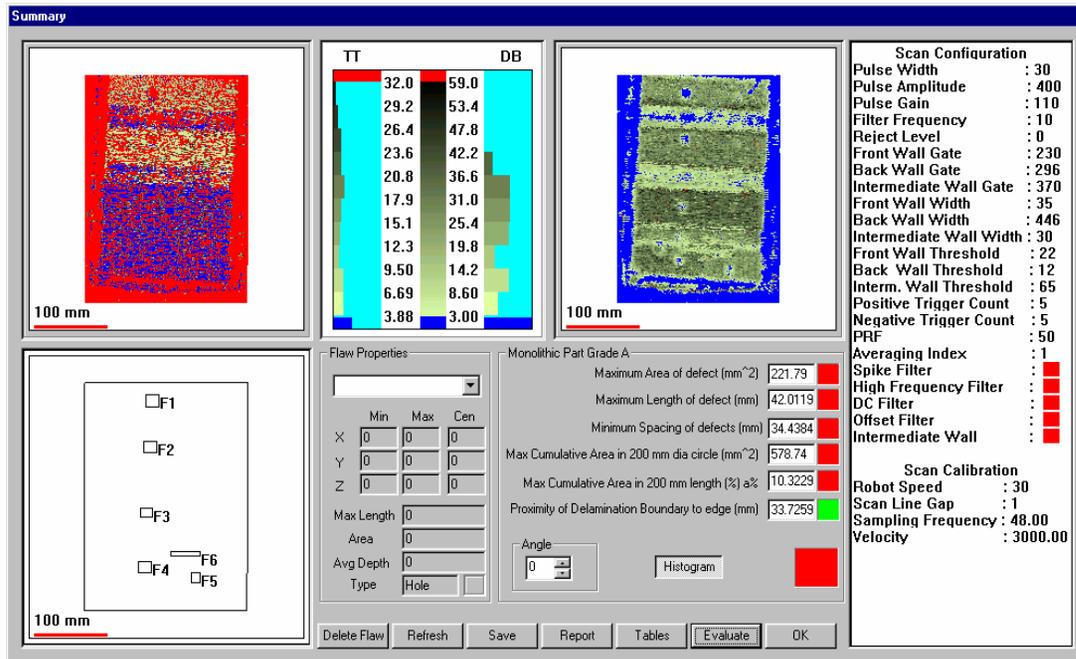
- The **GO/NO-GO report** can be viewed in the Summary window by selecting **<View Flaws>** in the **<Tools>** menu.
- The **TT and the DB views** are represented. The flaw database is also included.
- A window is provided for entering **comments** from the operator. Click and type.
- The window on the right represents all relevant **scan parameters**.
- Depending on the **Part Type** Selected, the Evaluation Criteria are displaced.
- To Evaluate the **GO/NOGO**, press **<Evaluate> button.** Make sure that appropriate Part Type and Grade has been selected using **<view tables>**
- After evaluation click on the <Report> button to generate a word report.

Go/No-go Analysis

- The Evaluate function will compare the flaw dimensions with the ADS-32 and provide GO (GREEN COLOR) and NOGO (RED COLOR) indication.
- For details on the failures, Click on the RED boxes to get the defects or group of defects that failed the Criteria.
- You can change the angle of the part to analyse the flaws in another line.
- The part type and grade can be changed by using the tables button.

Reference File Comparison


Reference File
100 mm
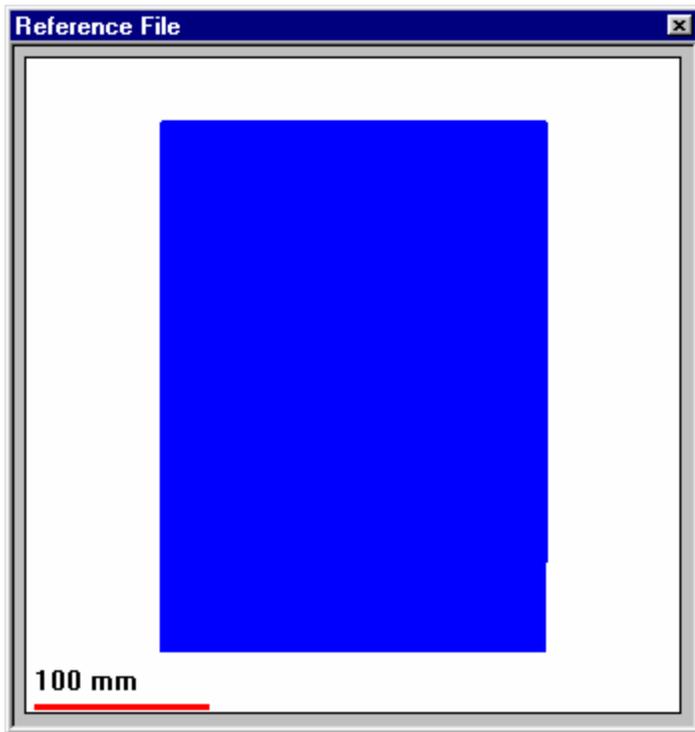
- The option to load and compare a reference data file is provided.
- Select <open reference file> from the <file> menu and select the reference data file.
- This opens a new window called reference file and any operation such as Zoom, Pan, Color Change, etc., to the main window is reflected here.
- To Plot the difference between the main window data file and the reference file, select <Plot Difference>, in the <Reference File> menu under <View>.
- For Plot Difference to work well, the data file and the reference file must be collected using identical settings.

Nudge

- Use this to nudge the image left, right, up or down.
- Use the center button to restore the original position.
- Use the text box to change the value of nudge.
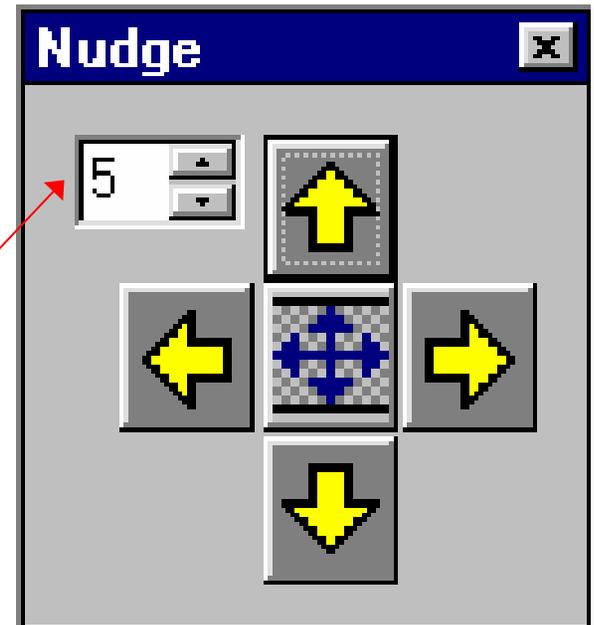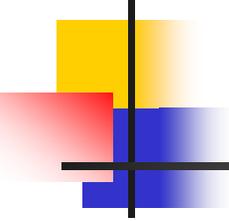
Some General Features

- All windows can be closed either by clicking on the **x** box on the right top corner or by un-checking the frames/window/toolbar on the menu.

- To open back the windows, go the the menu and select the frame/window/toolbar required.

- While analysing a data file, to open another file, proceed with open file operation and click <OK> button when prompted.

- For changing some of the color schemes of the window borders, etc., go to the <Control Panel> in the WINDOWS and select <Display Icon>and make changes in the <Appearance> tab.