The ART of Data Presentation

User Manual
Version 5.1

Pixoft® Diagnostic Imaging Limited

November 2012

Contents

1 LICENCE

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1.9 ENTIRE AGREEMENT

This Agreement constitutes the entire agreement between you and Pixoft relating to the Software.

2 Introduction

Vicasso is a unique tool for video processing and analysis.

At its simplest level it enables the playback of a single video, with frame accurate access to any part of the video via trackbar or single frame step buttons. The image itself can be zoomed in or out as necessary. If multiple videos are to be compared they can also be played synchronously in multiple windows.

At the next level a range of image processing tools allow the image to be enhanced to remove noise or increase contrast, etc, so that specific detail can be revealed. These enhancements can be applied to the whole video stream so that these features can be followed in video and the enhanced video can be saved out to a file.

Further analysis of the image is aided by a number of calibration and measurement tools, including the provision of grids and calibration and measurement lines.

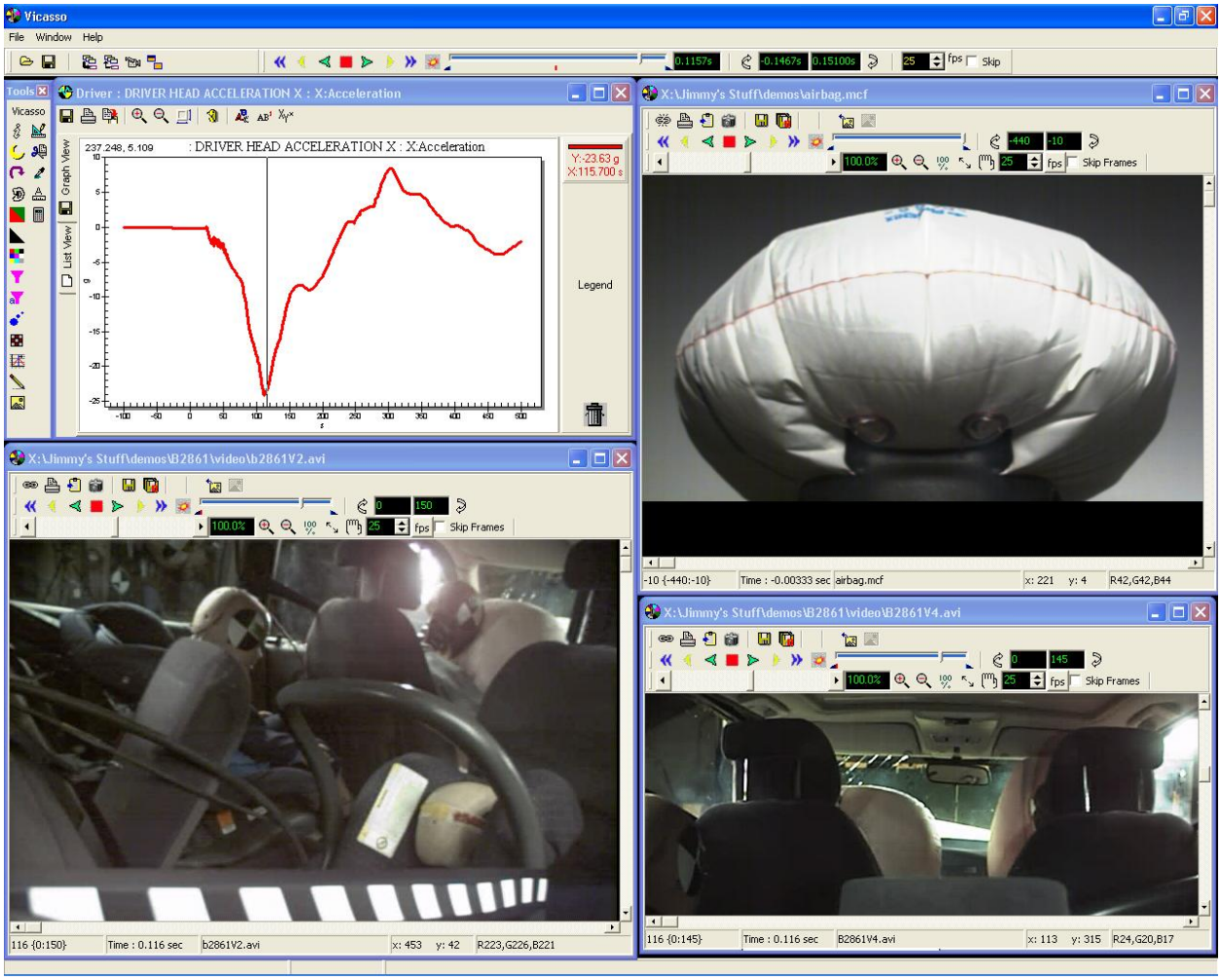
Another valuable function provided is the annotation of the video image, be it with text, grids, lines, and timing information or logos that helps to personalise the video to your company.

Vicasso includes many features to help users to work efficiently to realise their objectives. For example all adjustments can be previewed on a single frame before being applied to the whole video. Each successive adjustment is added to an adjustments (history) list and thus individual modifications can be disabled or deleted. A standard series of effects can be automated by being saved to a template and these effects added by batch files. Whilst simpler tools allow any single frame to be straightforwardly printed or saved to the clipboard.

There are two versions of Vicasso, the standard Vicasso and Vicasso Plus. Both versions allow playing of video files in various different formats. They also both allow the different filters and image enhancement features to be previewed in a frame, but only the '*Plus*' version allows the enhancement to be applied to the rest of the video sequence and the option to save them in a variety of formats.

Vicasso standard comes with the option to upgrade via entering a serial number and activation key found under the 'Help' menu on the main windows toolbar, see section 2.1.2. To obtain the serial number and activation key/s please contact your software supplier or visit http://www.pixoft.co.uk.

Not only does the 'Plus version allow enhancements made to one frame applicable to the rest of the video sequence but also provides the user with a valuable piece of image processing software capable of enhancing whole video files with various filters and mathematical functions.



Vicasso Player Main Window and Video Window

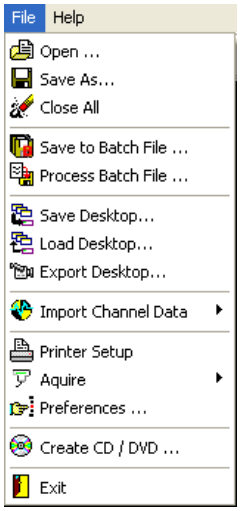
3 The Main Form

This consists of drop down menus and toolbars.

3.1 Menus

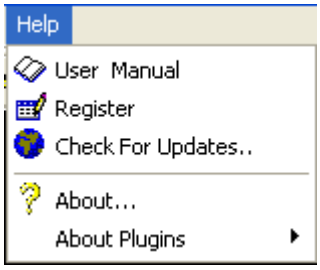
There are two available menus File and Help.

3.1.1 File Menu



Use this menu…		To do this…
Open ...	Open	Bring up the Open File Dialog Box. Vicasso can play and edit AVI video files, NAC Memrecam files (MCF), NAC HotShot Files (HSF), TIFF, JPEG and BMP sequences. Vicasso remembers what file type you last used and their location.
Save As...	Save	This brings up the Save Dialog Box. Vicasso can save out any video in the following format: AVI video file, TIFF, JPEG and BMP sequences. Any modification made to the video will also be saved out if they are present in the adjustments window. Once the save is complete the old video stream will be closed removing all the modifications made to it and the newly saved version with the modification will be opened and placed in focus.
Close All	Close All	This close the active video window/s in Vicasso.
Save to Batch File .	Save to Batch	This will save the current video to a batch file ready for batch processing (see section 7)
Process Batch File .	Process Batch File	This will process a previously created batch file (see Section 7)
Save Desktop...	Save Desktop	Save the current desktop (see section 3.1.3)
Load Desktop...	Load Desktop	Load a save desktop (see section 3.1.4)
Export Desktop...	Export Desktop	Export the Desktop (see section 3.1.5)
Import Channel Dat	Import Channel Data	Import measurement data (see section 9)
Printer Setup	Printer Setup	Setup the default printer
Aquire	Scan Image	Connect to a Scanner and scan and Image
Preferences ...	User Preferences	Set User Preferences. (See Section 4)
Create CD / DVD ..	CD/DVD Utilities	Start the built in CD/DVD burning tool (see section 8)
Exit	QUIT	Exit Vicasso Application

3.1.2 Help Menu



Use this menu…	To do this…
User Manual	Open the User Manual (PDF version)
Register	Register the Software and enable advanced feature. See section 3.1.7
Check For Updates..	Check for software Updates (see section 3.1.8)
About...	This will display an about box in the screen centre.
About Plugins	Display the About information of any installed Plugins

3.1.3 Saving The Desktop

This option will save the state of the current desktop to a file. This allows for fast re-creation of the desktop in a later session.

3.1.4 Loading the Desktop

This option will LOAD a previously save desktop. The Image Files of the saved desktop MUST be available in the original location. If not they cannot be loaded. Graph data is stored in the desktop file, so in this case the original files do NOT need to be available.

3.1.5 Exporting the Desktop

This function allows you to save the current desktop to an AVI movie sequence. The movie will run for the duration of time specified by the Mark IN and Mark OUT of the Master Time (see section 3.2.2).

When you select this option the MAIN Vicasso Window is Re-Sized such that it has a compatible size for an AVI output.

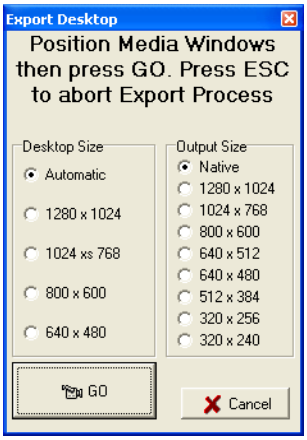
It will then display the dialog shown. You choose the desktop size by making a selection in the left radio group.

Once you have selected the desired desktop size you must the position all the open media windows (videos and graphs) to be contained within the boundaries of the Main Window. The generated AVI will be clipped at the main window boundaries, so and window outsize this boundary will also be clipped.

You can then select the dimensions of the AVI.

Once selected you can push the GO Button. You will be asked to specify the output file and the AVI Codec to use. Then the output process will begin.

To abort the process press the ESC key.



3.1.6 Notes on file formats and File Naming conventions

If a TIFF, JPEG or BMP sequence is to be played, the user has to select the start frame in that sequence. The filename for the sequence has to meet certain criteria in order to be loaded into Vicasso. A filename must have a constant description part made up of letters and numbers, but after the last letter or minus sign, the rest of the filename excluding the extension is classed as the frame sequence number. The filename is also not allowed to have more than one minus sign and the frame sequence part must only contain numbers. The entire sequence also must have the same filename length, if the sequence start frame has a minus sign, then the filename length is allowed to be increased by one, when the sequence gets to the trigger frame, i.e. frame zero then the filename length must be decreased by one. This means there must be a necessary amount of padding to the filename to acceptable.

Acceptable filename sequences are:

data0000.bmp data0001.bmp data0002.bmp data0003.bmp
data-002.bmp data-001.bmp data000.bmp data001.bmp
data01-002.bmp data01-001.bmp data01000.bmp data01001.bmp

Not acceptable filename sequences are:

data-01-005.bmp Data-01-004.bmp Data-01-003.bmp Data-01-002.bmp
data01a.bmp data02a.bmp data03a.bmp data04a.bmp

Questionable filename are:

data8.bmp data9.bmp data10.bmp data11.bmp
This sequence will open up in Vicasso but the programme will only find the first frames in this type of sequence, this is because the filename length changes, and as this is not allowed unless the sequence starts with a minus, the first two frames will only be shown.

data01000.bmp data01001.bmp data01002.bmp data01003.bmp
This sequence will open up all frames in it as they are the same length, however, the user might interpret the constant description part of the filename as 'data01' and '000' as the frame sequence number. The programme will however count the frame sequence number as starting from the last letter, this will not produce the desired frame count as the programme will assume the sequence starts at 1000, or at 1 second if the sequence has 1000 frames per second.

3.1.7 Vicasso Registration

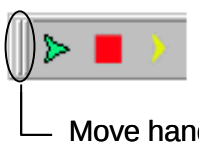
This is to register Vicasso. Vicasso when installed only comes with partial functionality, all the filters and setting will only allow a preview on the frame shown in the video window, but will not be applied to the rest of the video sequence. The Registration allows these filters and settings to be applied. The registration box will ask for a serial number and password, these can be obtained via your software supplier or from http://www.pixoft.co.uk, once these have been entered correctly the programme will inform the user that Vicasso has been successful registered and Vicasso Plus will appear in the main forms title caption.

3.1.8 Check For Updates

This option will attempt to connect Pixoft over the internet. To use this option you should have an internet connection. An installed firewall *might* disallow this procedure.

3.2 Tool Bars

There is a toolbar available on the main form. The toolbar can be re-arranged in its area or floated anywhere on the Work area of the screen. To reposition a toolbar, point to its **Move** handle and drag it to its new position. If you drag the toolbar onto the Work area of the screen, the toolbar will float. To dock the toolbar, drag it back onto the toolbar area.



3.2.1 Standard Toolbar

The Standard toolbar contains command buttons that allow you to manage Vicasso.

Standard Toolbar

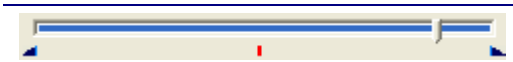
Use this button…		To do this…
	Open	Bring up the Open File Dialog Box. Vicasso can play and edit AVI video files, NAC Memrecam files (MCF), NAC HotShot Files (HSF), TIFF, JPEG and BMP sequences. Vicasso remembers what file type you last used and their location.
	Save As	This brings up the Save Dialog Box. Vicasso can save out any video in the following format: AVI video file, TIFF, JPEG and BMP sequences. Any modification made to the video will also be saved out if they are present in the adjustments window. Once the save is complete the old video stream will be closed removing all the
	Save Desktop	Save the current desktop (see section 3.1.3)
	Load Desktop	Load a save desktop (see section 3.1.4)
	Export Desktop	Export the Desktop (see section 3.1.5)

3.2.2 The Control Toolbar

The Control toolbar is used to replay and control video sequences. Playing videos from this toolbar allows multiple videos to be played in synchronism.

Control toolbar

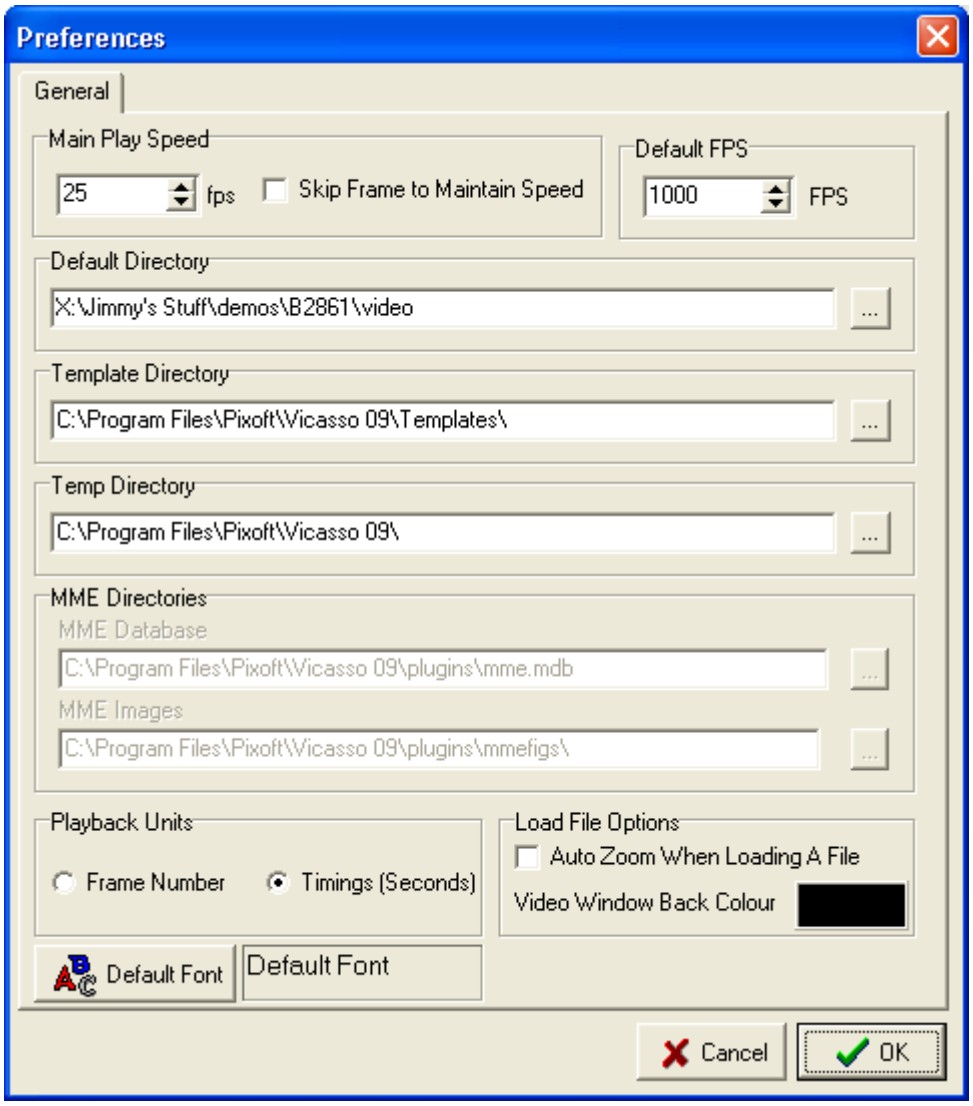
Use this button…		To do this…
	Rewind	Rewind the Master Time sequence to the earliest Time
	Step B	Step backward through the sequence a frame at a time
	Play Backwards	Play the sequence backward
	Stop	Stop the sequence
	Play	Play the sequence forward
	Step F	Step forward through the sequence a frame at a time
	Fast Forward	Advance the Master Time sequence to the latest Time
	Time Zero Frame	Set Master Time to 0
	Loop In	Mark a frame as the starting frame in the sequence if you don't want to view from the first frame. When playing the sequence will start its loop from this frame.
	Loop Out	Mark a frame as the last frame in the tracking sequence if you don't want to stop viewing at the last frame. When playing the sequence will end its loop at this frame.



The frame of the sequence to be displayed can also be set by dragging the pointer on the trackbar shown above.

4 Preferences Form

Click ‘File’ then ‘Preferences will bring up the preferences form as shown below.



4.1 General Page

4.1.1 Main Play Speed

This is the default play speed of any opened file. The ‘Skip Frame to Maintain Speed’ will skip frames to maintain the FPS speed if the computer can not keep up.

4.1.2 Template Directory

This is the default directory for templates.

4.1.3 MME Directories

The ‘MME Database’ is the default directory of the MME database and ‘MME Images’ is the default directory for the MME images. {For MME extensions}

4.1.4 Playback Units

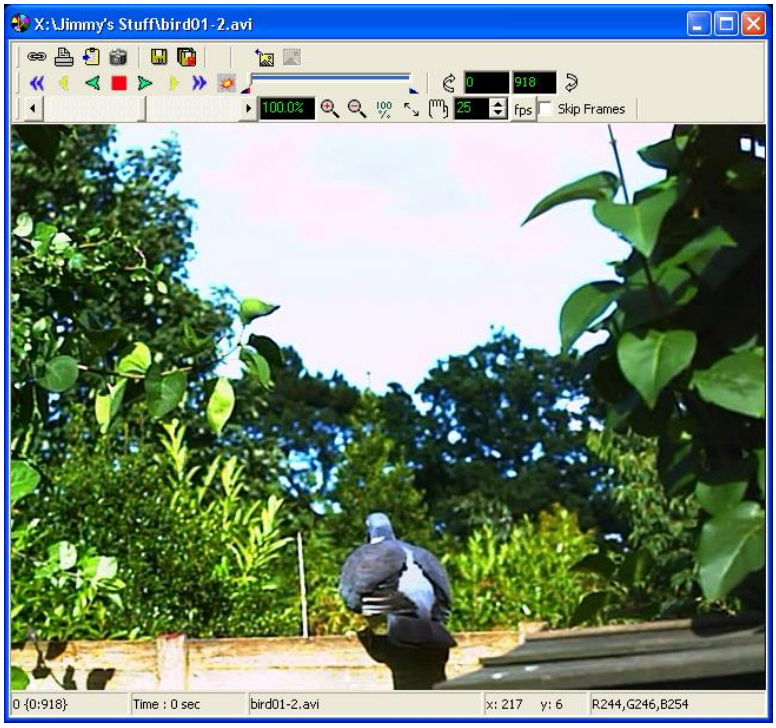
This is how the frame timings are shown. This is either by frame number or by timing.

4.1.5 Load File Options

This is how a loaded file is displayed when first opening. When Auto Zoom is checked the file will be zoomed to fit the window otherwise it will be displayed at 1:1 size. The ‘Video Window Back Colour’ is the colour the background will be of any video window.

5 Video Form

This form is created whenever a new video sequence is opened up using the standard toolbar or the file menu.



The Video Form

5.1 Video Display and Analysis Area

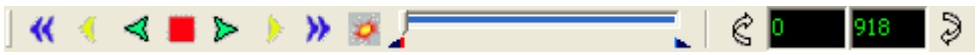
5.1.1 Image Information Toolbar

Image Information Toolbar

Use this button…		To do this…
	Synchronise	Synchronises the video window with the main form's control toolbar
	Un-Synchronised	Indicate that the video window is no longer controlled by the main form's control toolbar
	Print	This prints the current frame displayed in the video sequence
	Copy To Clipboard	Copies the contents of the image display to the clipboard
	Close	Clicking causes the video form to be closed
	Extract Frame	Opens a new Image/Video Window with a copy of the current frame
	Save as	Save the range of frames indicated by the spin-edit boxes  in the current video to a video file

	Save to Batch	Save the range of frames indicated by the spin-edit boxes  in the Current Video to a batch file for later processing
	Allow Drag (Where Installed)	Enables drag mode for the image. Used with AVI Overlay Option
	Remove Overlay (Where Installed)	

5.1.2 Sequence Control Toolbar



Sequence Control Toolbar

The Sequence ToolBar will only be visible if an image sequence is loaded. If a single image is loaded, it will not be shown.

The format of these controls is the same as that of those on the main toolbar described in section 2.2.2 The Control Toolbar. However these will only act on the local image sequence, whilst those on the main toolbar will move all open videos' frames in synchronism. Whenever this local sequence control toolbar is used to control the video window the Synchronise icon on the Image Information Toolbar changes to its broken version to indicate that this image window is no longer in synchronism with any other video windows that may be open.

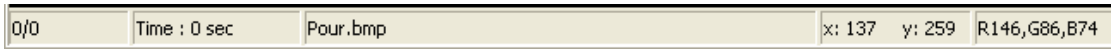
NOTE: the range boxes  here have a dual function: as well as marking the start and ends for local looped playback or the end position of the go to start or go to end buttons, they allow the user to manually select a range to save out. These figures can also be entered automatically by clicking the loop in and out buttons on the control toolbar. When the save out button  is pressed it will save out the range of frames indicated by these controls to a video file.

5.1.3 Analysis Toolbar

Analysis Toolbar

Use this button…		To do this…
	Zoom and zoom level	Use the scroll bar to adjust the zoom level with the current zoom level displayed on the right side
	Resize and un-zoom	Clicking resets the video frame to its original state
	Zoom In	Zoom in on displayed video frame by a factor of 10% for each click
	Zoom Out	Zooms out on displayed video frame by a factor of 10% for each click
	Playback Speed	Set the play back rate of the video.
	Show FPS Slider	Click the FPS Button to Show a Slider for alternative method of selecting the Playback FPS. This is a "toggle" button
	Skip Frames	Skip frames to maintain the requested playback rate

5.1.4 Video Form Status Bar



This status bar currently displays the frame number by total number of frames, the time (seconds) and the filename of the video frame being display in the video display area. The X, Y co-ordinates are located near the right side with the RGB pixel value at this position.

5.1.5 Full Screen Playback [ALT|ENTER]

Vicasso allows the video screen to be viewed using the entire screen. This can be done by selecting the video window and holding down the alt key and pressing enter on the keyboard. To revert back press the escape key.

