

<http://gmvc.cast.uark.edu> A Method Store for Advanced Survey and Modeling Technologies Mon, 01 Apr 2013 03:29:18 +0000 en-US hourly 1 <http://wordpress.org/?v=3.5.1> <http://gmvc.cast.uark.edu/scanning/zf-laser-control-interface-3/> <http://gmvc.cast.uark.edu/scanning/zf-laser-control-interface-3/#comments> Thu, 05 Apr 2012 15:29:03 +0000 snowball 5 meters]]> <http://gmvc.cast.uark.edu/?p=3617>

INTERFACE BASICS

Z+F Laser Control Interface Basics

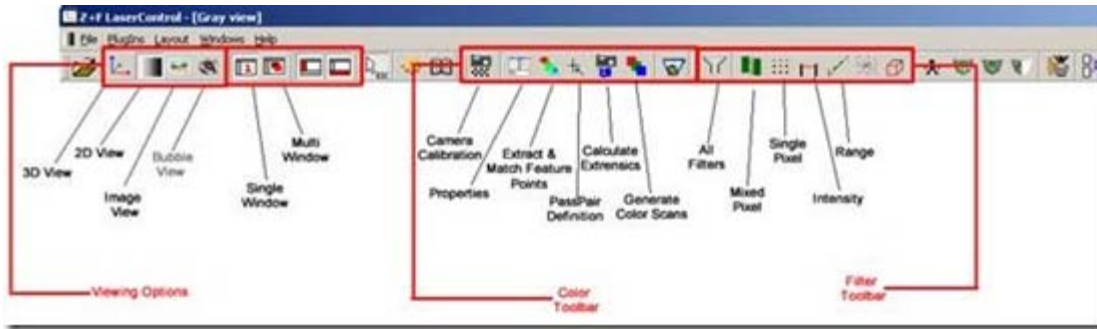


Figure 1: Laser Control Toolbars

VIEWING A SCAN IN 3D

1. To view a scan in 3D, RC in the 2D View and select Points to 3D (this gives you the most options), you can also select Full Scan to 3D (automatically subsamples) or Selection to 3D(automatically subsamples). In the Points to 3D options the Subsample factor is the key element to adjust. The default subsample is 0 which is automatic. If you want to see all of the data, set it to 1 (1/1) if you want it subsampled, set it to 4 (1 point is displayed for every 4) or 8 (1 for every 8). You can also filter by intensity and range and also do basic Mixed Pixel filters here. Remember this only filters that what you SEE in the 3D Window and doesn't actually filter the data at all.



Figure 2: Points to 3D options

OPTIONS FOR 3D VIEW

2. Look at the image for other options in the 3D View. Note: The 3D View is cumulative – data is added each time it is exported from a 2D view. To clear it, RC in the 3D window and choose Clear View.

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basic Mixed Pixel filters here. Remember this only filters that what you SEE in the 3D Window and doesn't actually filter the data at all.

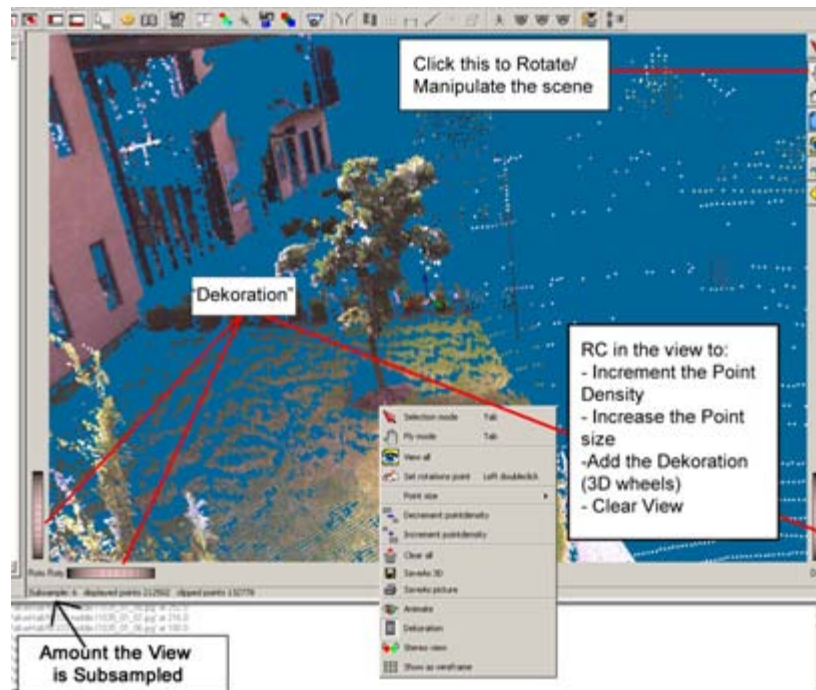


Figure 3: Points to 3D Options

CONTINUE TO...

Continue to [Z+F Laser Control: Color Mapping](#)

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FILTERING

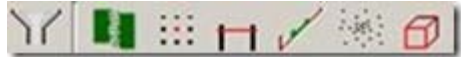
1. Once all of the scans have been color mapped, go through and verify the quality on all of them. As you are viewing the data in 3D, you will notice that there are extra scan points floating around in the air, as shown in the figure below. The data needs to be filtered before it is exported from Laser Control.