6 Image Toolbar

The Image toolbar is shown below

ABOUT

Image Information

Brightness & Contrast

Rotate and Flip

Add Logos

Edge Detection

Binary / Morphological Filters

Colour Adjustment / Correction

Basic Filters

Advanced Filters

Motion Blur Removal

Custom Kernel for Spatial Filtering

Histogram Adjustments

Annotations

Adjustment Manager

Vicasso

ABOUT

Calibrate and Measure

Crop And Resize

Pixel Colour Peek

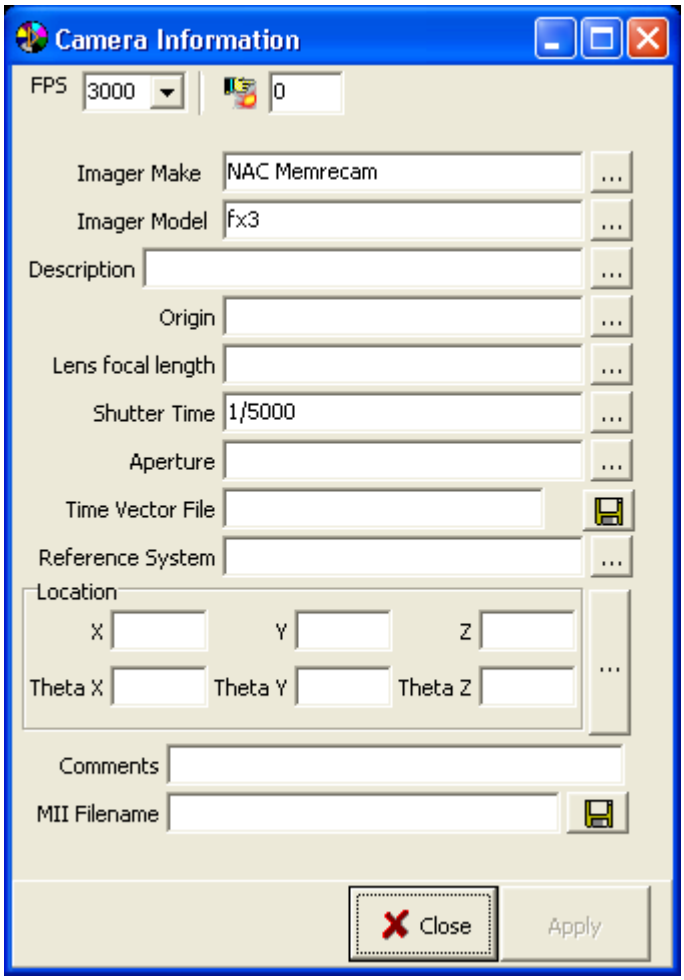
Length, Area, Angle Measurements

More Measurements

The following will appear if installed or required

Camera Specific Settings

6.1 Imager Info



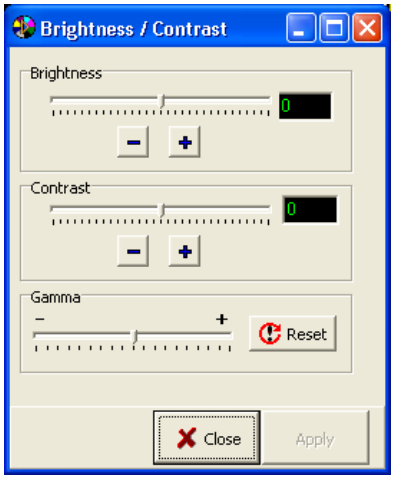
Imager Info

Use this button…		To do this…
	Camera Frame Rate	The drop down list allows the frame rate for the sequence to be chosen from a list of typical values. Alternatively the frame rate can be typed directly into the edit box. This frame rate is used to derive the time information for analysis using graphing functions. Also when any other Image Forms (Image Sequences) are open the program will use this information to calculate the appropriate frames to display in each sequence such that they are correctly synchronised.
	Set TZero	Clicking sets the currently displayed frame as the Time Zero (or reference) frame. This will determine the origin of the time axis for analysis using graphing functions. Also when any other Image Forms (Image Sequences) are open they will synchronise with this sequence such that their Time zero frames are displayed concurrently. Often this will be set to the first frame in which the airbag is activated.

Further information can be entered here. If a MII filename is entered then when the video is saved, all the information on the page will be added to the specified MII file.

If the image sequence is saved to an AVI file then this additional information will be stored in the AVI. It will be available to Vicasso when the AVI is loaded.

6.2 Brightness/Contrast



Brightness/Contrast

On this page you can adjust the Brightness, Contrast and Gamma curve of the image.

6.2.1 Brightness

The Brightness of the image can be changed by using the trackbar or plus/minus buttons. The effect is displayed interactively; however there may sometimes be a slight lag if working with large image sizes.

Press the Apply button to add the effect to the whole video.

6.2.2 Contrast

The Contrast of the image can be changed by using the trackbar or plus/minus buttons. The effect is displayed interactively; however there may sometimes be a slight lag if working with large image sizes.

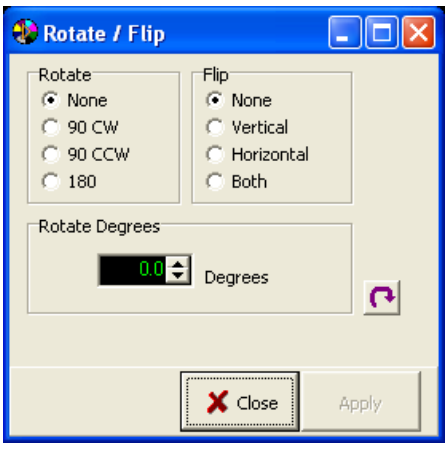
Press the Apply button to add the effect to the whole video.

6.2.3 Gamma

The Gamma Curve of the image can be changed by using the trackbar. The effect is displayed interactively; however there may sometimes be a slight lag if working with large image sizes.

Press the Apply button to add the effect to the whole video.

6.3 Rotate and Flip



Rotating an image by an predefined angle, 90 clockwise and counter-clockwise and 180 degrees around the centre of the image. Flip refers to the image being changed row by row or column by column or both from one end to the other.

To preview the Rotation press the Preview Button . To apply the rotation press the Apply Button.

Example:

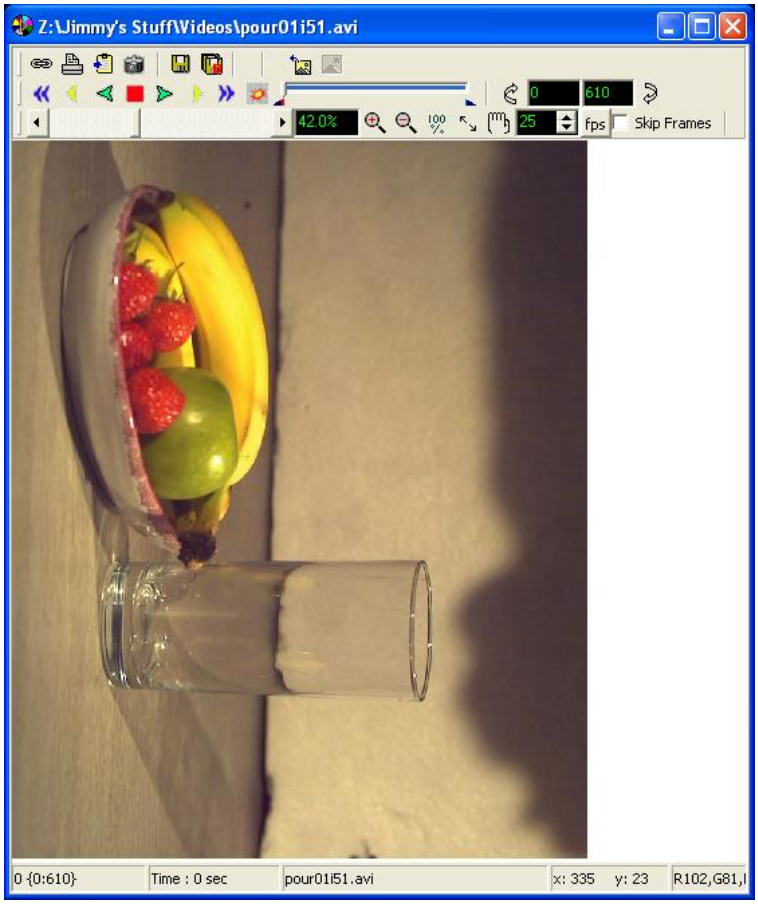


Figure 6-1Image rotated 90 degrees clockwise

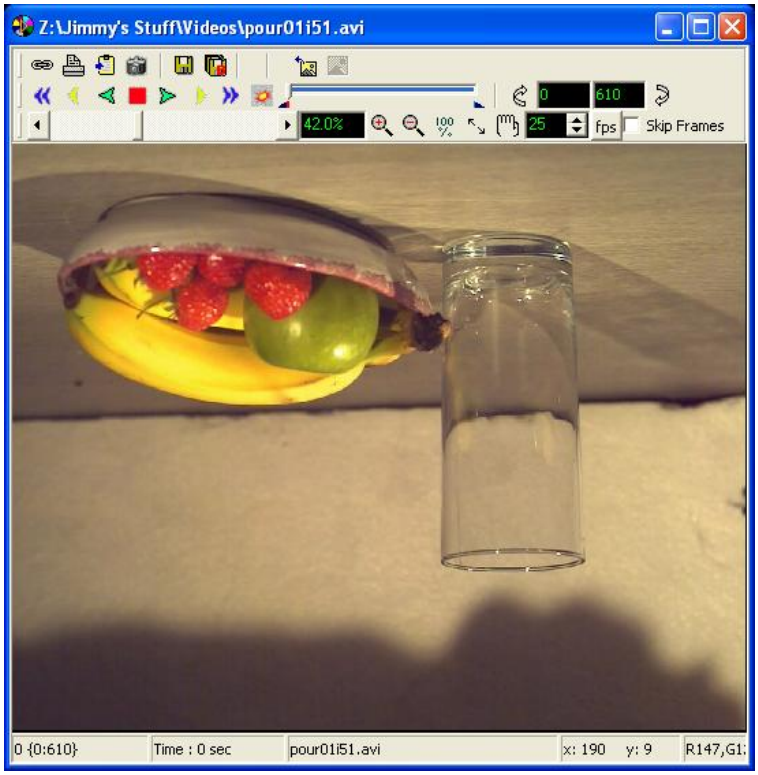


Figure 6-2: Image Flipped vertically

6.4 Logo's

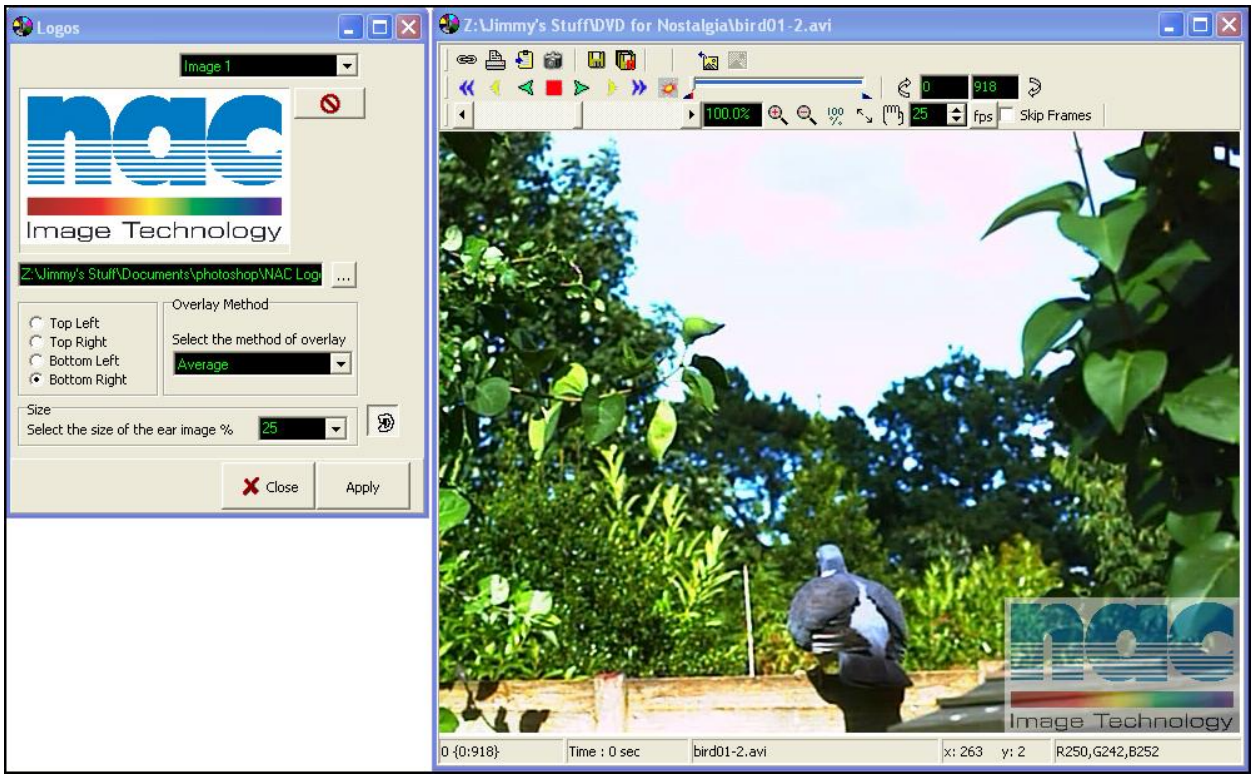


Figure 6-3 A Logo Superimposed onto the Image

The Logo tool allows a bitmap to be placed on top of the image, this can be any bitmap, so long as it is not bigger than the video's image size. There are a number of options on how and where and at what size to choose from. Up to four bitmaps can be placed on the image, to access each individual bitmap use the drop down box at the top called 'Select Image'. Before changing the logo bitmap, if the current bitmap in the ear box has not been applied it will be lost as soon as another bitmap is brought up in the logo box.

To Preview the logo press the preview button 

To apply the bitmap to the video, click apply.

To load an image click 'browse', this will open up a dialog box where a select bitmap can then be added. The bitmap can then be moved into position with the 'position' box, and the bitmap size can be changed with 'size' box and the method in which it is superimposed can be changed by selecting the required method with the drop-down box in the 'Overlay Method' box. There are a number of methods to choose from depending on what the background image is. Experimentation is crucial to achieve the desired effect.

There is also a clear button  which clears the selected ear image from the video, and does not apply it when the video is playing.

6.5 Edge Detection

Vicasso comes with six methods of edge detection.

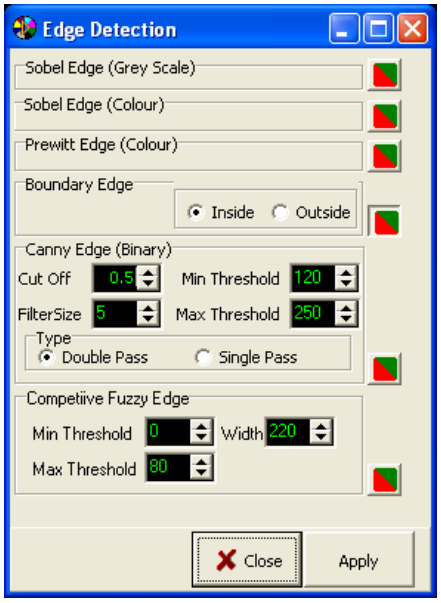


Figure 6-4 Edge Detection options

Push the required Preview Button  to preview and then Apply the Edge Detection.

6.5.1 Sobel Edge (Greyscale)

The Sobel Edge uses the following mask to find the edges of the image.

$$\begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$$ in the Horizontal Direction

$$\begin{bmatrix} -1 & -2 & 1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$$ in the Vertical Direction

In this case the image is converted to HSL (Hue, Saturation and Luminance) colour space and the mask is applied to the luminance (or intensity) component. Thus the greyscale value of the resultant image indicates the

6.5.2 Sobel Edge

The Sobel Edge uses the following mask to find the edges of the image. The Sobel mask gives greater influence to the central pixels (i.e. those closest to the calculated pixel) than in the case of the Prewitt mask.

$$\begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$$ in the Vertical Direction

$$\begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$$ in the Horizontal Direction

In this case the mask is applied to the RGB value of the image and thus the RGB values in the resultant image indicate the relative strength of the edges in each of the colour components.

6.5.3 Prewitt Edge

The Prewitt Edge uses the following mask to find the edges of the image. The Prewitt mask gives equal influence to all of the surrounding pixels.

R $$\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$$ in the Horizontal Direction

ıg Ltd

$$\begin{bmatrix} -1 & -1 & -1 \\ 0 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix}$$ in the Vertical Direction

In this case the mask is applied to the RGB value of the image and thus the RGB values in the resultant image indicate the relative strength of the edges in each of the colour components.

6.5.4 Boundary Edge

The boundary Edge function will find the edge boundaries in the image by highlighting the differences between the image and the erosion (inside Edge) OR dilation (outside edge) of the image.

The erosion / dilation of the image is performed with a square 5x5 neighbourhood. For more information on Erosion and Dilation see Binary/Morphological FX {6.6}.

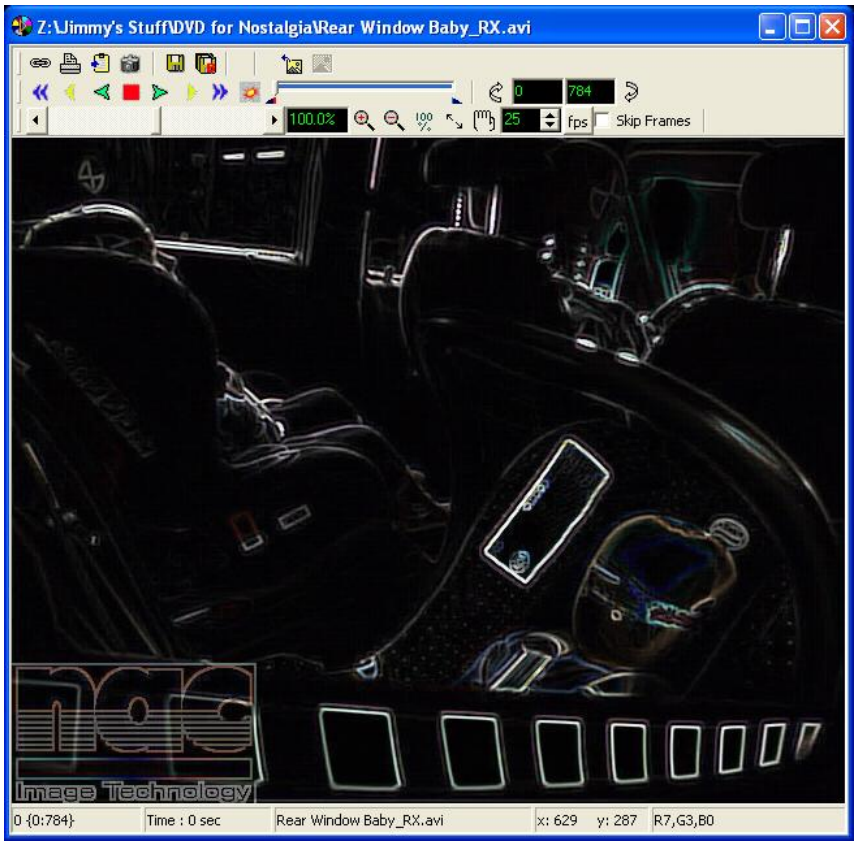


Figure 6-5 Example of Boundary Edge

6.5.5 Canny Edge

The Canny edge detector is a complex edge detector that attempts to optimise the edges detected so that they correspond as close as possible to true boundaries of objects in the image. It attempts to meet the following criteria:

Low error rate – maximising signal-to-noise ratio, so that true edges present in the image are not missed, whilst ignoring non-edges such as noise.

Edge points must have good localisation - marked edges should be as close as possible to centre of true edges.

Each edge should only give a single response.

The basic steps to achieve this are:

Smoothing to eliminate noise - automatically uses Gaussian Filter.

Preliminary edge detection – automatically uses Sobel operator.

Non-maxima suppression - using edge magnitude and direction derived in the previous step. Examines pixels along an edge to ensure that only a single row of pixels is used to show an edge (no thick edges).

Hysteresis thresholding - removes unlikely candidates for edges by removing all edge pixels unless they are above a threshold strength. However isolated edge pixels are designated a higher threshold than edge pixels which are along an edge line.

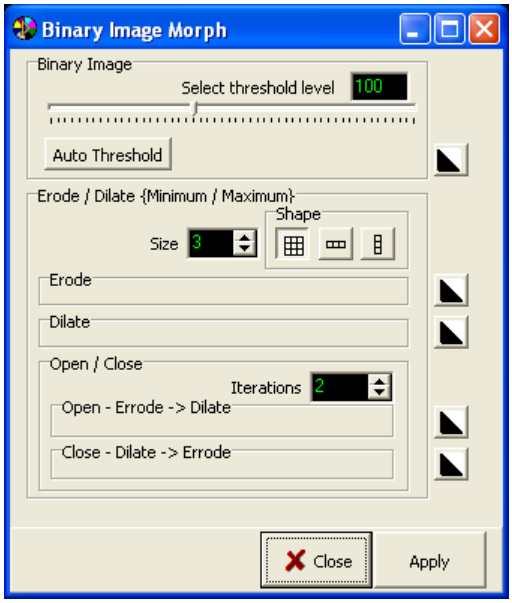
The cut-off and filter size parameters are those for the Gaussian filter automatically used within this edge detection method. Please refer to Gaussian Filter 6.8.2 section for further details.

6.5.6 Competitive Fuzzy Edge

The competitive fuzzy edge algorithm is a complex algorithm for detecting edges in an image. It produces a binary edge map of the image which is generally more accurate than the Canny edge detection but faster. The Min and Max threshold adjust the sensitivity of the edge detection along with the Width setting and experimentation is generally best to find optimal results. The default settings are generally very good for most images but tweaking the settings may produce optimal results.

6.6 Binary/Morphological FX

The Binary/Morph FX tool has functions which are often used on binary images although they also have uses on colour images. The exception is the binary image function, which is a thresholding function used to create a binary image initially.



6.6.1 Binary Image (Threshold)

The Binary Image function allows the user to change the image into black and white, with the selected threshold point. The user can change this by using the slider bar. Any value below the threshold is turned black and anything above it is turned white. This is generally used to extract pertinent information from an image by separating the foreground objects from their backgrounds. By pushing the “Auto Threshold” button, the software will calculate the best threshold value automatically.

6.6.2 Errode / Minimum

The Errode function will modify each pixel value to be the minimum value within it’s neighbourhood. The neighbourhood is defined by the size and shape options.

6.6.3 Dilate / Maximum

The Dilate function will modify each pixel value to be the Maximum value within it’s neighbourhood. The neighbourhood is defined by the size and shape options.

6.6.4 Open

The Open function performs a defined number of iterations of the Dilate function followed by the same number of the Erode function. The effect is to separate blobs while not noticeably changing the size or shape of the individual blobs.

6.6.5 Close

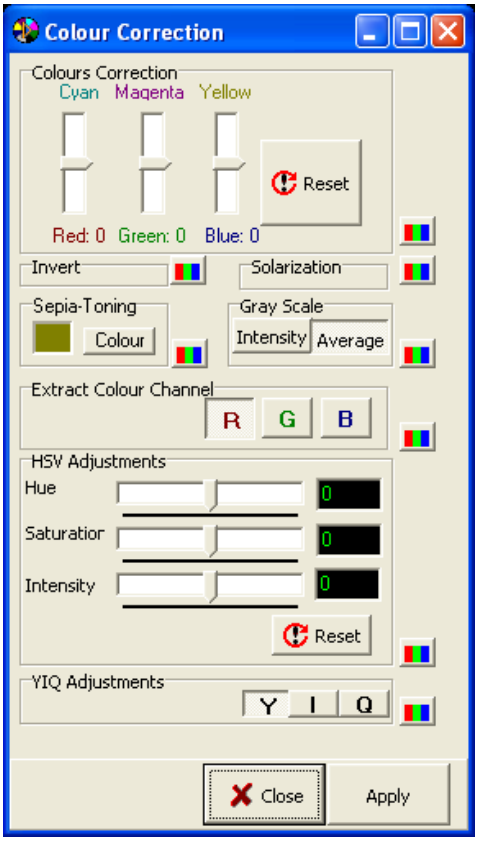
The Close function performs a defined number of iterations of the Errode function followed by the same number of the Dilate function. The effect is to close holes in blobs while not noticeably changing the size or shape of the individual blobs.

6.7 Colour Adjustments Tab

The colour Adjustments Tab Sheet is shown to the right.

6.7.1 Colour Correction

Here you have the option of changing the colour ratio of the current frame displayed in the video area. The slider bars operate on the red, green and blue colours of an image, adding or taking off the selected value on the slider bar for each individual pixel. There is also the option to reset the image to initial value by clicking the reset button, or applying the chosen settings to whole video sequence.



Press a Preview Button to see the effect. 

6.7.2 Invert

When the preview button is clicked the current image will be inverted and displayed, such that dark areas become bright and vice versa and for example purely red area will only contain blue and green. The apply button inverts the entire video sequence. The image is said to be a negative picture.

6.7.3 Solarization

This is an effect that mimics the effects of exposing the image to bright light during development. Again the preview button previews the current frame while the apply button applies the effect to the video sequence.

6.7.4 Sepia-Toning

Applies a chosen colour via the ‘Sepia Colour’ button to the current frame. The preview button applies the effect just on the current frame and the apply button to the whole of the video sequence.

6.7.5 Gray Scale

This turns the current image into a Gray Scale image, and the apply button turns the whole video sequence into a Gray Scale video. The grey level is calculated by either averaging the Red, green and Blue components (Average) or by calculating the Intensity.

6.7.6 Extract Colour Channel

This will filter out all colours except the selected, either red, green or blue.

6.7.7 Hue, Saturation and Intensity

By adjusting the hue, saturation or intensity track-bars will adjust the picture's hue, saturation or intensity. Clicking 'Reset' will reset the track-bars back to zeros and clicking 'Apply' will apply the settings.

6.7.8 YIQ Extraction

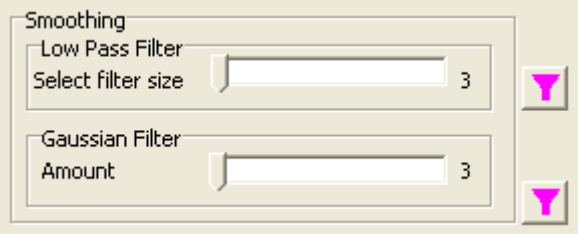
By clicking the Y, I or Q buttons this will extract the Y, I or Q component of the image. Clicking Preview will preview the option and clicking Apply will make the selection permanent.

6.8 Filters

On this tool sheet there are Five types of filters divided into Smoothing and Sharpening groups:

6.8.1 Smoothing - Low Pass Filter

A Low pass filter smoothes the image, it can be used to blur an image. The larger the filter size the more the smoothing effect is applied.



6.8.2 Smoothing - Gaussian Filter

Many filters in either the space or spatial frequency domain contribute negative effect to the responses of noise-smoothing linear image enhancement filters. Frequency-domain side lobes lead to noise leakage, and space-domain side lobes lead to ringing artefacts. A filter with side lobes in neither domain is the Gaussian filter, with impulse response:

$$H(m,n) = \frac{1}{2\pi\sigma^2} e^{-(m^2+n^2)/2\sigma^2}$$

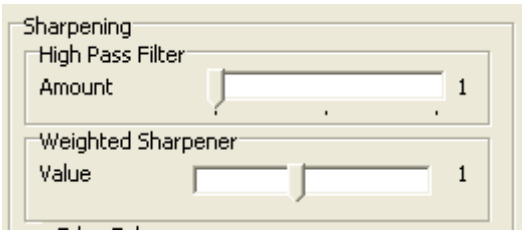
Impulse response is also infinite in extent, but it falls off rapidly way from the origin. The Gaussian filter is noted for the absence of ringing and noise leakage artefacts. The half peak radial frequency bandwidth is:

$$\Omega_c = \frac{1}{\pi\sigma}\sqrt{\ln\sqrt{2}} \approx \frac{0.187}{\sigma}$$

The Gaussian Filter feature selects an appropriate cut-off and filter size for the blurring amount selected. The larger the amount, the more the blurring is applied.

6.8.3 Sharpening - High Pass Filter

High pass filtering sharpens the image, it is used to highlight fine detail in an image or enhance them by convoluting the image with a filter mask. The values for a 3 x 3 mask should include a positive value in the centre location with negative coefficients in the rest of the mask; the sum of their elements should equal unity preventing a reduction of contrast. The larger the amount the more the filter is applied to the image.



6.8.4 Weighted Median Sharpening

The weighted sharpener can be used to sharpen an image; it works by adding proportional amounts from two high-pass filtered images of the original image to the original image. First the positive slope edges must be extracted, then the negative ones, and combining appropriately the original image. Two parameters are then available one for a clean image and another for a dirty image. The higher the value the more the sharpener is applied.

6.8.5 Edge Enhance

The Edge Enhance is an advanced filter sharpen edges in the image. choose the level of enhancement from the drop down list.

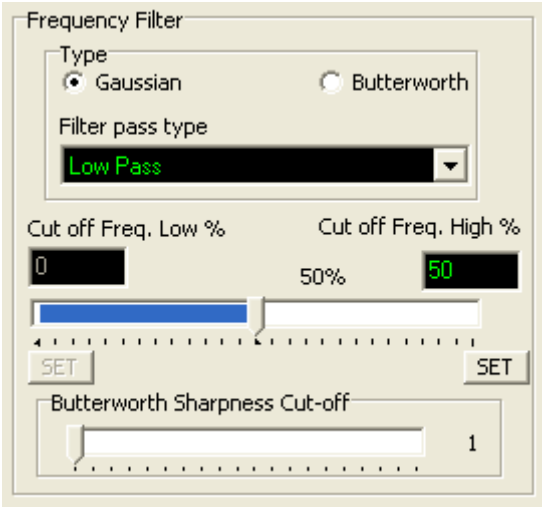
6.9 Advanced Filters

On this tab sheet there are four advanced types of filters:

6.9.1 Frequency Filters

The frequency filters allow frequencies contained in the image to be filtered out; e.g. high frequencies taken out to smooth the image or low frequencies to produce an edge map. The frequencies can be filtered using either the Butterworth or the Gaussian filter, described below.

To filter out frequencies the range type must first be selected. These are;



Low Pass	Retain just low frequencies
High Pass	Retain just high frequencies
Band Pass	Retain a custom range of frequencies
Band Stop	Filter out a custom range of frequencies (i.e. Similar to band pass but filters out all frequencies in the selected range instead of retaining the just the range)

Low and high pass are basically the same as band pass but the cut-off low frequency is fixed at 0% for low pass and high frequency is fixed at 100% for high pass. The cut-off frequency amounts are expressed as percentages of the maximum and minimum frequencies which could exist in the image. So applying a band pass with cut-off frequencies of 0% and 100% for low and high cut-off's respectively would simply return the original image. To select either the high or low cut-off frequency percentage either moving the track bar to the desired position (The track bar's % position is shown near the middle of the track bar) then clicking the 'Set' button on the left to set the low cut-off frequency or the right button for the high frequency. The value can also be typed into the cut-off text boxes which will automatically update the value. The selected range is shown in the track bar as the blue section. Clicking preview will preview the selection and Apply will apply the selection.

6.9.1.1 Butterworth Filter

The Butterworth filter is a better way to perform high and low pass filtering in the frequency domain. This filter reduces ringing by tapering edges. The following relationship can be used for low-pass filtering:

$$H(u,v) = \frac{1}{1+\left[\frac{D(u,v)}{C}\right]^{2n}}$$ where C = cut off frequency, n = order of the filter

For high-pass filtering the relationship changes as follows:

$$H(u,v) = \frac{1}{1+\left[\frac{C}{D(u,v)}\right]^{2n}}$$

The Butterworth Filter box has a filter pass type, which allows the following types of filtering: low, high, band pass and band stop.

When selecting the Butterworth Filter the Sharpness Cut-Off track bar will become visible. This has a range 1 to 20 and is used for the Butterworth filter pass type. Vicasso allows experimentation to achieve the desired effects.

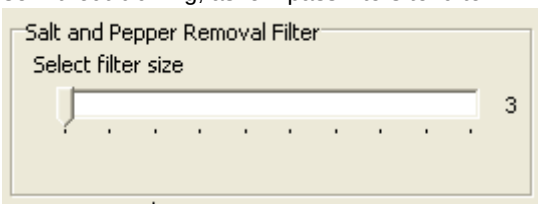
6.9.1.2 Gaussian Frequency Filter

Gaussian Frequency Filter on the Advanced Filters Tab

This is similar to the Butterworth Filter described above but is less susceptible to ringing artefacts.

6.9.2 Salt and Pepper Removal Filter

The Salt and Pepper Removal or Median Filter is used to remove noise without blurring, as low-pass filters tend to blur edges and other sharp details. A median filter replaces the centre pixel from a k x k matrix with the neighbourhood's median value. Sorting all the pixels within the neighbourhood in to order from smallest to largest and then selecting the middle value, which is the median value.



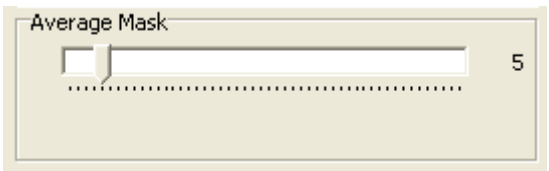
This type of filter is particularly good at removing salt and pepper noise. The size of the filter must be greater than width of the noise. The higher the filter size though the longer it takes to remove the noise. Example:

A frame with a lot of noise before applying the Salt and Pepper Removal Filter

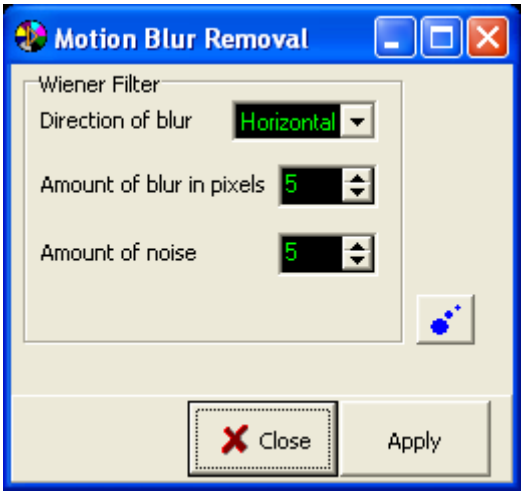
After the Salt and Pepper Removal Filter has been applied with a 5 x 5 filter size

6.9.3 Average Mask

After filtering the image is pixellated to the filter size.



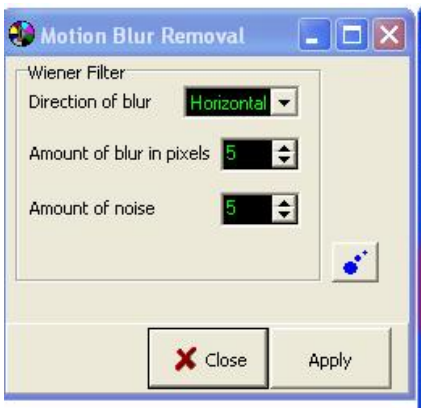
6.10 Motion Blur Removal

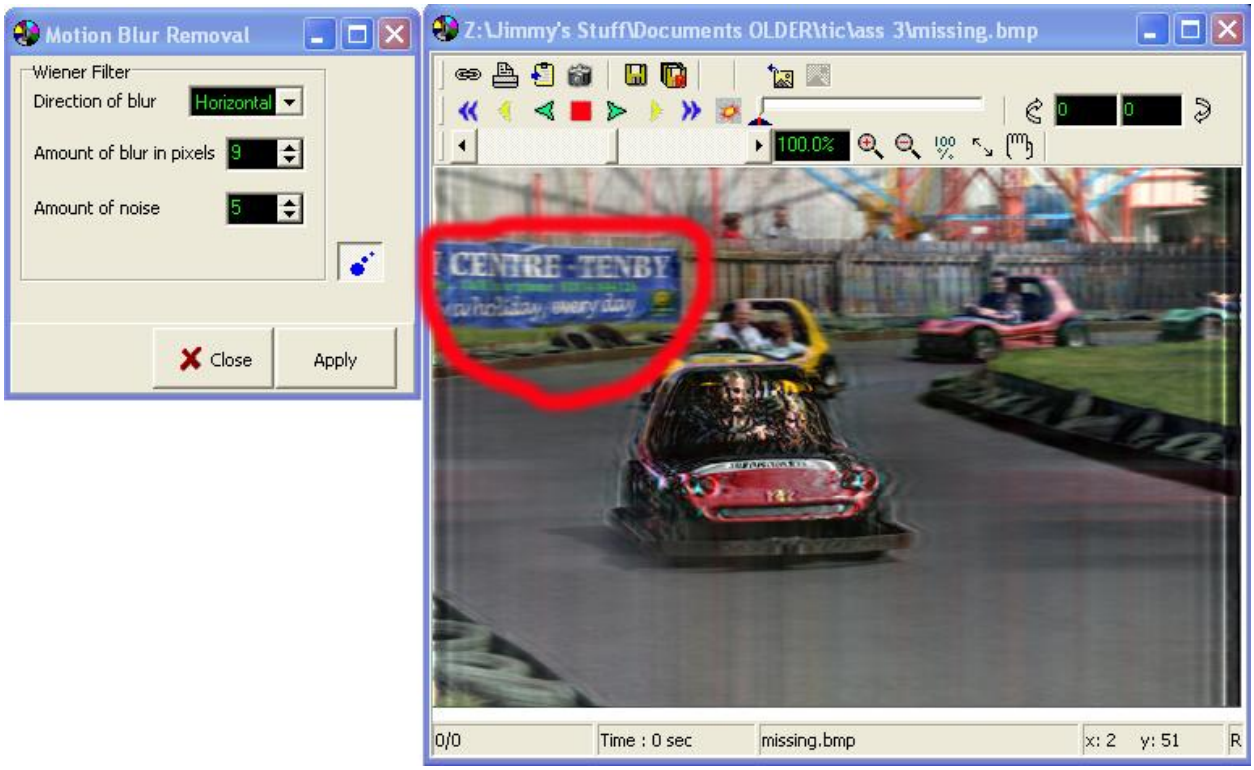


The Wiener Filter is a specific restoration filter that tries to remove motion blur from image, sometimes caused by objects moving to fast or over exposure.

The Wiener filter box takes three options, the direction of the blur horizontal or vertical, the amount of blur in pixels, and the amount of noise. Experimenting is required to achieve optimal results.

An example if using the Weiner filter is shown in the screen shots below. In the upper image the banner at the side of the race track is unreadable due to motion blur caused by the camera movement during the taking of the picture. If we apply the Motion Blur removal filter we can read the banner clearly. This filter is designed to extract information for the image. During the process some of the image might become distorted as shown in the screen shots. However, the information we require is successfully extracted.

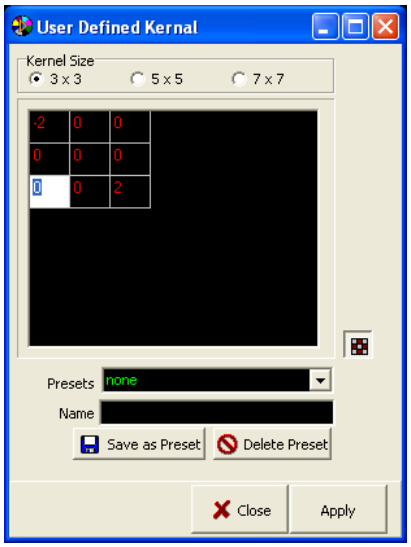



Motion Blur Removal
Wiener Filter
Direction of blur
Horizontal
Amount of blur in pixels
9
Amount of noise
5
Close
Apply
Z:\Jimmy's Stuff\Documents OLDER\tic\ass 3\missing.bmp
100.0%
CENTRE TENBY
0/0
Time : 0 sec
missing.bmp
x: 2 y: 51

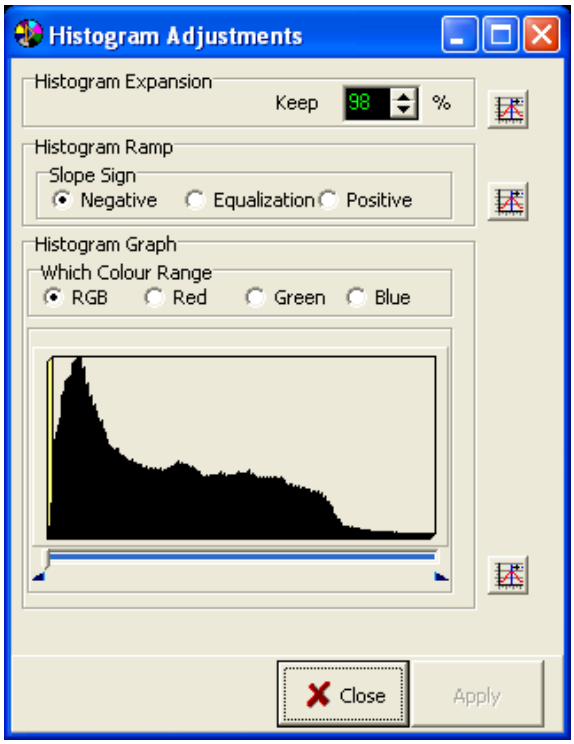
6.11 Custom Kernel

The Custom Kernel page allows you to specify a user defined Convolution (Spatial Filtering) Kernel. You have the option to create preset custom kernel definitions.

The custom kernel may be 3x3, 5x5 or 7x7 in size. The kernel values MUST be integer. The kernel is auto scaled to the number of cells such that a 3x3 kernel will be divided by 9 etc.



6.12 Histograms



6.12.1 Histogram Expansion

Histogram Expansion otherwise known as Histogram Stretch is a common technique applied to images to make them more visually distinctive. Full scale histogram stretching is a simple linear point operation that expands the image histogram to fill its entire range. If a compressed histogram with maximum brightness value B and minimum value A, the goal is to spread the brightness levels A and B to brightness levels between 0 and K-1 in a transformed image. Expressed in two linear equations:

$$PA + L = 0$$
$$PB + L = K - 1$$

where $P = \left[\frac{K-1}{B-A}\right]$ and $L = -A\left[\frac{K-1}{B-A}\right]$

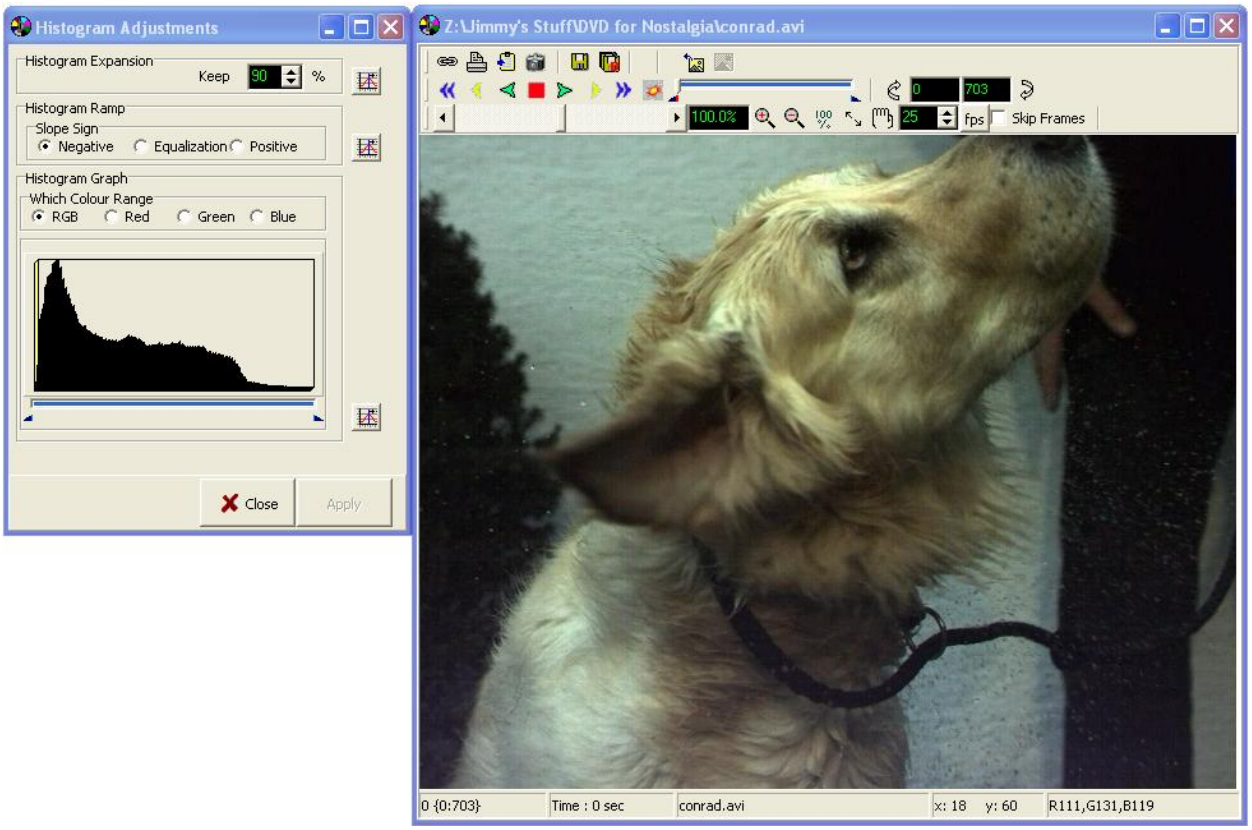


Figure 6-6 Image before Histogram Expansion

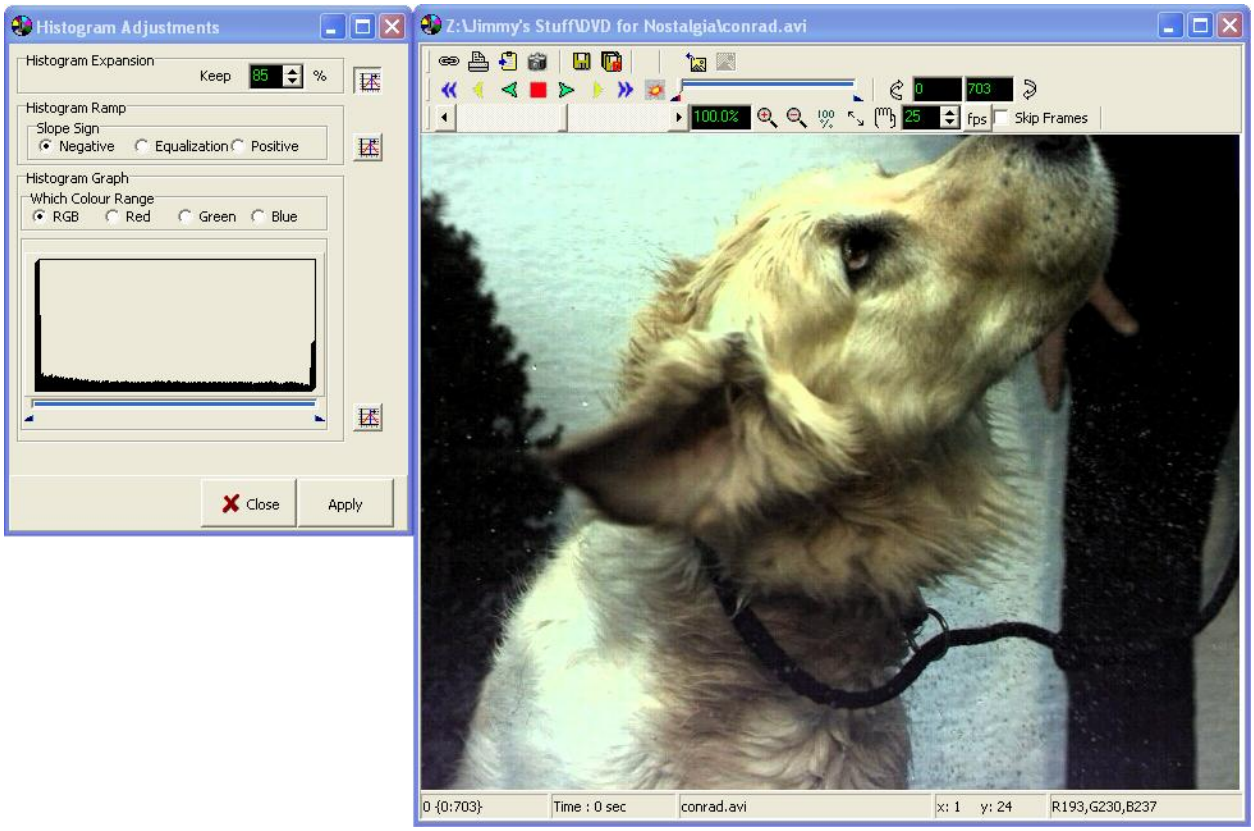
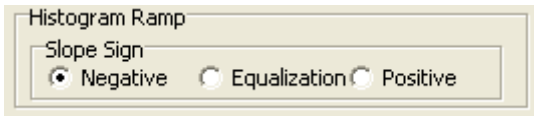


Figure 6-7After Histogram Expansion at 85%

6.12.2 Histogram Ramp

Another technique to improve contrast is to define the output shape of the histogram. One example of this is histogram Equalisation or flattening. The idea is that the image intensities should not only fill the available range, but should also be uniformed distributed over the range. Hence, an idealised goal is a flat histogram. Vicasso provides another two methods of changing the shape of the histogram is using a positive slope ramp which stretches low intensities while a negative ramp would stretch high intensities.



The results of these operations are shown in the figures below which also indicate how the histogram distribution changes after these effects are applied.

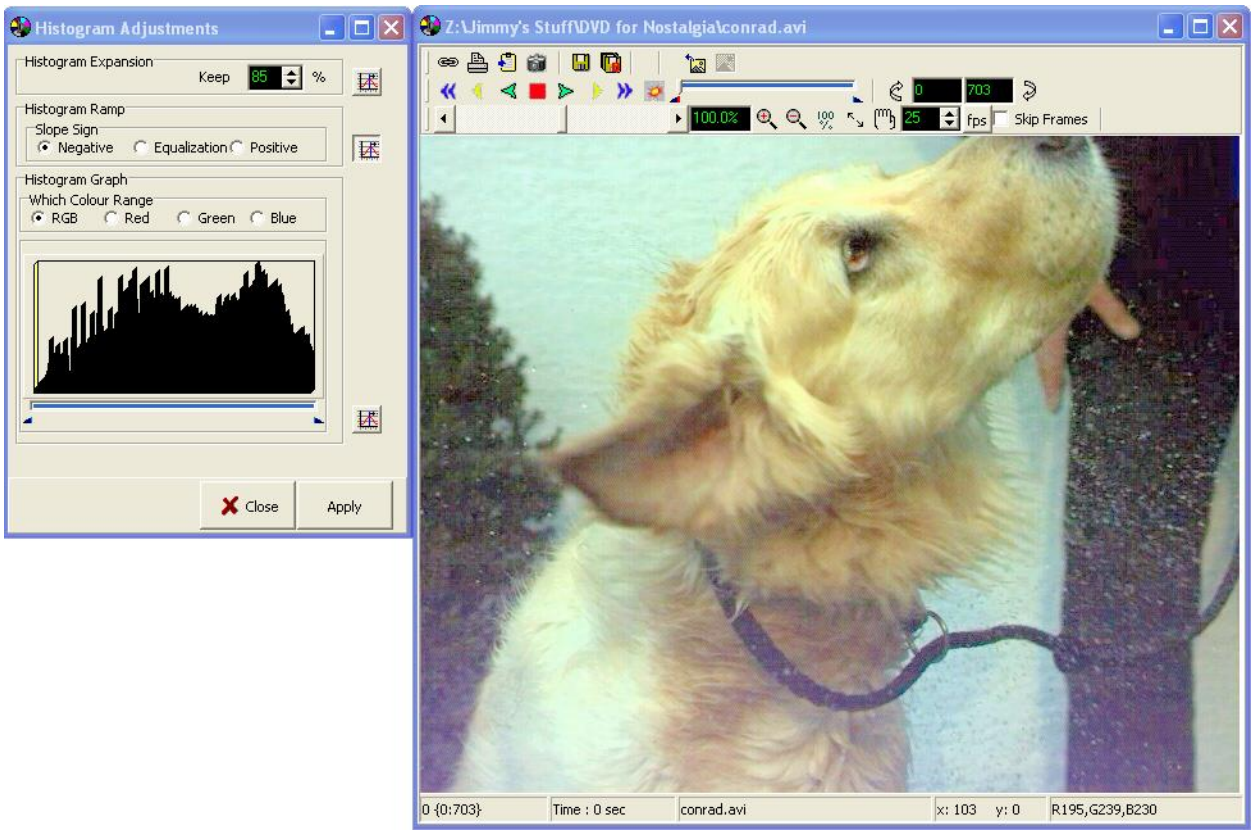


Figure 6-8 Image after Histogram Ramp – Negative Slope

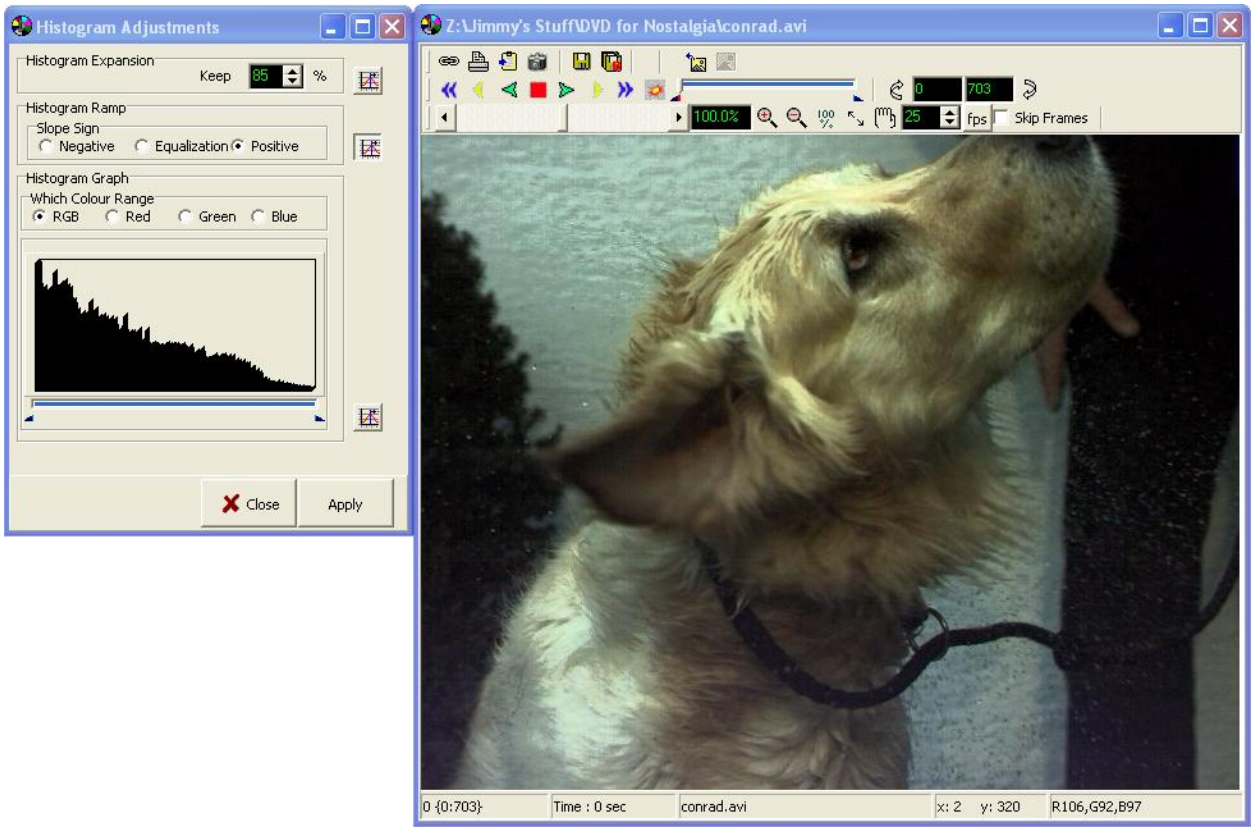
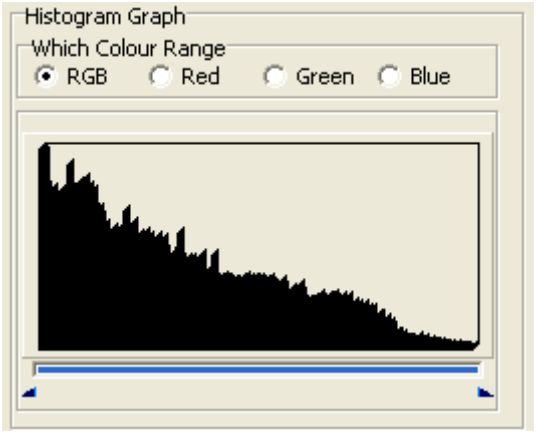


Figure 6-9 Image after Histogram Ramp – Positive Slope

6.12.3 Histogram Graph



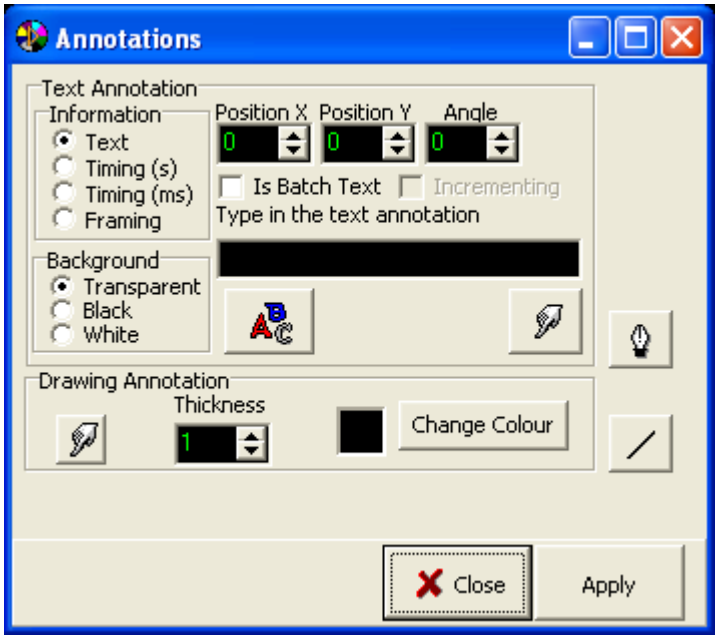
At the bottom of the Histogram tab sheet there is the option to view a histogram graph and manipulate it directly and previewing the changes. Before a graph can be viewed, the colour range must be selected first. All colours can be displayed, or just the red, green, blue channels individuals.

Once the range has been selected the preview button displays a new window containing the graph and to cut off slider bars at the bottom. At first when the graph loads up, the whole spectrum of shading values are displayed. The sliders at the button allow the high and low values to cut off. The picture below displays an initial histogram graph of the original balloon image.

To preview any changes the user wishes to make, the slider bars need to be move and the image in the video player window will change directly. If the user wishes to apply selected cut off values then the apply button will apply the changes to each frame in the video sequence.

6.13 Annotations

The annotations tab allows the user to place text anywhere on the image using the chosen font, and draw lines.



Annotations

6.13.1 Textual Annotations

To place text onto the image, the user first types in the required text in the top blank box, then the position needs to be selected by clicking on the 'Set Position' button which will become depressed. Once the 'Set Position' is depressed the user can select a position on the image with the mouse, wherever the user clicks on the image will become the top left hand corner of the text. The text will then be placed on the image after the user has clicked the left hand mouse button on the image, and the position will be place in the 'Position X' and 'Position Y' box for reference.

If the font requires changing, the 'Change Font' button will display the font dialog box:

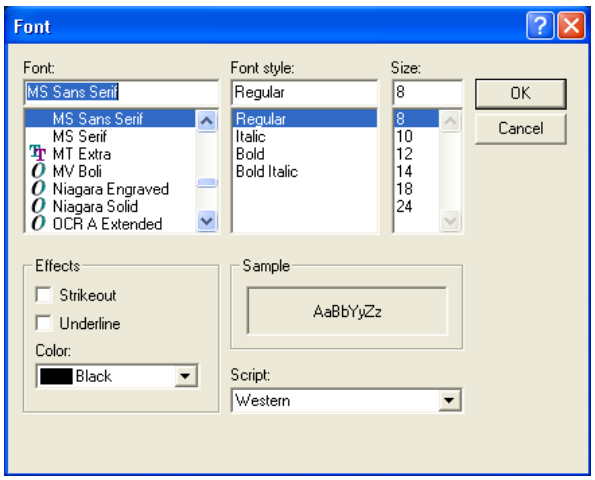


Figure 6-10 Font Dialog Box

In the font dialog box the user can not only change the font, but the colour, style, size and apply effects and scripts. Once the user has selected the required changes the OK button will update the image and close the font dialog box, clicking 'Cancel' will discard the changes and close the font dialog box.

Some fonts are not fully supported. You should try to use True Type Fonts (Marked "TT" on the Font Dialog Box).

The 'Preview' button allows text to be placed on a single frame, which is called automatically after changing the font or position. The 'Apply' button is only available with Vicasso Plus, this will apply the text to the whole video stream.

6.13.2 Batch Annotations

You can flag an annotation as a Batch Annotation by selecting the Check Box. Batch Annotations work in the same was as text annotations, EXCEPT that the actual annotation text is input by the user when the Batch File is processed. As the batch file is processed the user is prompted for the Batch Annotation Text. The prompt text is the text entered by the user during the set up of the batch annotation.

As an illustration, suppose that the users wants to set up an adjustment template to apply to all files being converted. This may annotate a test number for example. However, the test number will be different for each test. The user can set up a Batch annotation template, which prompts for the test number. This annotation can be applied to any number of tests, which are to be processed in a test wide batch file. As the batch file is processed, the user is prompted for the test number. This is then annotated onto ALL the files in the batch file.

The next time the batch file is run, with the next test for example, the user will again be asked for the test number.

Use the ***Incrementing Check Box*** to specify that the Numerical part of the Annotation should be INCREMENTED with each file in the Batch File. In order for this to operate correctly the right most part of the Batch Annotation text should be numerical.

Correct Examples are :

T1234

TEST001

Incorrect Examples are :

1234T

0001TEST

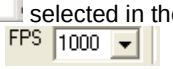
TEST

Please consider these examples when entering the Batch Annotation. NOTE : remember you will do this when you PROCESS the BATCH FILE.

6.13.3 Frame / Timing Information Annotations

This function allows the video image to be annotated with frame or timing information. Choosing the Framing radio button and pressing preview or apply will annotate the frame number onto the image, whilst the choosing the Timing radio button will annotate the time of that frame onto the image.

Both frame and timing information is calculated with respect to the reference frame 

selected in the Camera Info tab, whilst the timing information calculation also uses the Frames Per Second 

information entered on that tab page.

By default the annotations are placed in top right hand corner of the image. The Set Position button allows the text to be moved to any required position: once the ‘Set Position’ is depressed the user can select a position on the image with the mouse, wherever the user clicks on the image will become the top left hand corner of the text. The text will then be placed on the image after the user has clicked the left hand mouse button on the image, and the position will be place in the ‘Position X’ and ‘Position Y’ box for reference. If the font requires changing, the ‘Change Font’ button will display the font dialog box:

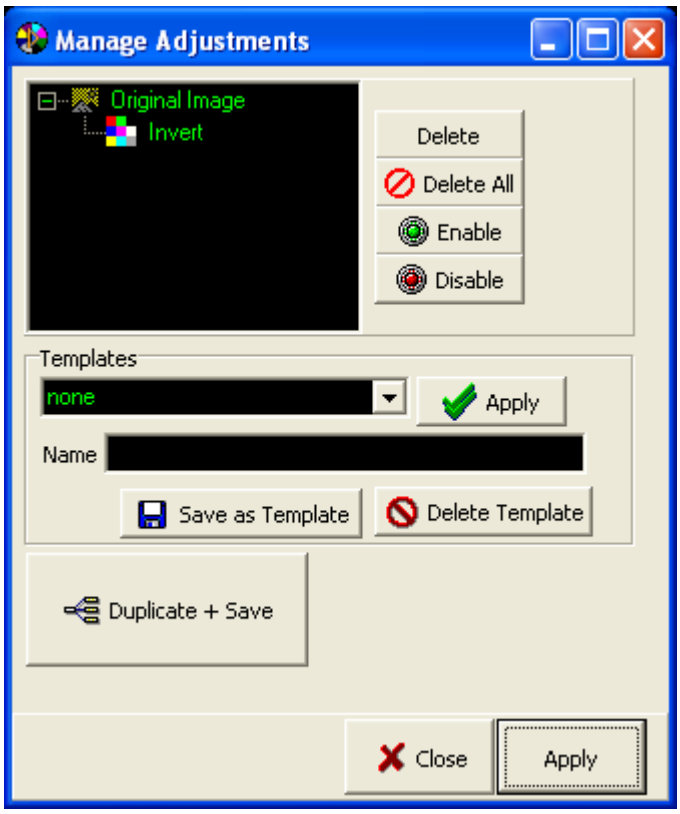
6.13.4 Drawing Annotations

This box allows the user to place single straight lines anywhere on the image. The user also has the option to change the colour of the lines drawn.

To draw a line onto the image the user needs to depress the line button within the drawing annotation box by clicking on it once. Then the user can change the colour if required and then draw the line onto the image. This is done by first selecting the start position of the line and clicking and holding down with the left hand mouse button, then dragging the mouse with to the end position, while the mouse is in motion an example line will be drawn to give the user the idea of what the line will look like. Once the mouse is position the user released the mouse button and the line will be drawn in the chosen colour. Vicasso plus allows many line to be drawn onto the image and applied to the

whole video sequence, but after each line is drawn the user must click the ‘Apply’ button else the last drawn line will not be added to the video sequence. This is because each line is classed as a modification to the image and therefore is unique, so a separate entry is added for each line in to the adjustments list on the adjustments tab.

6.14 Adjustment and Template Manager



The list box contains all the enhancements, adjustments and filters made to the video sequence. They will only appear here once they have been applied.

Use this button…		To do this…
	Delete	Delete the selected Adjustment from the list
	Delete All	Delete ALL the adjustments from the list
	Enable	Enable an adjustment (but not delete it)
	Disable	Disable a previously disabled adjustment

6.14.1 Templates

Lists of adjustments can be saved as a template. This will save time if you apply the same adjustments to a number of video sequences.

The drop down combo shows the available templates.

To Select and Apply a template you should select the template from the drop down combo and push the Apply button. NOTE: The template adjustments will be APPENDED to the adjustment list, so if you have already applied some adjustments these ***will*** be retained.

To create a new template you should first prepare the adjustments in the normal way. Next type a descriptive name in the NAME edit box. Push the Save As Template Button. The adjustment on the list will be stored into the template.

To Delete a template you should select (but not apply) the template from the drop down combo list and then push the Delete Template button.

Use this button…		To do this…
	Apply	Apply the selected template to the current Video
	Save as Template	Save the current adjustments to a template. Specify the template name in the “Name” Edit Box
	Delete Template	Delete the current template

6.14.2 Duplicate and Save

The duplicate and save function provides quick batch processing facilities. You can apply adjustments to one image sequence and then, using the duplicate and save option, apply the same adjustments to other files and resave them as an image sequence. If you push the duplicate and Save button you will see the following screen.

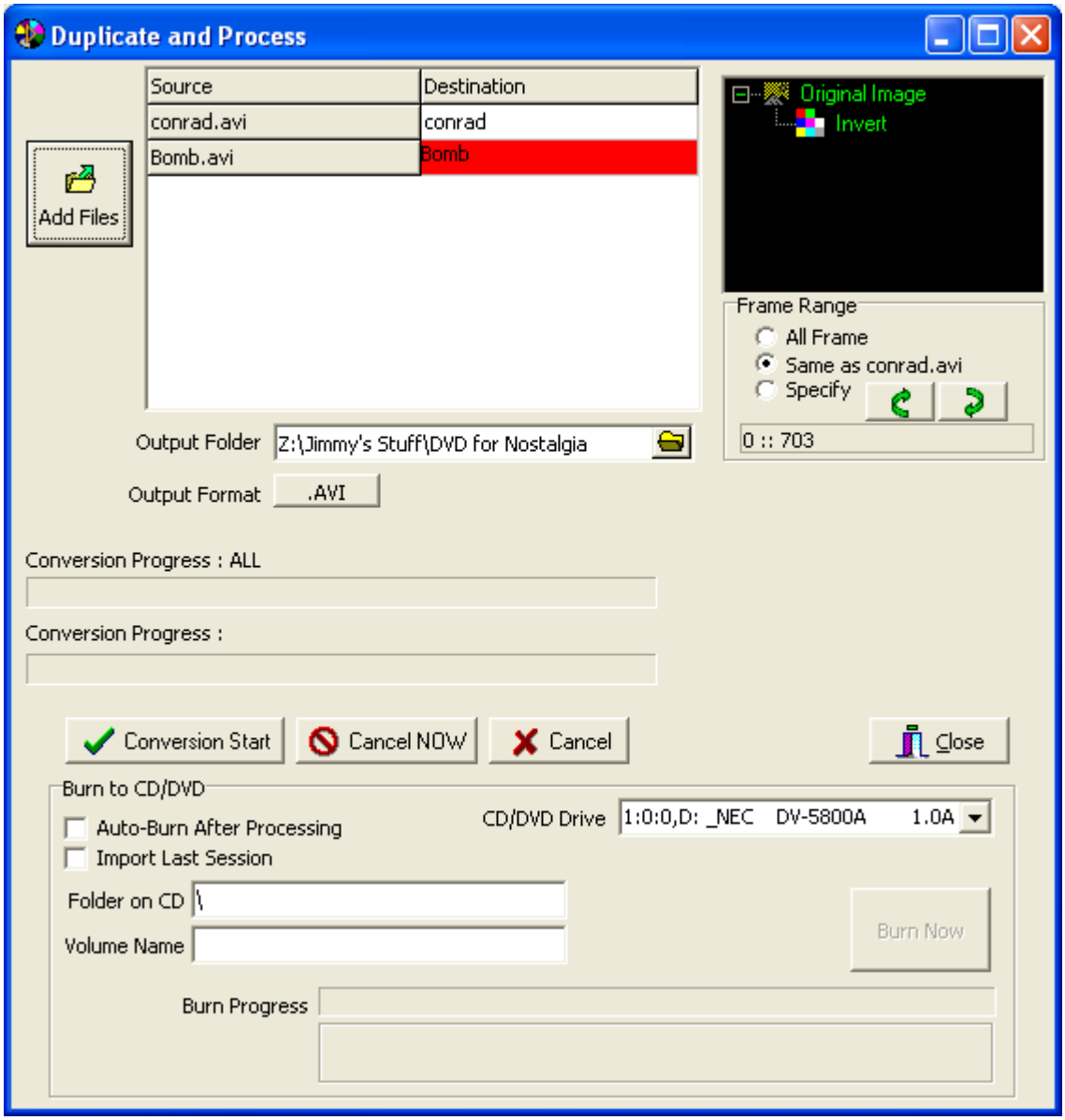
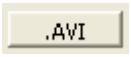
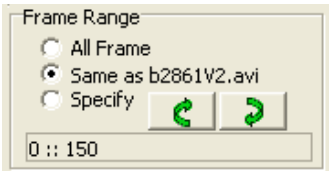
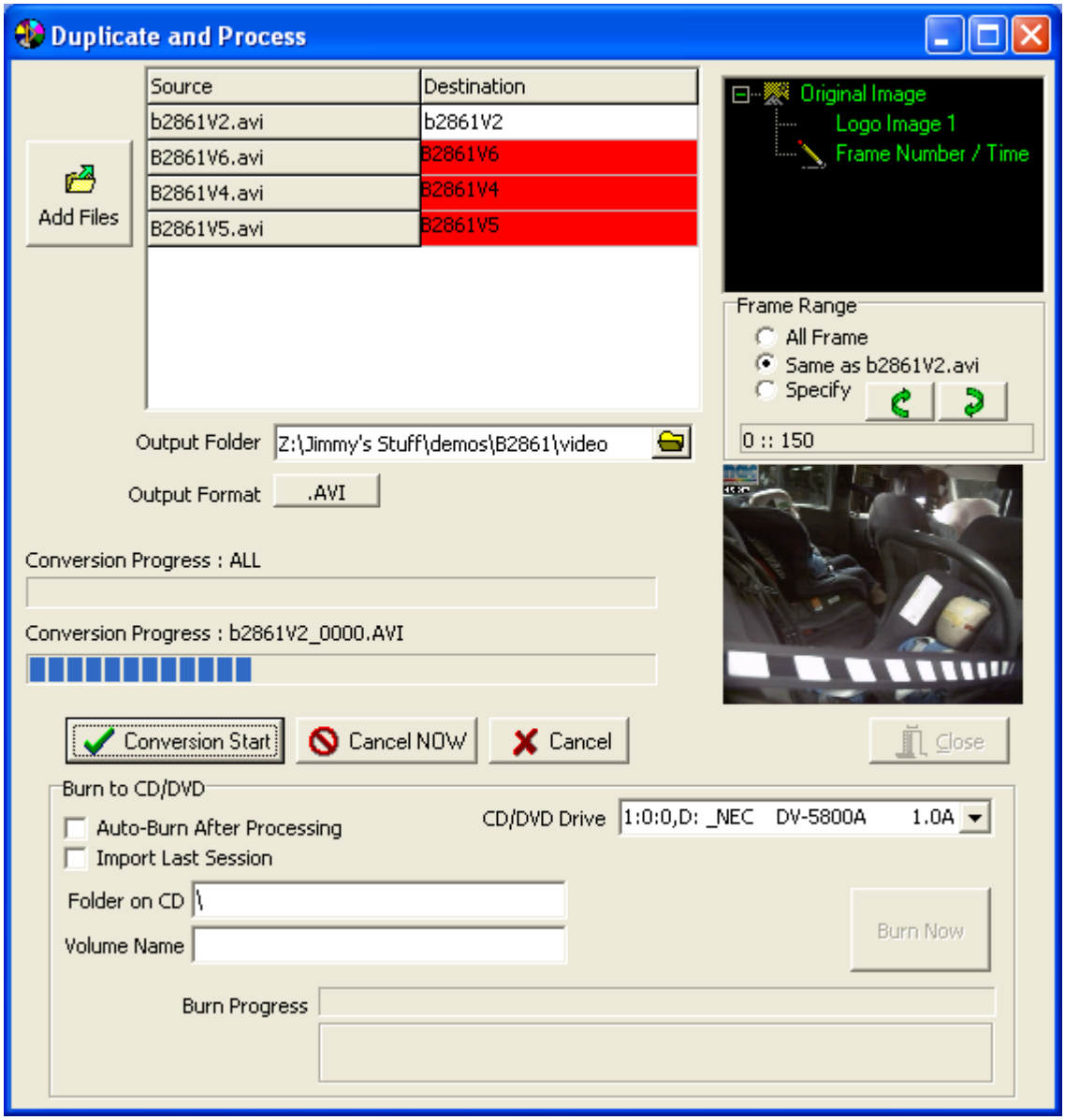


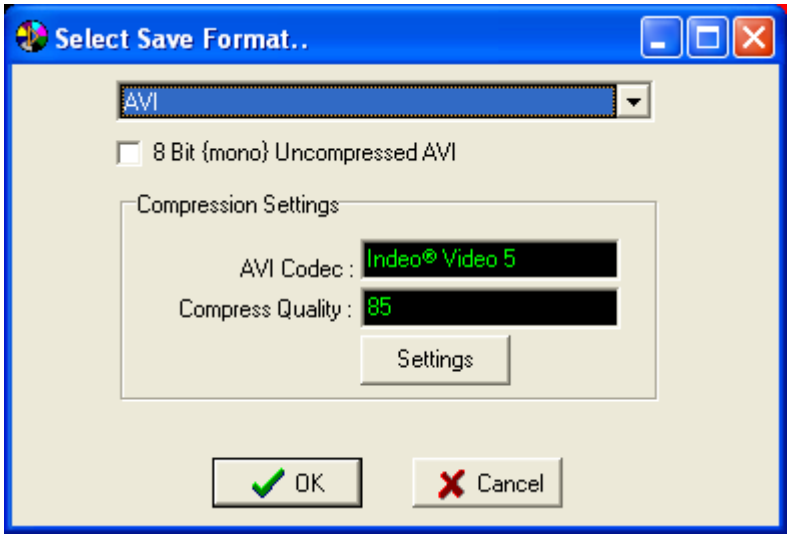
Figure 6-11Duplicate and Process screen

Use this button…		To do this…
	Add files	Add files to be processed
	Output Folder	Specify the folder to save the files to.
	Output Format	Select the format of the processed files
	Frame Range	Specify the frame range to process for the set
		Specify the Start Frame
		Specify the End Frame
		Begin File Conversion
		Cancel the save in immediately
		Cancel the Save when the current file processing is finished
BURN CD / DVD		Save the processed files to CD or DVD



The above screen shown the Duplicate and Process file working. A thumbnail of the current file is shown together with progress bars for the current file and the set.

6.14.2.1 Output Format



Push the output format to select the save file type. Options are :

AVI
AVI[8] : 8 bit mono
TIFF
BMP
JPEG

6.14.2.2 Destination Filenames

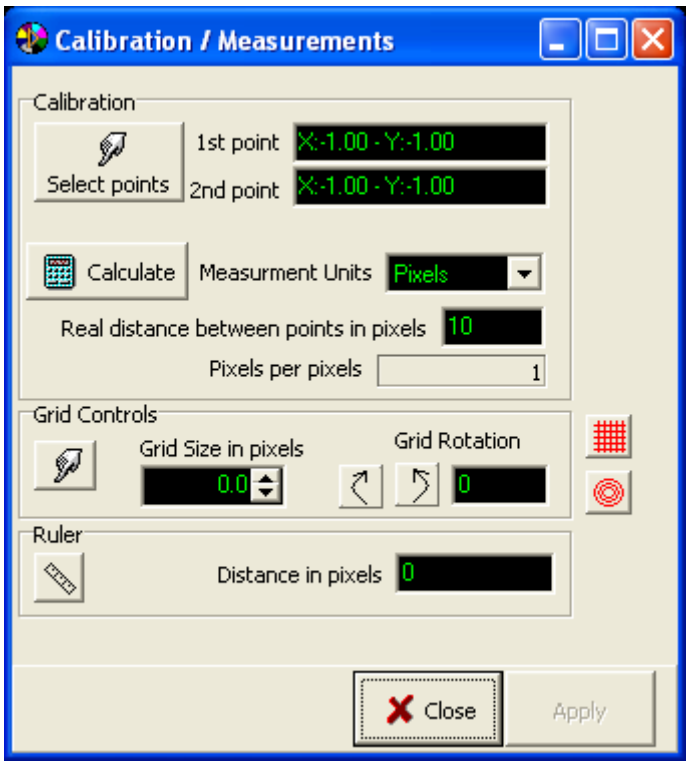
The destination filename will be the same as the source filename by default. This is because we assume format conversion as part of this process. To change the filename you can select the filename in the Destination Column and type the new filename. If the filename already exists then a number tag will be added to the destination file at the moment of saving.

6.14.2.3 Burn to CD / DVD

Checking ‘Auto-Burn After Processing’ will cause the processed files to be automatically burnt to a CD. Clicking ‘Import Last Session’ will import a previously written session ready for the new files to be added. The CD drive with the burn facility must also be selected under the ‘CD Drive’ options.

6.15 Calibrate and Measure

This tool allows quantitative measurements to be made from the images within the video sequence. Firstly calibration must be carried out to allow translation of pixel measurements in the image to physical units that apply to the real scene in which the image was captured. Measurements can be aided by the use of a square grid, polar grid or calibration lines. There is also a measurement tool, which once calibrated measures the length of a temporary line drawn on the frame.



To enable both grid and calibration line editing, the calibration factor must be worked out first. This is a very simple operation. The user first has to select two points that the distances they are apart are known. This is done by clicking the 'Select points' button, this will then remain depressed until two points on the image have been selected, underneath a label will appear asking for the first point and then the second. As the points are selected they will appear in the edit box on the right. Once the points are selected the user can then select the units and the real distance between the points. Once this figure has been added, the 'work out' button will become enabled, this when click will work out the number of pixels on the image to one unit of the distance using Pythagoras theorem.

With this pixel distance worked out, the user can now place grids, and lines. If the however a grid was required without calibration, the grid controls does allow a grid or polar grid to place by entering the grid size in pixels, but first a cross start position must be selected. Once selected a grid or polar grid can be previewed and applied with the grid size in pixels.

NOTE : It is important to note that measurements are only strictly correct if they are made in the same plane as the calibration marks. However reasonable results can usually be obtained when the distance between the calibration plane and the measurement plane is much less than the distance from these planes to the camera.

6.15.1 Grid Controls

To place a grid, the grid size and cross start position needs to be selected. To select a start position first click the 'Select Position' button then, click the required location on the image. For the square grid this will ensure that a grid vertex will pass through this point; for the polar grid this point will the centre of the polar circles.

Once the grid size is selected the user can then click one of the preview buttons, grid for a square grid, and polar for a circular grid.

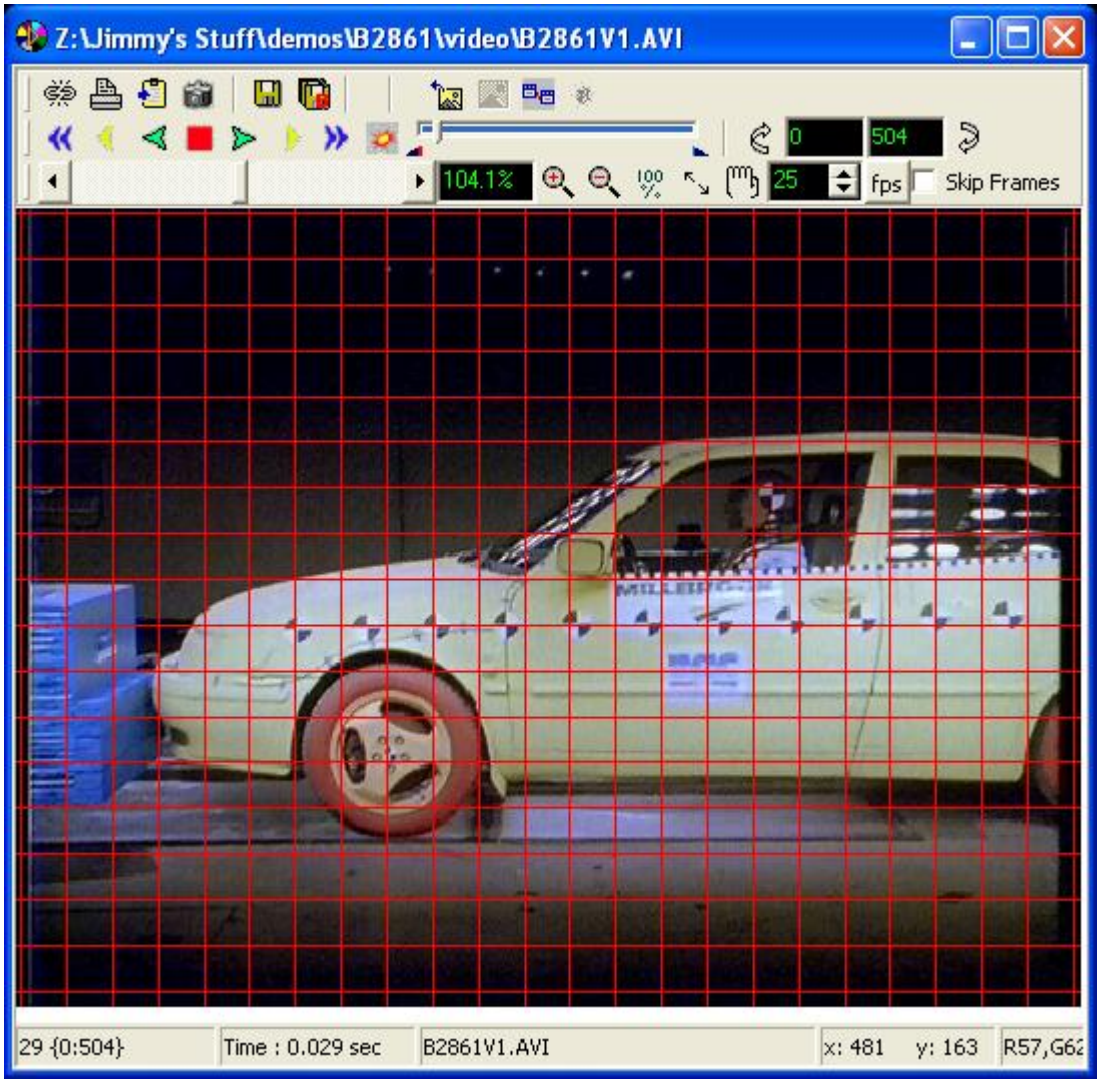


Figure 6-12 Preview of a square grid

There is also the option to rotate the grid though 90˚. This can be applied by clicking the two rotation buttons above the preview buttons. One rotates clockwise and the other rotates anti-clockwise, there is also a display to show what the current angle is.

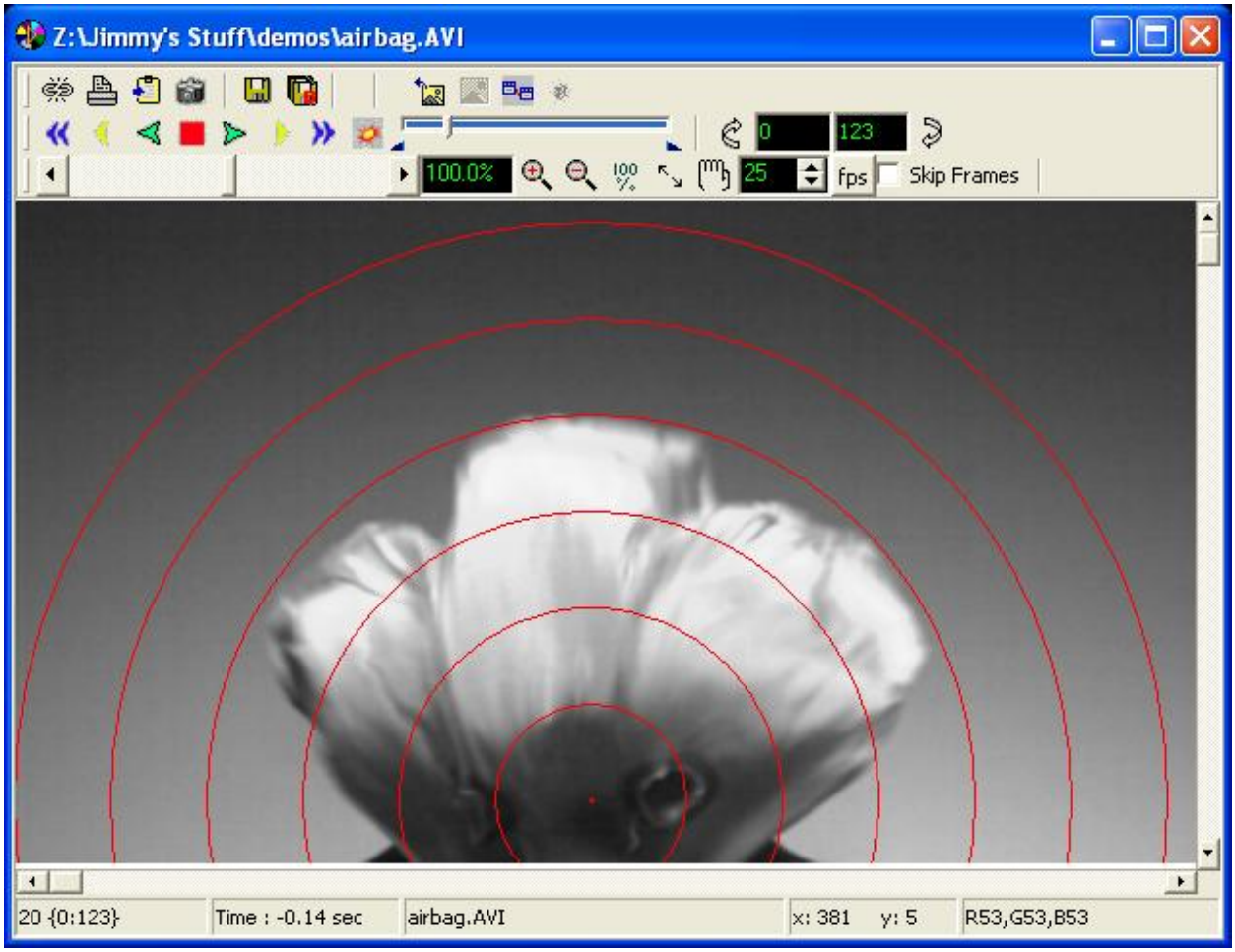


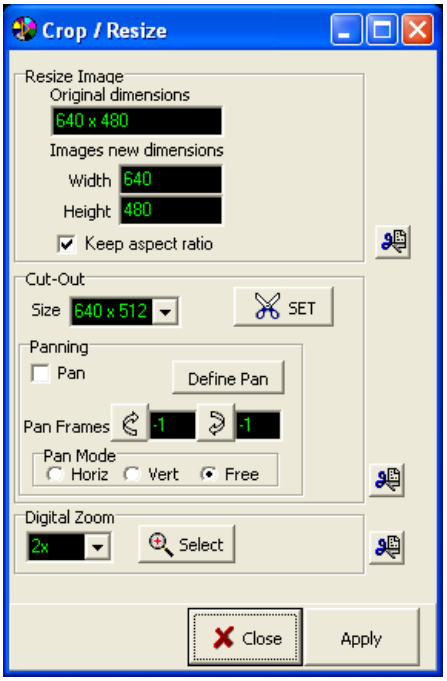
Figure 6-13 Preview of a polar grid

Clicking either the grid or polar apply button will enable the selected grid to be displayed throughout the video sequence; this option is only available in Vicasso Plus.

6.15.2 Single Distance Measurements

The measurements tool allows the user to drag a line on the image via clicking the diagonal line in the Measurements box. The line is drawn on the video windows via using the right hand mouse button and dragging to the desired location. When the line has been drawn and the mouse button released the distance is provided in the chosen units via the display box. This line is not permanent and will disappear when the video sequence is played, if a permanent line is required use the annotation line under the annotation tab.

6.16 Crop and Resize



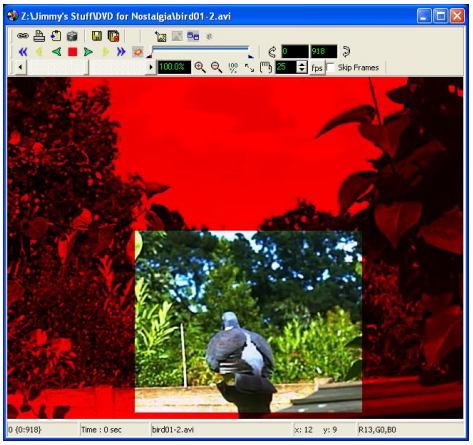
Use the Crop and Resize tool to adjust the size of the resulting movie.

IMPORTANT NOTE : If you will use other effects, such as annotations, which need to be positioned in a specific location on the image, then you should ALWAYS perform the Crop and Resize function ***FIRST***.

6.16.1 Resizing

The resizing image box allows the manipulation of the video's width and height. The original values are also displayed above for the user's information. The user also has the option to keep the aspect ratio of the video, so if the user enters a new height, the width is adjust accordingly and vice-versa. The user can then click the preview button to adjust the size of the video. Then the apply button will be enabled, allowing the user to select whether they wish to save out this new image size or not.

WARNING : if you intent to save the images as an AVI file please be aware that many AVI Codecs *DO NOT* allow a "free" width / height / Aspect Ratio. You should try to use the cut-out function as an alternative.



6.16.2 Cut-Out

Use the Cut-Out to create a fixed dimension Crop of the image.

- First Select the cut-out Size using the Size Combo Drop Down List.
- Click the SET button.
- Drag the area to the required location on the image.
- Click the Apply Button.
- This will give you a cut-out section at the location specified.

6.16.3 Panning Cut-Out

Additionally you can have the cut-out section pan over the full image. The Panning direction can be Horizontal Only, Vertical Only or Free (Horizontal and Vertical). The panning does not need to be over the entire length of the movie sequence. You can specify a ***Start*** and ***End*** Frame.

When making a panning cut-out the system will use your input to determine the "speed" of the panning so care should be taken when defining the cu-our range. You may initially need to try this a few times in order to get the desired results.

To make a panning cut-out follow the procedure below :

Select the cut-out size from the size Combo.

Play the movie to the frame on which you want the panning to **START**.

Select the Pan Mode

Push the SET Button and position the cut-out over the correct portion of the picture.

Check the Panning Checkbox

Push the Define Pan Button

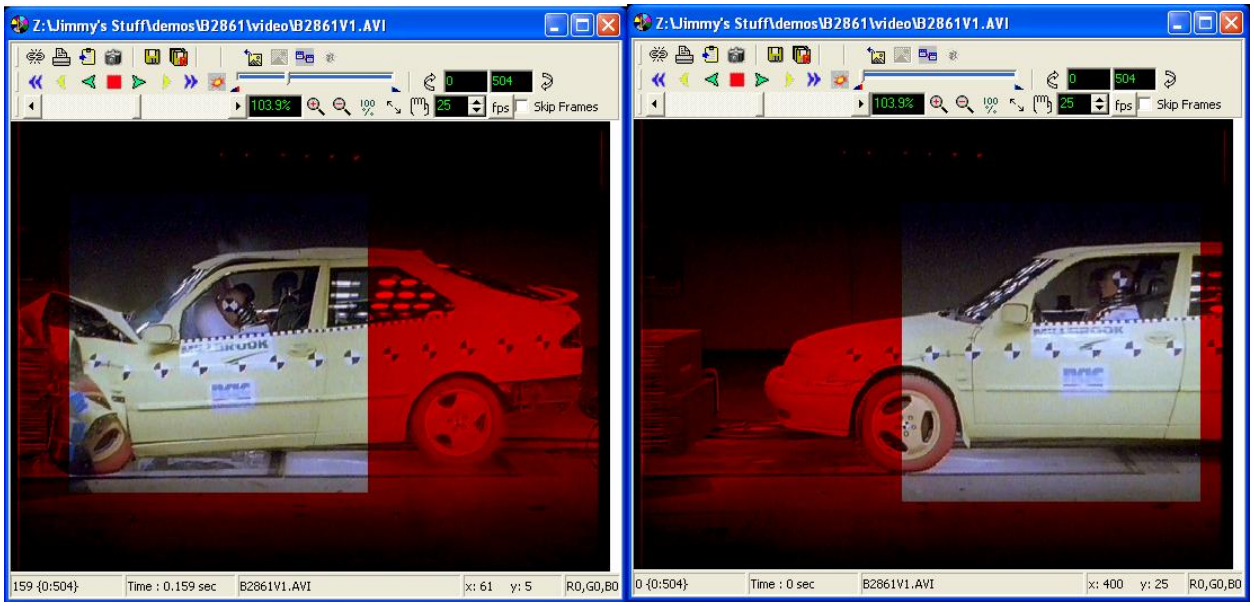
Push the "Pan Frames Start button"

Play the movie to the frame on which the panning should stop

Move the Cut-Out selection to the position required

Push the Pan Frames End Button

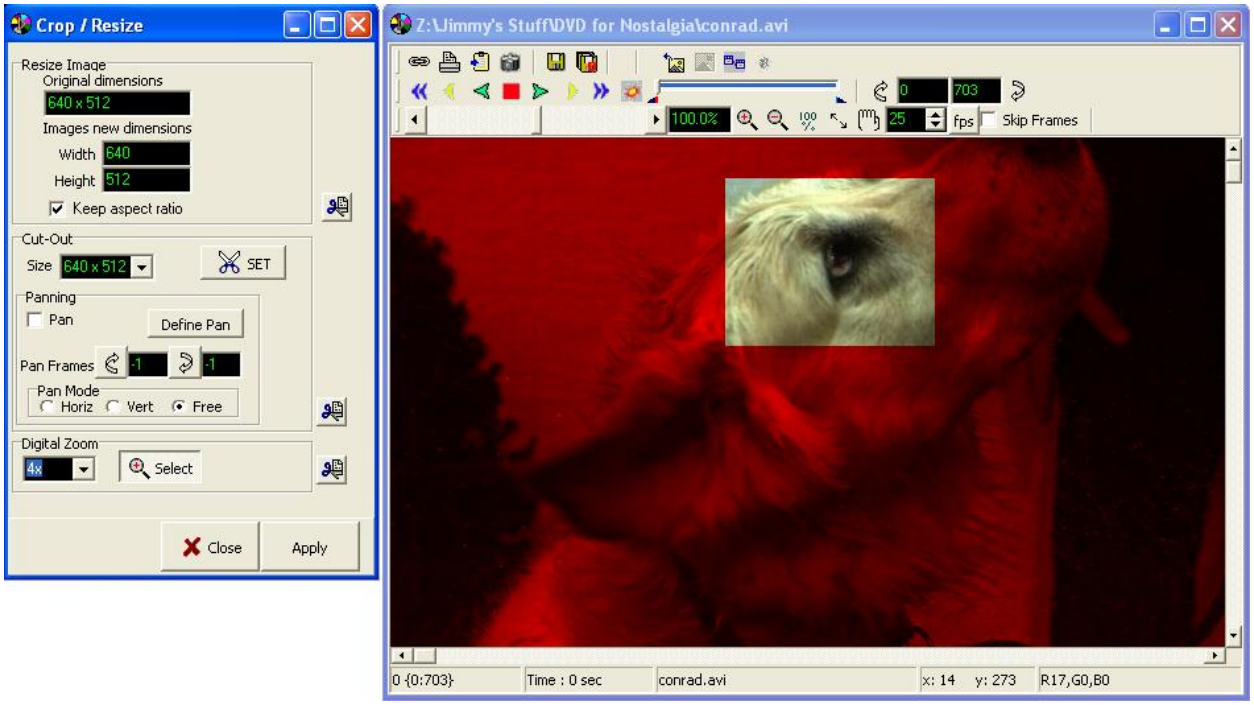
Push the Apply Button



The System uses the number of frames between “start” and End Pan frames together with the distance moved by the Cut-out Selector, to calculate the speed of the pan.

You may need to experiment with this function to get the results you require.

6.16.4 Digital Zoom



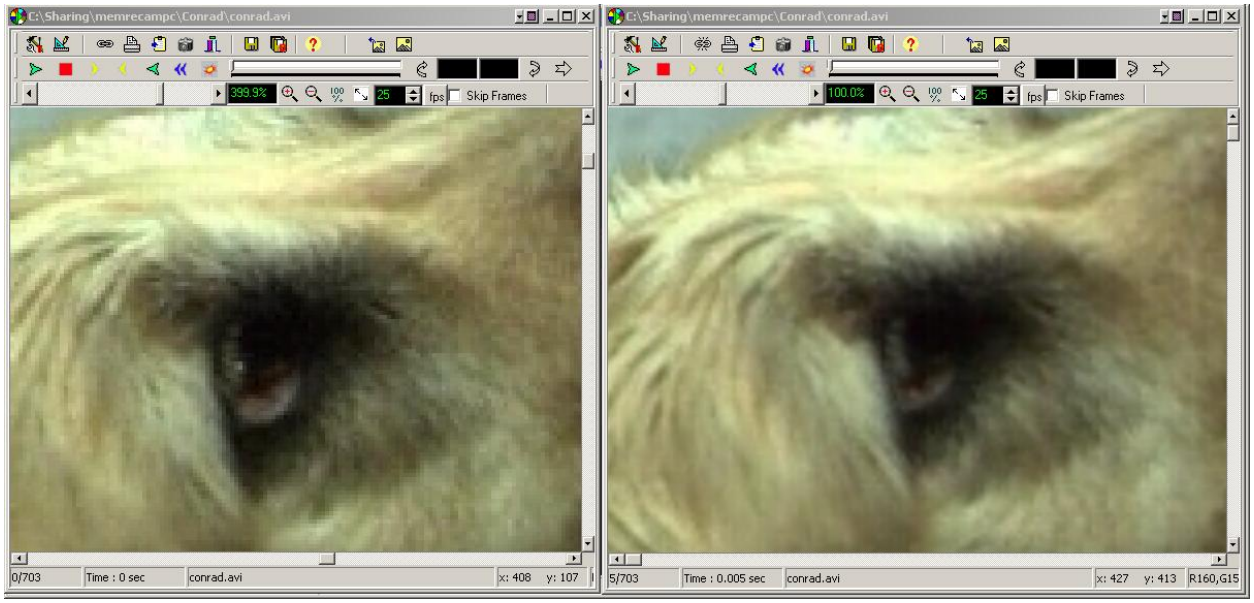
The digital Zoom function allows for a portion of the image to be digitally zoomed and enhanced. You can select 2x, 4x, 8x or 16x zoom.

The resulting image will ALWAYS be the same size as the original image.

To use the digital zoom push the select button. You will be shown a masked area which denotes the area that will be zoomed. You can drag this around the image to the desired location. The size of the mask area is determined by the level of zoom. The higher the zoom level, the smaller the mask.

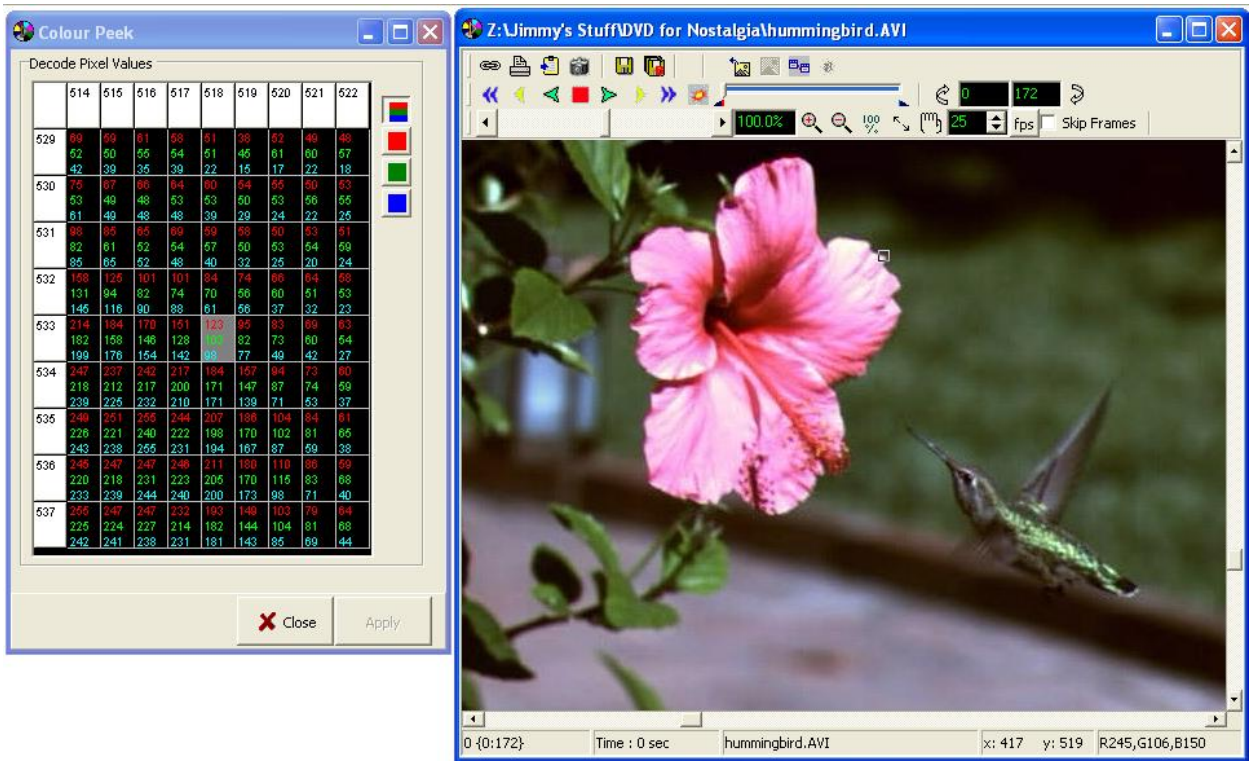
When the area to be zoomed has been chosen then click the **Apply** button.

The images below show a comparison of digital zoom versus a conventional zoom. The Digital Zoom (on the right) has much less image pixilation.



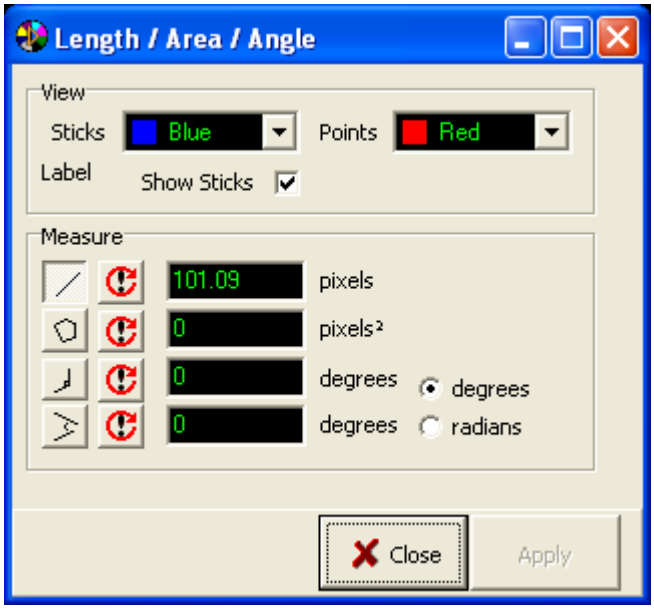
6.16.5 Pixel Values

This allows the pixel values of pixels to be determined. Clicking ‘Colour’ Button will allow the pixel analysis area to be chosen. After clicking this, a rectangle will appear on the image at the mouse cursor when over the image. The values of the pixels will appear in the three grid boxes with the X and Y co-ordinates around the edge. This will continue to update until the mouse button is pressed which will stop the continuous search and will leave the grid values at the position when the mouse was clicked as shown below.



6.17 Length, Area and Angle (LAA)

The LAA tab provides tools to measure Length, area and angle on a single frame.

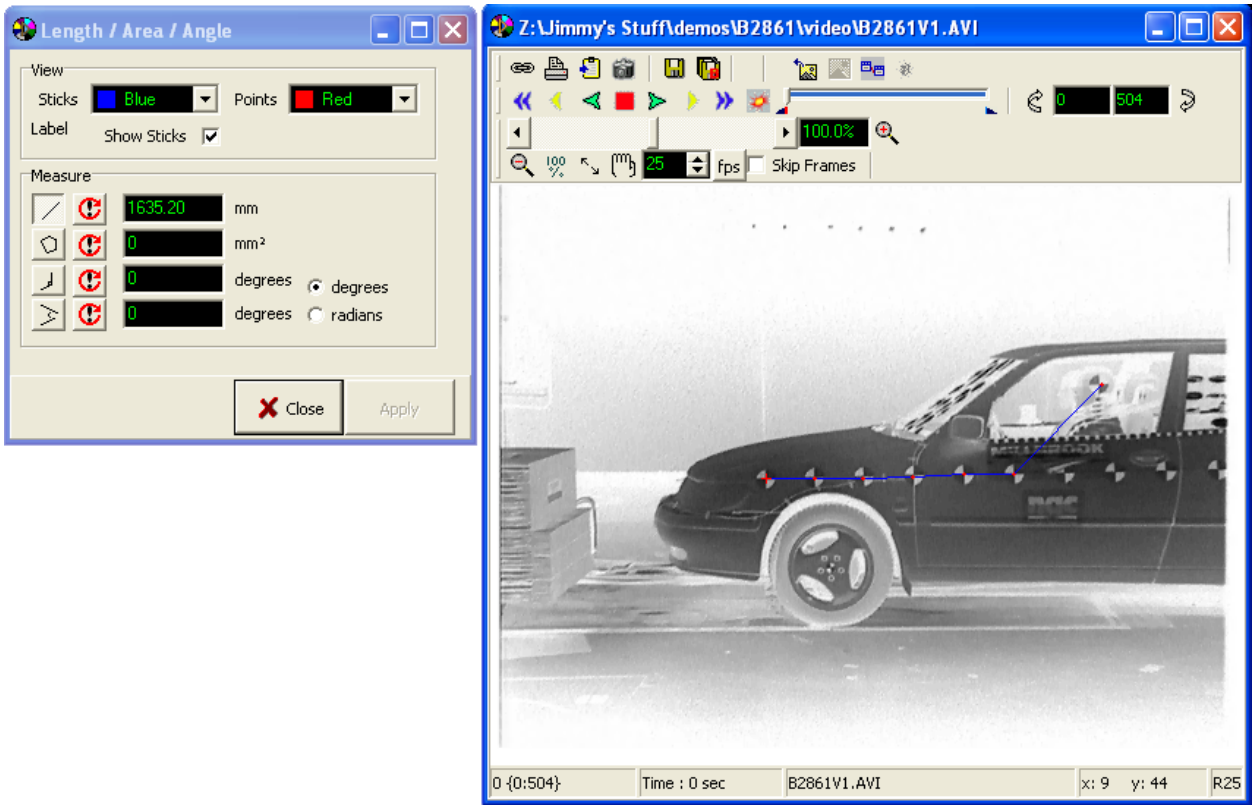


Use this button…		To do this…
	Length	Measure a Length
	Area	Measure and Area
	Angle 1	Measure an angle from THREE Points
	Angle 2	Measure and Angle from FOUR points
	Reset	Reset the Current LAA Tool
Sticks Blue	Stick Colour	Select the colour of lines used in the measurement
Points Red	Point Colour	Select the colour of points used in the measurement
Show Sticks	Show Sticks	To Show / Hide the lines and point in the measurement

6.17.1 Length

This tool allows length measurements to be drawn on the video frame. To use this function the programme does not have to be calibrated, and if not will measure the distance in pixels.

To use this function, click the button with the diagonal line through it. Then click the start position of the distance required on the video frame, then click another position on the frame, the distance is then calculated and displayed the box, if you wish to carry on working with another distance, simply click another location on the video window. The programme will then keep adding all the distances until you either press the  redo button, which will wipe the slate clean and so you can start again or by pressing the  button again which will turn off the length measurement tool.

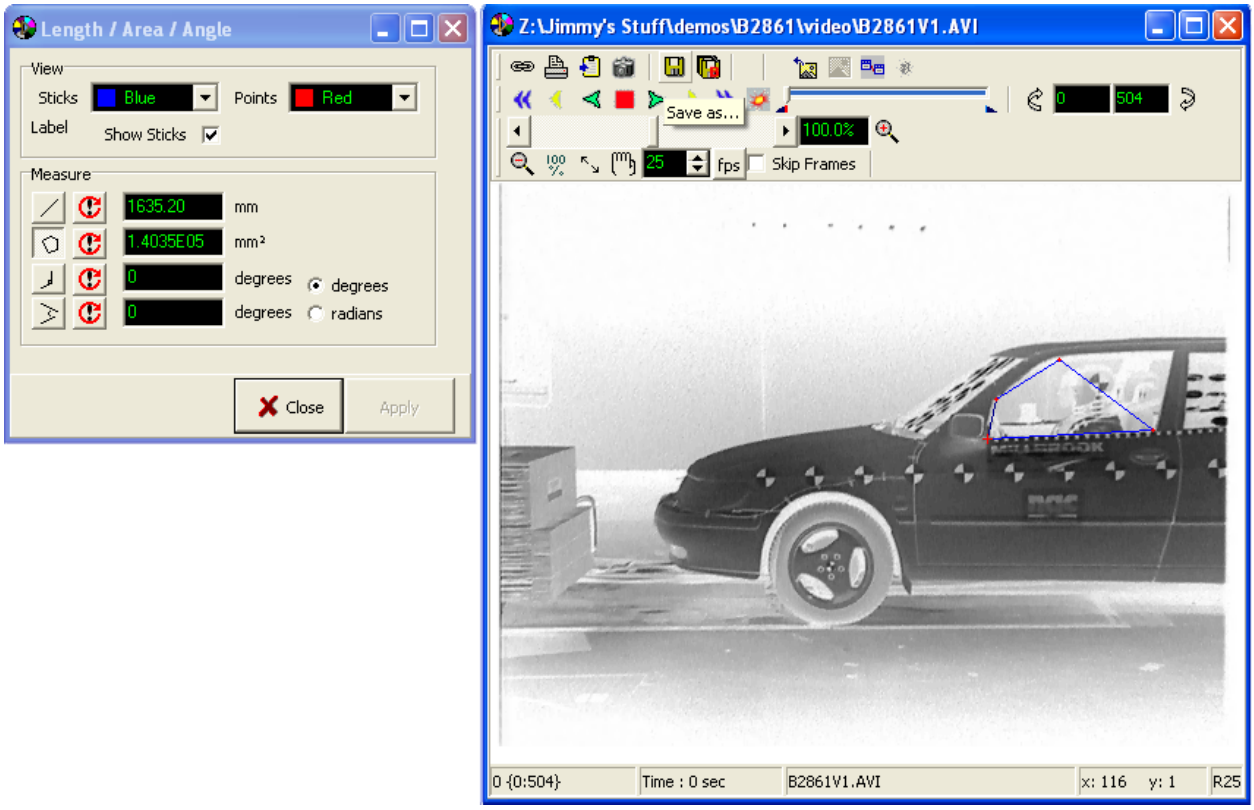


6.17.2 Area

The function work along the line of the length measurement tool, except it works out the area in between the selected points, because of this there is the need for at least 3 points before the area can be displayed. To start click the area button, then click on the desired locations on the video frame, once a third point is clicked another line will be joined from the first point clicked to the last point clicked and an area calculated. To continue to work out an area keep clicking on the video frame until the area has been defined, as an example see below, the area calculation results box will be continually updated given the area in pixels if not calibrated or in the calibrated factor and units.

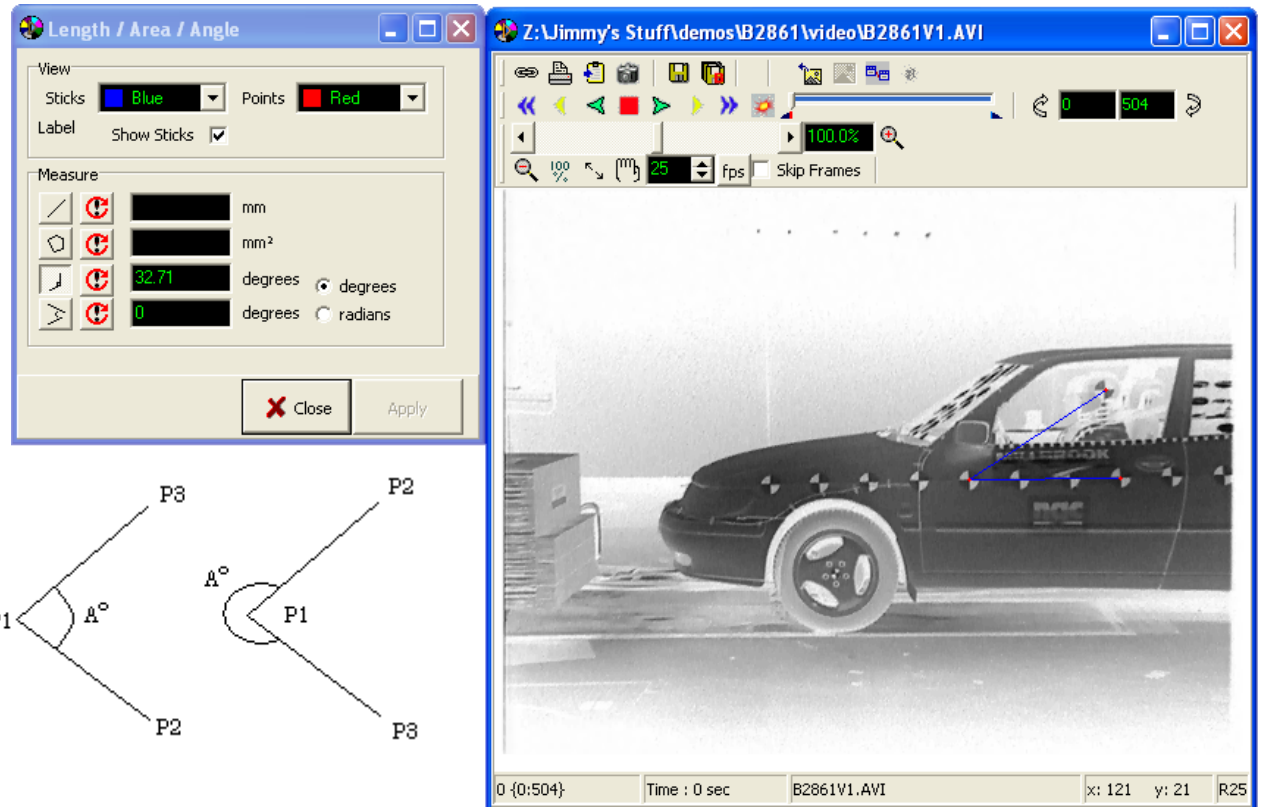
The reset button resets the results so a new area can be calculated. To turn off the area tool click the area button again.

Note : For the area tool to work successfully do not cross over the points as this will provide an incorrect area calculation.



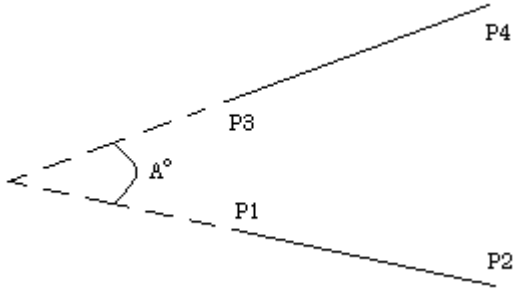
6.17.3 Angle

The first angle measurement tool needs three points to be defined on the video frame. To select three points first click the  button, then select P1 on the video frame, then P2 and finally P3.

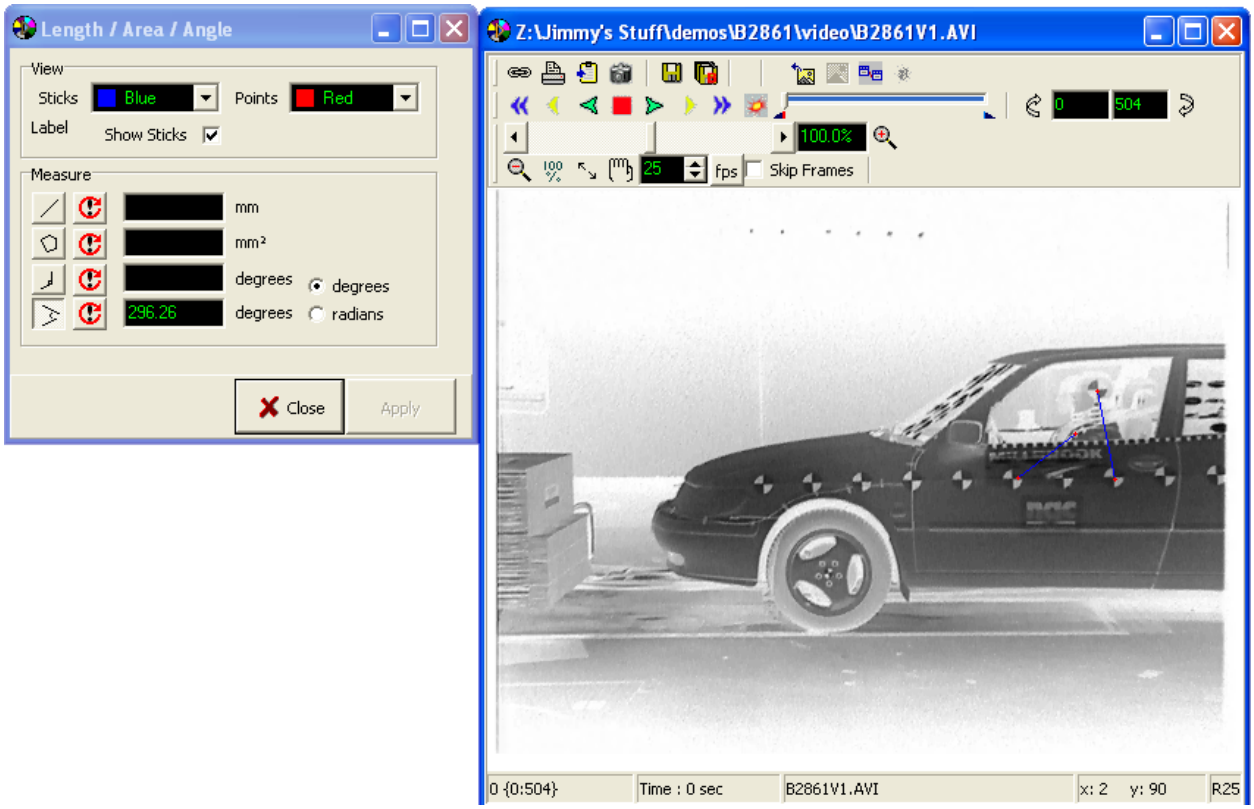


The angle is worked out anti-clockwise.

The second angle type works along the same lines of the first angle tool, except it works out the angle between two lines. To use first click the  button then select the first, base line, points P1 and P2, now select the final line, points P3 and P4 by defining their location on the video frame.



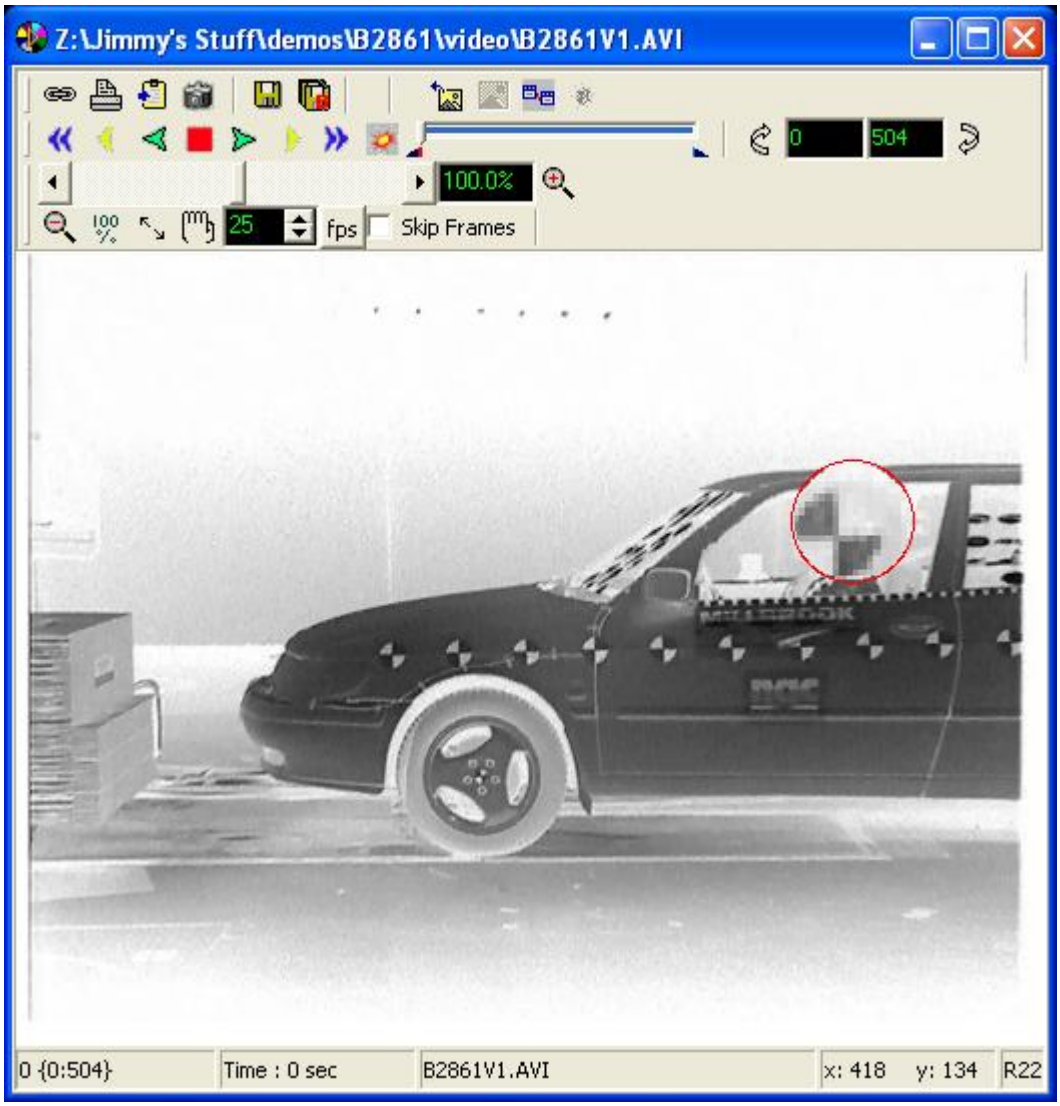
The programme will then find out the angle of where the two lines meet and display the angle in the results box. The results can either be displayed in radians or degrees.



For both angle measurements tools there are the options to reset the measurements by clicking the  reset button, then the measurements can be entered again from the start. To stop angle measurements simply click the angle button again.

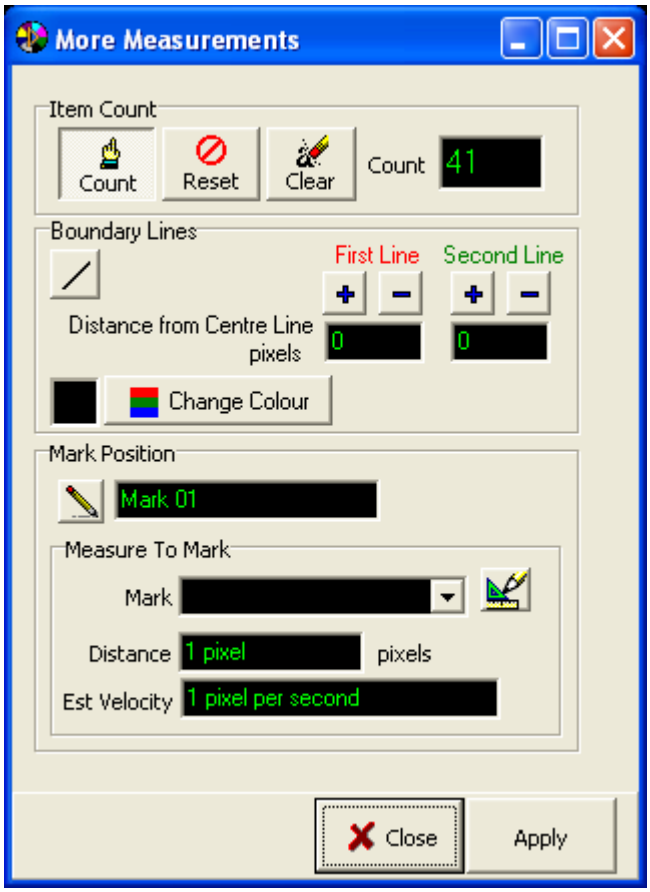
6.17.4 Detailed Positioning

A RIGHT mouse down on the image will ZOOM an area around the mouse position to allow better positioning of the LAA points.



In the zoom mode, keep the mouse button depressed and move the mouse to the desired location. Then release the mouse button.

6.18 Measurements 2



6.18.1 Item Count

The Item Count Function allows for easy tagging and counting of items in an image. This is particularly useful for Blob Analysis.

Use this button…		To do this…
	Begin Count	Begin Counting
	Reset	Reset the Counter – Does NOT Clear the Tags
	Clear	Clear the Tags – Does NOT reset the counter

When counting, every time the image is clicked, the position of the click is tagged (marked) and the counter increased by one.

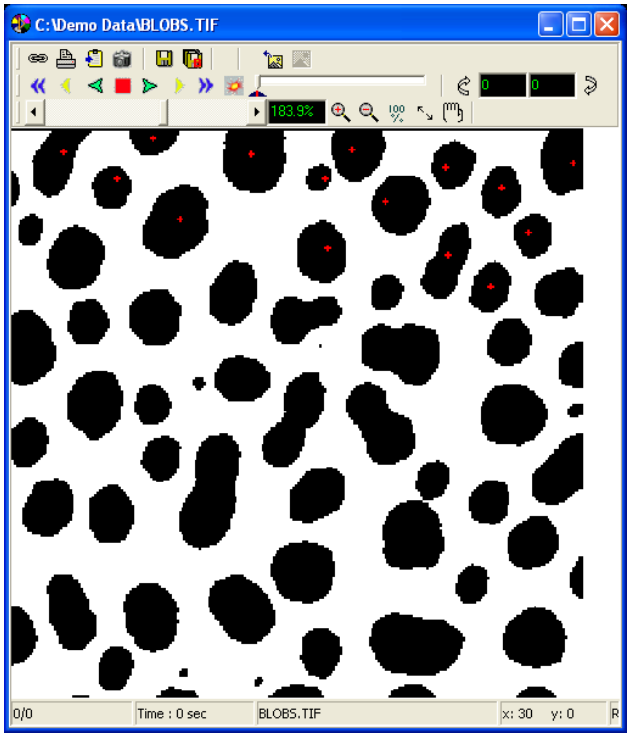


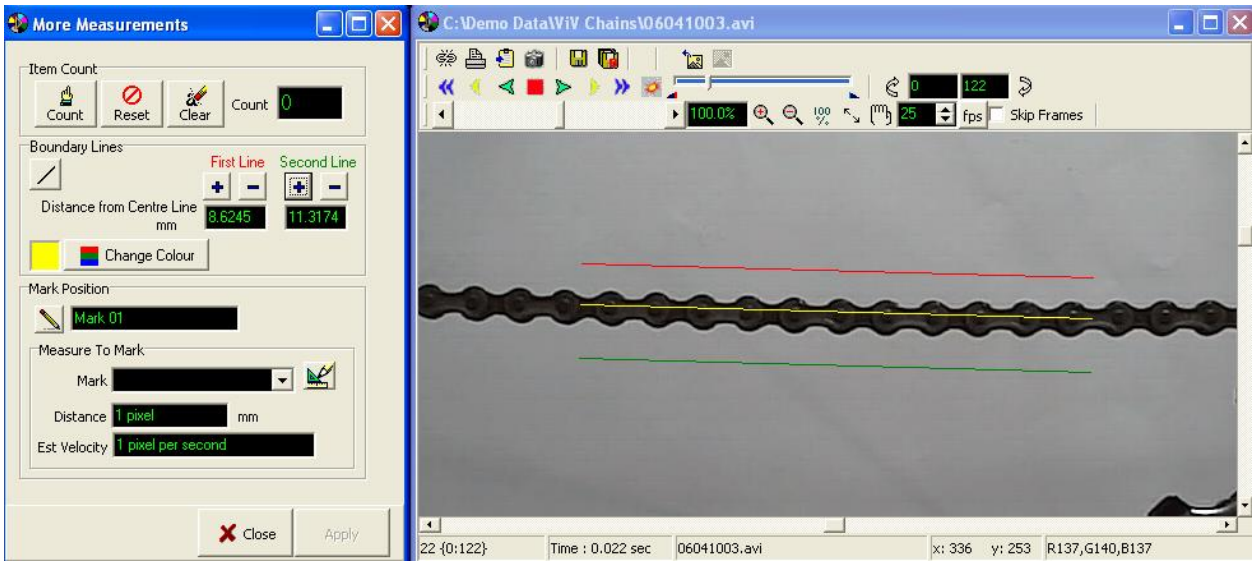
Figure 6-14 Tagged items

6.18.2 Boundary Lines

Before the boundary lines can be viewed the position must be drawn first onto the image, this done by depressing the line button in the calibration lines box. Again using the same technique to draw an annotation line the user can draw the boundary line:

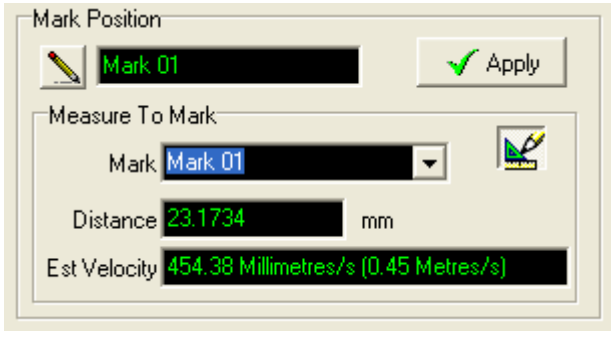
The boundary line can also be drawn in any colour, the user can change the colour by clicking the 'change colour' button, and selecting the required colour. When the mouse button has been released the boundary line is drawn automatically, only one can be drawn on the video sequence. To offset the two boundary lines, the user can increase the distance from the middle line by clicking the plus or minus buttons below the line name label. When these buttons are clicks the image will be updated accordingly and the distance will be entered in the box below. To change the individual line colours the user can also click on the name label, a colour selector dialog box will appear and a colour can be chosen, once happy with the colour the 'OK' button can clicked, and the line will change colour, along with the label to indicate the new colour. If the middle line is in the wrong place the user can draw a new boundary line by clicking the line button again and repeating the process.

Once the lines are in the right place, the apply button will annotate the lines on the whole video sequence.



6.18.3 Position Marks

You can use the Position Marks to assist in measuring the movement of a feature in an image sequence.

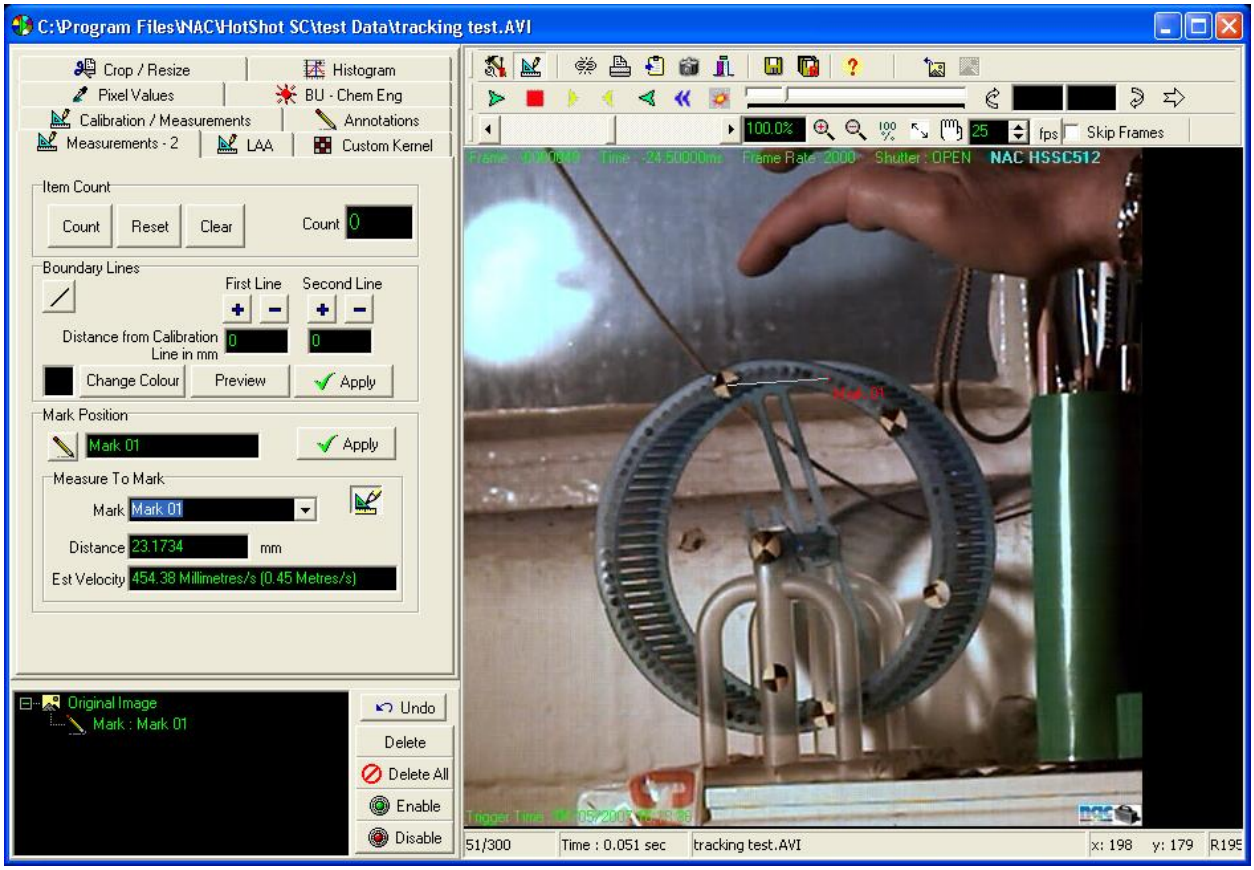


Use this		To do this…
	Specify	Specify Mark. Depress this button and then click the location to mark in the image.
	Apply	Confirm Mark Position
	Select	Select the defined mark to measure

Measure — Toggle measurement ON / OFF. Press this button and then move the mouse cursor over the image to see the distance (and velocity if on a different frame)

Distance — Read the distance from the MARK to the current cursor location

Velocity — Read the Estimated Velocity to the current position



6.19 Camera Specific Settings

6.19.1 MCFF Settings

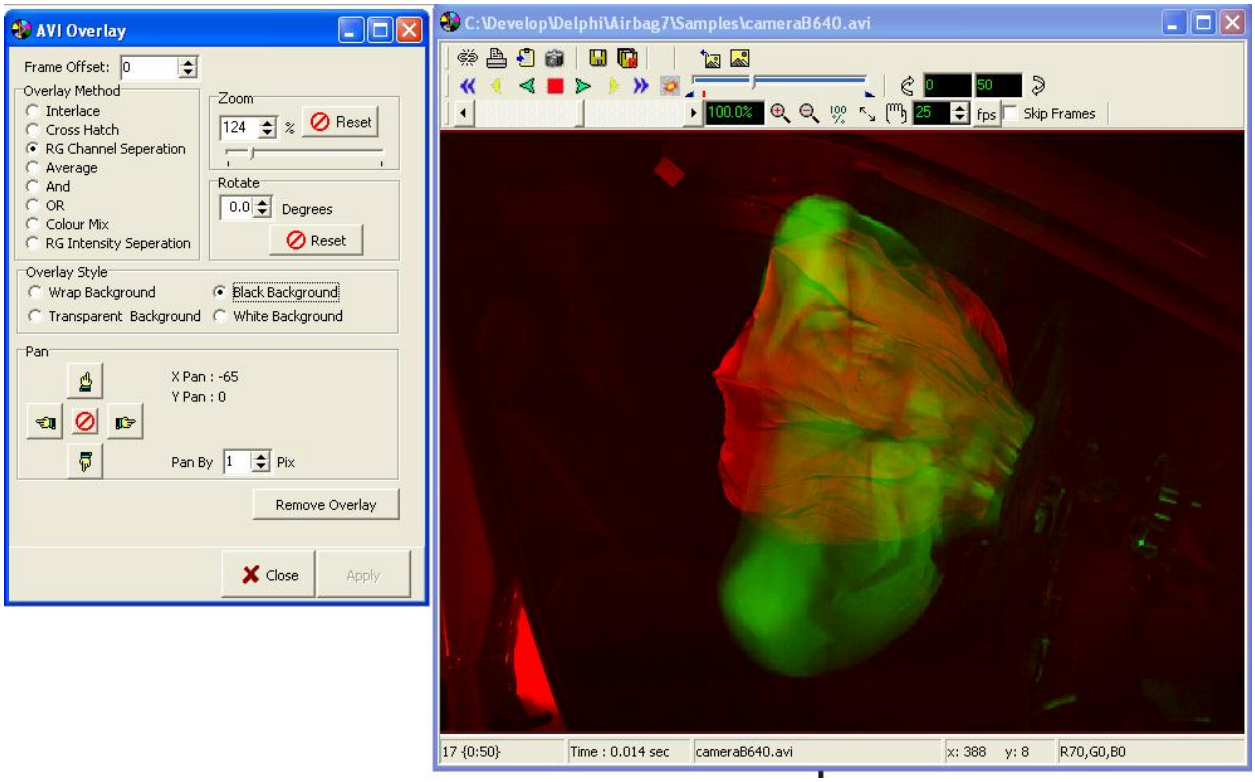
If you are working with NAC Memrecam MCFF Raw data files, you can use this page to adjust the image settings. For details of the meaning of these settings you should refer to your Memrecam User Manual.

6.19.2 HSF Settings

If you are working with NAC HotShot SC Raw data files, you can use this page to adjust the image settings. For details of the meaning of these settings you should refer to your HotShot SC User Manual.

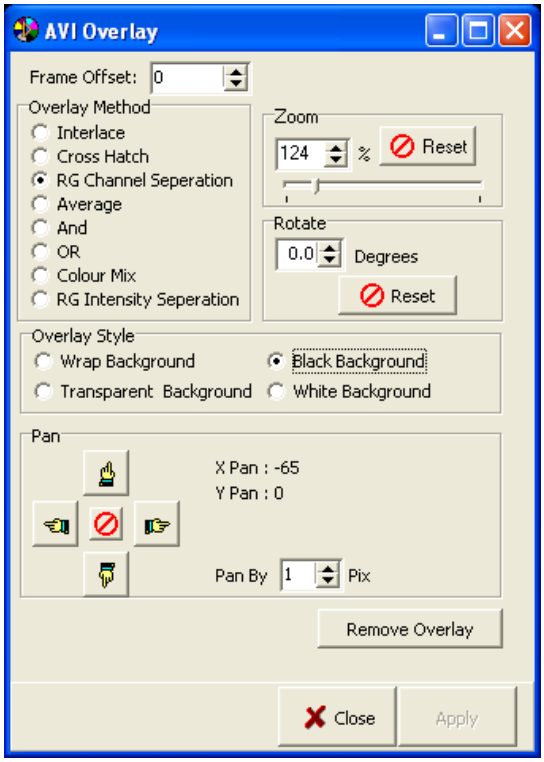
6.20 Overlays (Where installed)

This option allows two videos/pictures to be merged together. For this the two video/pictures must be open in Vicasso; one which will be the source and one the destination. Note that the source will not be able to be adjusted once it is being used for an overlay until the overlay is cancelled.



Once two files are open as shown above, the source file must be set up to allow it to be used for an overlay. This is done simply by clicking the  button. Once this is clicked the source video can be dragged onto the destination form. This is done by clicking anywhere on the source image area then clicking and dragging the mouse onto the destination image area. This will then disable the source form and the destination will have the source as an overlay as shown below.

The overlay Options can then be used to adjust the overlay as shown below.



Use this …	To do this…
Frame Offset	This option will offset the source (if it is a multi-frame file).
Overlay Method	This allows the way the overlay to be presented in different ways including, interlace (Every other line is either from the source or the destination file), cross hatch, RG channel separation, average, ‘and’, ‘or’ and colour mix.
Pan	This allows the source overlay’s position to be moved. Clicking the centre ‘Reset’ button will move it back to the default position. Changing the ‘Pan By’ value chooses the number of pixels the overlay moves when the move buttons are clicked once.
Zoom	This allows the source overlay to be resized. This can be done either by adjusting the zoom track-bar or by changing the value in the zoom value box.
Rotate	This allows the source overlay to be rotated by the desired number of degrees.
Remove Overlay	This option will remove the overlay from the destination form and will re-enable the source form.
Overlay Style	These options allow the overlay to be displayed in slightly different ways. Wrap Overlay will fill the entire source image with overlay images (Based on how many will fit in), Transparent Overlay Background will only show one overlay image in the source with the remaining overlay considered transparent, Black Overlay Background will display one overlay image and will consider the remaining overlay area black and White Overlay Background will display one overlay image and will consider the overlay’s background to be white in colour.

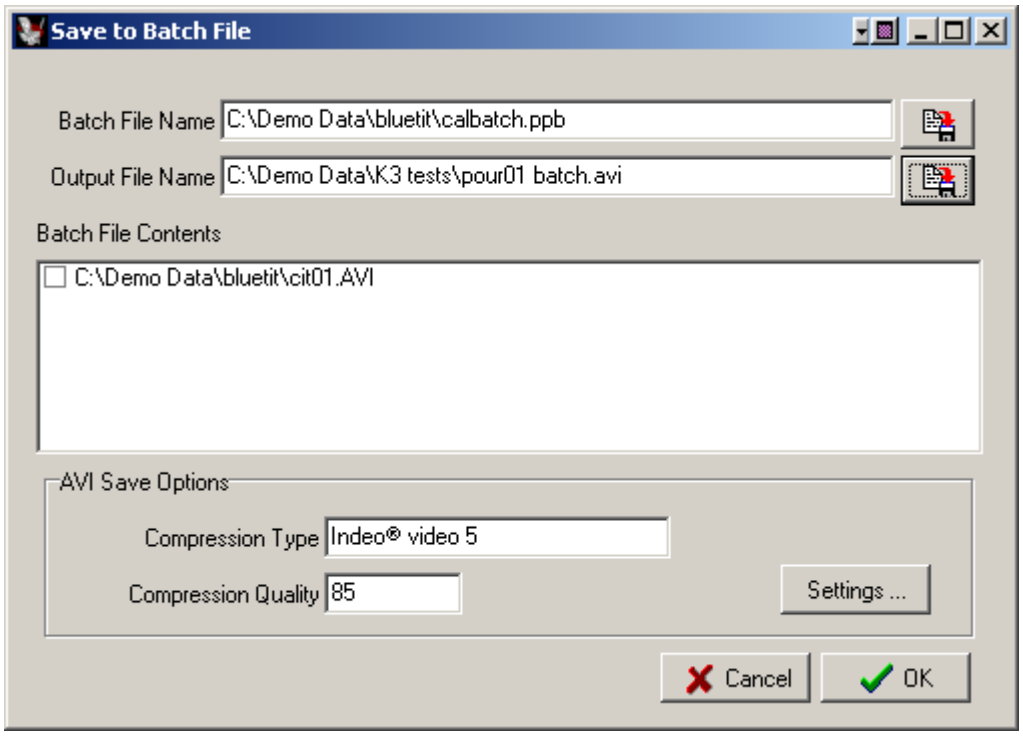
7 Batch Files

When creating / converting a number of movie sequences with Vicasso, you have the option to perform the “saving” option as a batch process. The batch file can be run at the end of a session and will save out all the movies saved to the batch file.

7.1.1 Saving to Batch File

To save a sequence to a batch file choose the “save to batch file…” option form the main menu, or press the “save to batch” button [ ].

The following screen is shown



By default the last batch file saved to will be automatically entered in the “Batch File Name” Edit box. To choose a different batch file click the “browse” button [ ].

If there are already “batch jobs” in the batch file they will be displayed in the “batch file contents” list.

Use the browse button to enter an output file name.
If the output format is “AVI” then you have an option to set the AVI Save Options. By default these will be the last used Settings.

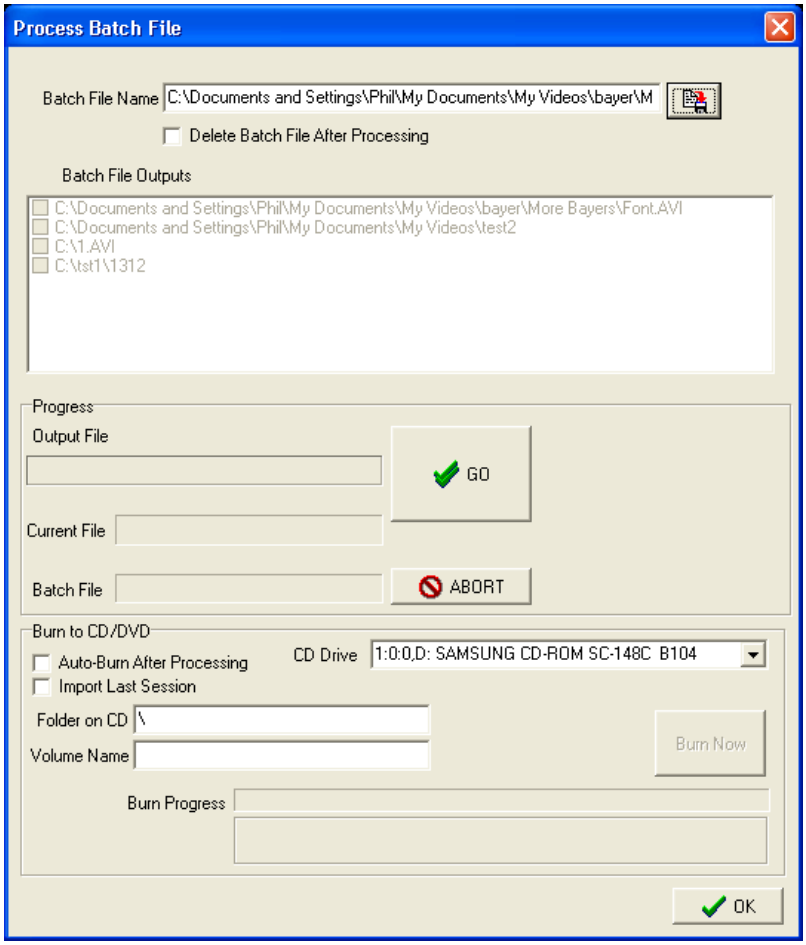
Clicking “OK” will save the current file to the batch file ready for processing later.

7.1.2 Processing a batch file

To process a batch file you MUST Close ALL open movie windows.

Choose “File|Process Batch File…” fron the main menu.

The following screen appears.



By default the last saved to Batch file will be entered into the Batch File Name Edit box. You can select a different batch file by pushing the “Browse” button.

The Batch file contents will be displayed in the Batch File Outputs List.

To process the batch file Click the “GO Button”.

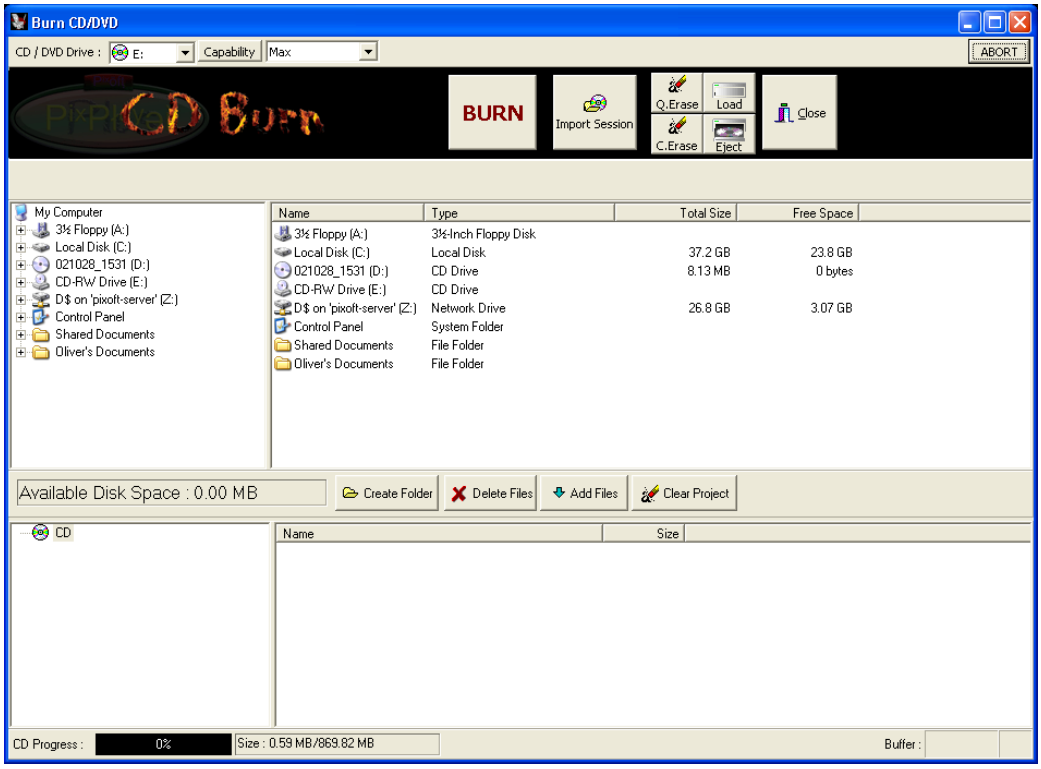
If you check the “Delete Batch File After Processing” the batch file will be automatically deleted after processing is finished.

Batch File processing can take some time depending on the contents. There is a “Current File” and a “Batch File” progress indicator.

Clicking ‘Auto-Burn After Processing’ will cause the processed batch files to be automatically burnt to a CD. Clicking ‘Import Last Session’ will import a previously written session ready for the new files to be added. The CD drive with the burn facility must also be selected under the ‘CD Drive’ options.

8 CD Writing

The CD writing feature allows files to be written straight to a CD/DVD from within Vicasso.



8.1 Specify the CD writer

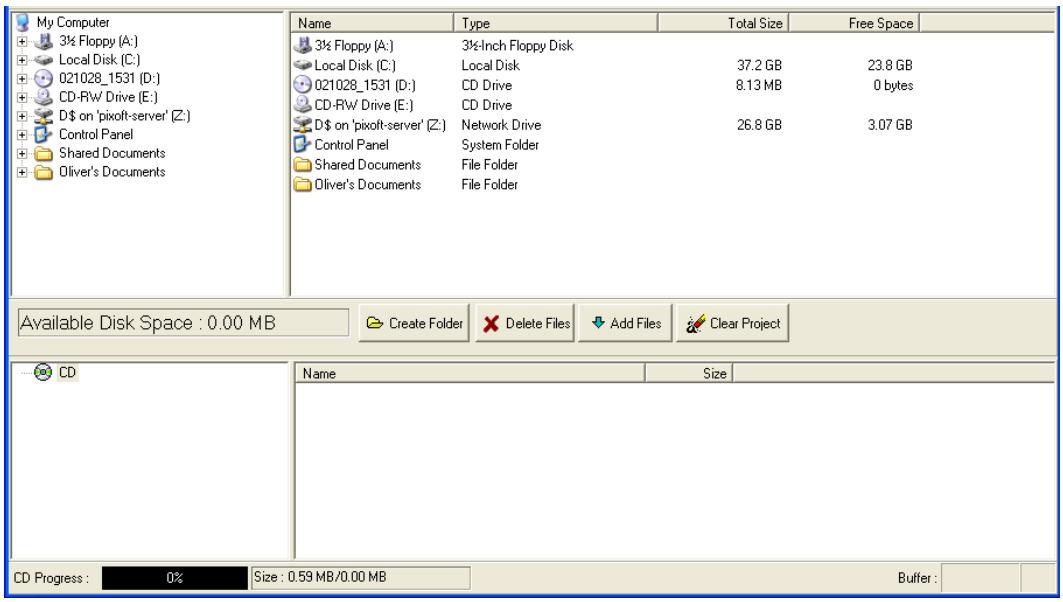
Firstly the CD writer needs to be specified by clicking the CD/DVD Drive combo box and clicking the appropriate drive.

Then clicking the Capability button will show what the drive is capable of writing to and the technologies it supports.

The write speed then needs to be selected by click the combo box next to Capabilities and selecting the appropriate speed.

8.2 Adding files

The main area of the form is split into two sections as shown below;



The first section is the file browser, allowing exploring of files and the second section is the make-up of the CD/DVD. Files/Folders can be added to the CD by either dragging from them from the file browser section or by clicking Add Files or Create Folder.

8.3 Burning the CD/DVD

Once the CD/DVD has been designed the files need to be transferred to the disk. This is done by clicking ‘BURN’. This will write the selection to the disk.

8.4 Loading/Ejecting the CD/DVD

To eject the media simply click ‘Eject’ in the window which will eject the CD/DVD. To Load the media, i.e. when a new disk is placed in the drive clicking ‘load’ will cause the CD tray to close.

8.5 Continuing with a disk

A writable/re-writable disk, which may already contain files, may need to have files added to the selection. This can be done by inserting the disk and clicking ‘Import Session’. This will load the disks contents and will allow additional files to be added. Once added clicking ‘Burn’ will add the new files to the disk.

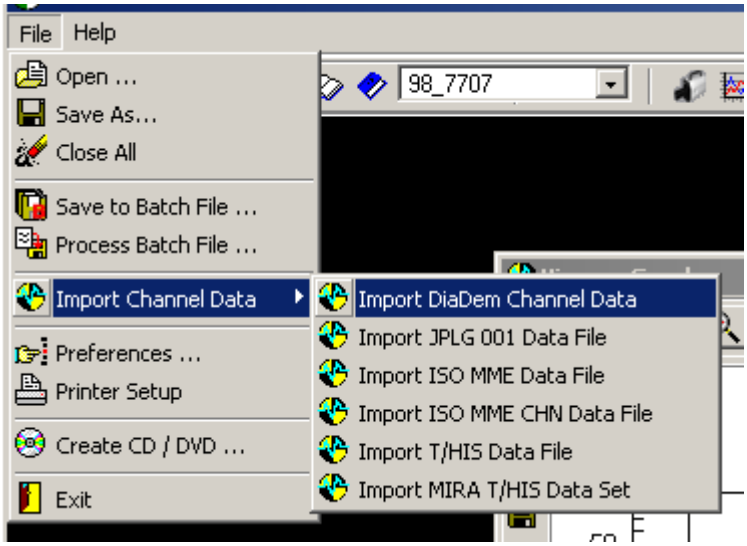
8.6 Erasing a re-writeable disk

To erase all files on a re-writeable disk can be done by either clicking ‘Q. Erase’ or ‘C. Erase’. ‘Q. Erase’ does a quick erase of the disk wiping all files and is generally a lot quicker than performing a ‘C. Erase’ or complete erase which formats the disk and generally takes a lot longer to perform.

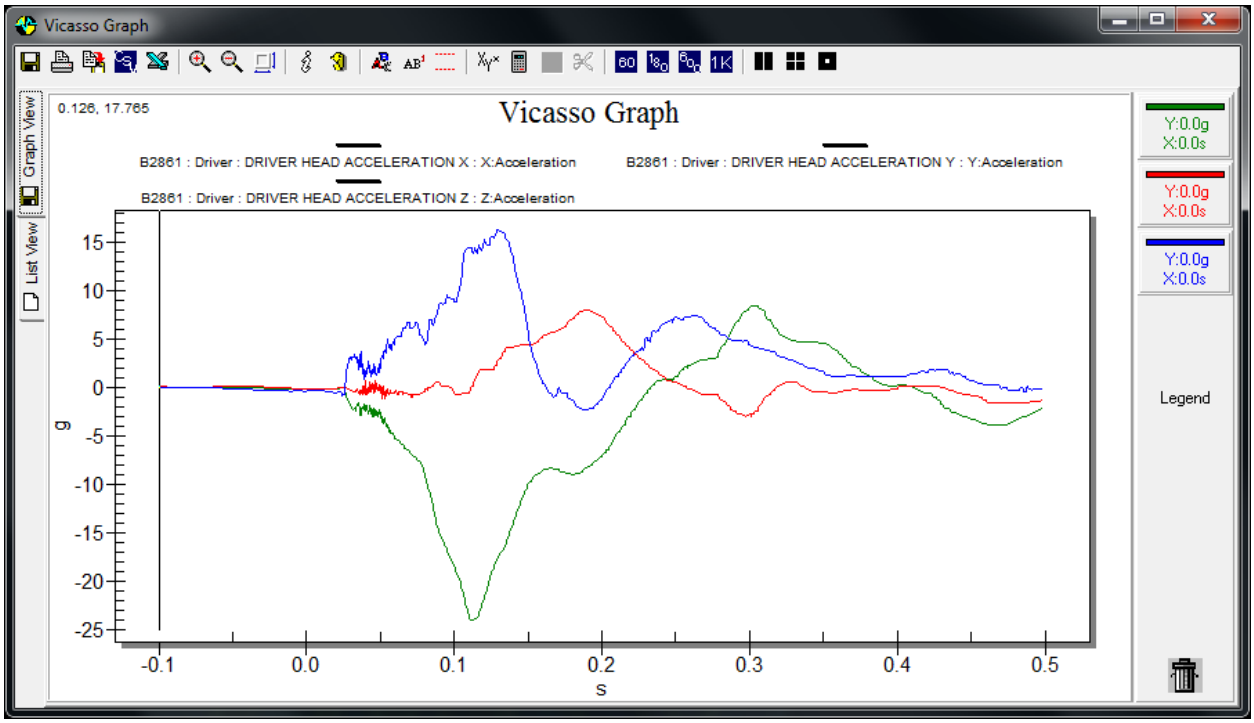
9 Importing Data

This feature allows external data to be imported in Vicasso to be displayed in graph form. The data can be imported using a supplied or custom created plug-in.

This is done by clicking File->Import Channel Data as shown below. Under this menu will be listed all available plug-ins to import the data.

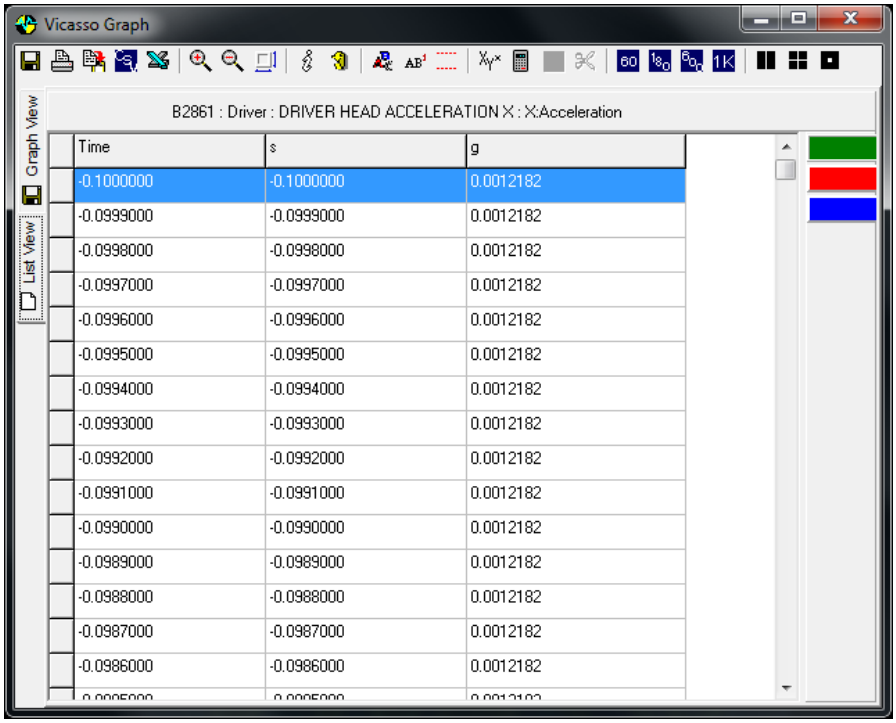


Clicking a plug-in will allow the file with the data to be selected and imported. This data will be presented in a graph as shown below.



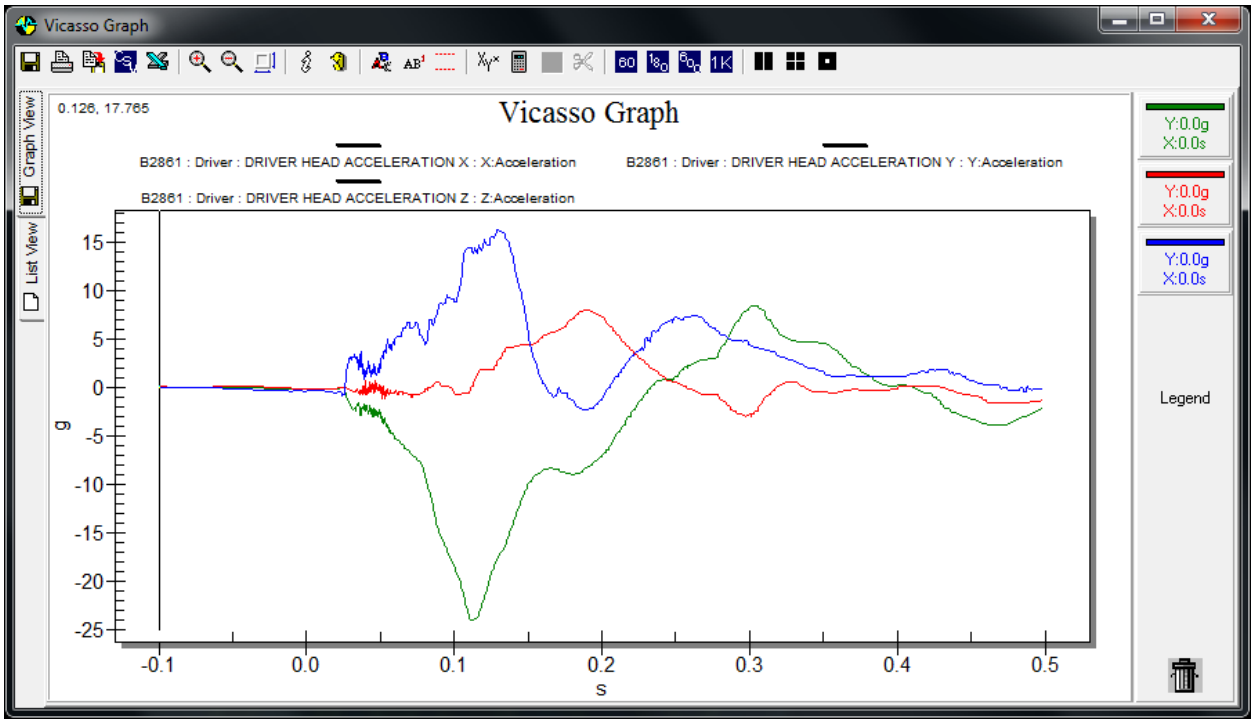
9.1 Graph Manipulation

Once you have plotted graphs there are two viewing options, as a graph or as a list. These are shown below



The colour of each plot is defined by the colour of the point from which it originated (Y-Axis). You can change the colour of the plot by using the customisation dialog (see Modifying the graph display settings).

The value of the plot at the cursor position is displayed in the legend.



Use this…	To do this…
	Save the current graph
	Print the current graph
	Copy the graph image to the clipboard
	Save the graph data to Comma Separated Text File
	Export the Graph data to MS Excel (must be installed)
	Zoom in/out of the graph
	Will enable scroll bars to allow easy scrolling when zoomed into the graph
	Show Graph Information
	When a data channel is selected; will invert the data i.e. if Y-axis data is 30,50,60 inverting will make it –30, -50, -60.
	Change the font of the list view's font
	Rename the graph's title
	Annotate the Min and Max graph values on the graph
	Allows the X-Axis' or Y-Axis' data to be multiplied by a factor and the Axis's units to changed; useful for example if data is in metres and it is needed to be shown in cm. In this case the X-Axis' data would be multiplied by 100 and the units would be changed from 'm' to 'cm'.
	Perform calculations on the graph data
	Calculate Velocity and Displacement from an Acceleration (in G) Graph. Only available for graphs with a single channel
	Make a CUT OUT subset of the graph.
	Filter the selected data to CFC 60, 180, 600, 1000
	Change the graph cursor display

Use the **Graph View | List View** tab to select the desired view.

In graph view a cursor will scroll along the graphs showing the synchronisation point with **master time**. In list view the data table will scroll.

9.2 Graph Menus

Use this…	To do this…
Graph|Rename	Rename the Graph
Graph|Copy	Copy the graph image to the clipboard
Graph|Print|Printer / File …	Print the graph to a printer or file

Graph|Export T/HIS…	Save each plot on a graph as an ASCII Time History (compatible with MIRA Data Viewer)
Graph|Unload	Close the Graph Window.

Custom|Zoom Scrolling	Place Scroll Bars on the graph when the graph is zoomed

Custom|Undo Zoom	Undo any zoom on the graph
Custom|List Font..	Set the font used in the List View

Analysis|Invert	Invert the selected channels (see selecting channels to manipulate)

9.3 Selecting Channels to manipulate

Where there is more than one channel plotted on a graph you can select a channel using the legend on the right hand side of the graph. A RIGHT CLICK will select the channel. To select multiple channels use a LEFT CLICK. To deselect RIGHT CLICK again.

You need to select channels in order to do the following:

Analysis|Invert

Drag a channel into the Trash Can (deleting the channel)

Drag and Drop a Channel between Graph Windows

In the List View you can select the channel to list by clicking the list view legend.

9.4 DRAG & DROP

You can Drap & Drop channels between graph windows by doing the following :

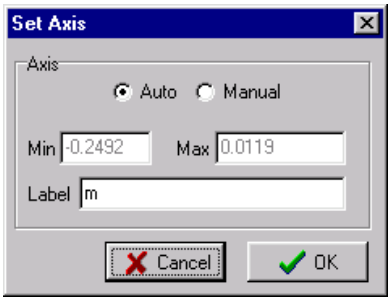
Select the channels to D&D from the Graph Legend.

Right mouse down inside the graph image

Hold down the mouse button and drag to another graph window

Release the mouse button

9.5 Setting the AXIS Bounds



The graph axis is auto-scaled to fit the data. You can change the bounds in two ways.

- Zooming the graph (see zooming the graph)
- Manually setting the axis bounds

To manually set the graph axis you must double click the axis to set. Where there are multiple Y-axis be sure to click the correct one. This will display an axis dialog where you can enter the bounds to set.

9.6 Modifying the graph display settings

Right Click of the graph window will display a popup menu. This menu will ONLY operate if:

No Channels are selected
Graph Zoom button is INACTIVE

The function of these options is as follows:

Use this…	To do this…
Viewing Style	Set the viewing style (colour / monochrome)
Font Size	Set the graph text font size
Numeric Precision	Set the number of decimal places to use. This value will change precision displayed in the legend.
Plotting Method	Change the plotting method. The default and most useful is Line. Other options include bar / area/ etc
Data Shadows	Draw Data Points with Shadows
Grid Lines	Show or Hide grid lines with the data
Grid on top	Set whether the grid is “in front of” or “behind” the data
Include Data Labels	Display the X and Y values at each data point
Mark Data Points	Mark each data point with a symbol
Show Annotations	Unused at present
Undo Zoom	Undo any zoom of the graph
Maximize	Create a full screen *copy* of the Graph
Customization Dialog…	Display a Dialog to allow full customisation of the display properties of the graph
Export Dialog…	Display a dialog to allow printing and exporting data
Help	Display graphing Help

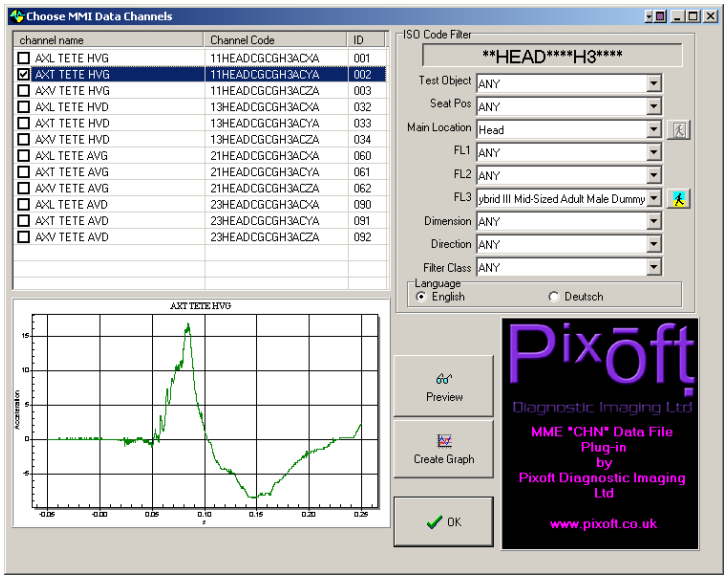
9.7 Synchronising with other data windows

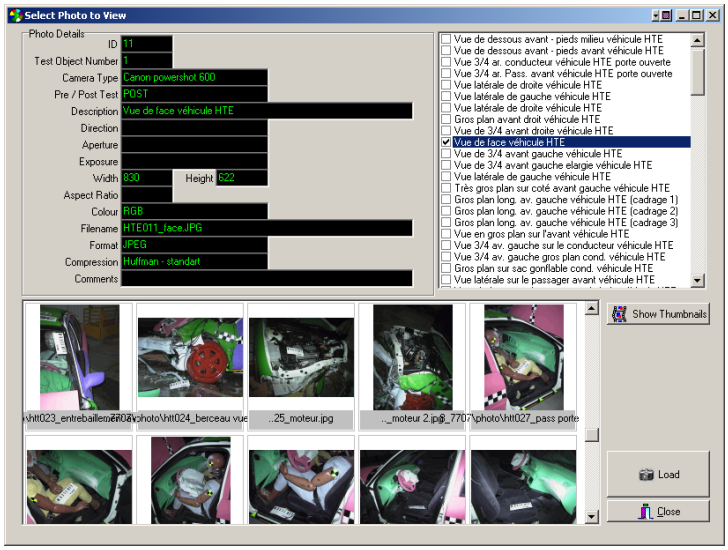
Clicking on a plot in a graph window will move master time to the time of the sample on which you click.

10 Optional Functions

A number of additional TAB pages are available as Options within Vicasso. These tabs will only be available if this option has been requested.
For further information on these options please contact is at the address in Chapter 11.

10.1 ISO MME Support





10.2 Time Base Correction

The Time Base correction is used with images taken with wet film from a High Speed Cine Camera. It uses the timing marks in the film to determine the actual speed of the film feed.

10.3 Image Strobe

Image Strobe uses a foreground extraction technique to separate the foreground from the background. You can then overlay a number of, frame offset, foreground images onto the background image. This has the effect of strobing the motion path of the foreground object.

10.4 Custom Functions

Pixoft can utilize its image processing expertise to incorporate custom functionality into Vicasso. This allows for a very cost effective solution to your image processing requirements since much of the image handling algorithms are already part of Vicasso. So the custom development would be far less effort than building a system from scratch.

If you have any particular image processing needs that are not currently supported, please contact us for further details of what we can offer.

10.5 Custom / Unsupported File Formats

If you have a file format that is currently not supported by Vicasso, and you would like it to be, please contact us with details. This may be a proprietary format or a standard, but currently not supported, format.

11 Contact & Support

For technical support, enquiries, customisations and any other enquiries please contact:

Technical Support (Vicasso)
Pixoft Diagnostic Imaging Ltd
1 Beach Street
Dawlish
Devon
UK
Tel : +44 (0)1626 86 7777
Fax. +44 (0)1626 818501
E. support@pixoft.co.uk

www.pixoft.co.uk

12 Disclaimer

This document is for use as a guide only. Because we are committed to improving our software, some feature in this document may differ from those in the current software version. While we make every effort to keep this document in line with the current software, this cannot be guaranteed.

If you have any comments about this document, or the Vicasso software, we will be very please to hear from you at the address given in Chapter 11.