Figure 4: Extraneous data in the scan that will need to be filtered out

2. Open the Filter module by clicking on the Preprocessing button . Choose all of the scans and then select the Mixed Pixel, Range and Single Pixel filters – use the default settings for each filter and then verify the results.

3. To see the results of the filter, open a scan in 2D View and RC in the viewing window and select View Masks. Click on the Scans Tab in the TOC and hit the plus next to each scan – each filter is color coded to match what you see in the viewing window. You can RC on each filter and choose to View/Hide or Remove it. Each filter can also be ran individually using the filter icons in the Filter Toolbar.



EXPORTING YOUR DATA

4. Once you are satisfied with the results, you are now ready to export the data. To export the data, select File – Batch Convert to ZFS. The source should already point to the root file where all of the original ZFS files are stored and Destination is an Export subfolder within the root file location that will be created when the Start button is pressed. Be sure and check Use Mask to ensure that the filters are applied to the exported data and UNCHECK the Intensity Filter. Hit Start. All ZFS files in the root file are then converted. Here you can also export the data to ASCII (XYZ.ASC) and also PTS. For the ASCII file format, be sure to view the Options and select RGB data.


5. The data should now be ready to imported into other software such as Cyclone, Polyworks, or Rapidform.



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MANUALLY IDENTIFYING FEATURE POINTS PT 1

Manually Identifying Feature Points

If the automatic Extract and Identify Feature Points operation did not work or if you need to add additional feature points to a scan to get better results (and less error), then you will need to manually add a few feature points to a scan and its associated images.

1. First, click the Passpair Definition button  on the Color Toolbar. Immediately, you should see all of the points in the 2D View identified from that automatic feature point extraction. If you select an image from the TOC and open it, you will also see feature points in the image. The key to good color mapping is it have feature points in all/most of your images. When you have a scan that is a large %age sky then it can often be difficult for the automatic feature point extraction to execute. Therefore, you will want to place points in areas where you would like to see an improvement of the color mapping (areas that were not mapped well initially) and you also want a good distribution of points across all of your images where points can be easily identified.

2. By default when you open the Passpair Definition options the 2D Zoom Windows will automatically open for the scan in the 2D View and also for an image that you open. To effectively use the 2D zoom window in the 2D View (Gray View) change the Selection Mode from Rectangular to Point by clicking on the button several times until it changes from  to .

MANUALLY IDENTIFYING FEATURE POINTS PT 2

Now as you click and drag your mouse around the 2D View the view changes in the 2D View.

3. Now identify some prospective Feature points between a scan and its images. Drag the mouse in the 2D view to identify a Feature point location in the Zoom View – click on the point in the Zoom view and Name it (something that is easy to remember). Now identify the same point in the image view – Click on it (using the Zoom View) and give it the EXACT SAME NAME (copying and pasting the name often works best here). Now, check all of the images to see if the same point is identifiable in any other image, if so select the image, identify the point and give point the SAME NAME.

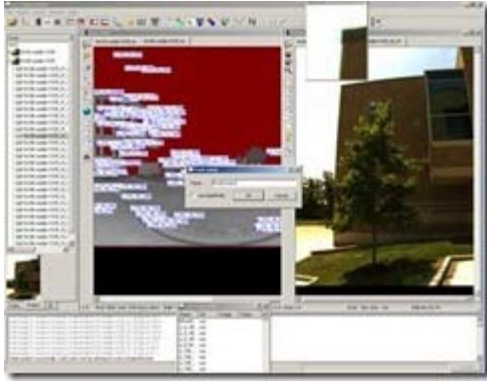



Figure 5: Process of identifying and naming manually identified points.

4. Rinse and repeat.

5. Once you have identified all of the manual feature points (3-10), click the calculate extrensics button  to calculate the external calibration file.

6. Note the error and Generate Color Scans to view the results. Verify the quality of the results and proceed as necessary.

CONTINUE TO...

If you are satisfied with the quality of your results, continue to [Z+F Laser Control: Filtering and Exporting Your Data](http://gmvcast.uark.edu/scanning/zf-laser-control-color-mapping-2/)

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COLOR MAPPING PT 1

Z+F Laser Control Workflow for Color Mapping


1. Create a New Project.

2. Select all scans that you wish to import. If you forget a scan, do NOT Open File but instead Right Click (RC) on the project name in the table of contents (TOC) and choose Add Scan to Project.

3. Make sure the appropriate toolbars are enabled by going to File – Options. Select Plugins on the left and enable the Color and Filter toolbars.


Note: If the Color Plugin does not appear and you are using a floating license, be sure the License.dat file


is copied to the local user's profile at the following location C:\Users\Users Name\AppData\Roaming\ZF. Locate this .dat file in the same location within the folder of another active user

4.  Double click (DC) on a scan to open it in 2D View. To view a scan in full 3D, RC in the 2D window and choose Full Scan to 3D (or selection if applicable). Next, open the 3D View by going to Window – 3d View or select the 3D View button.

5. If the images did not import automatically with the scans, RC on the Scan Name(s) in the Project Tab and choose Add Picture from scan –. Repeat for all scans; you can also add images by opening the scan (double clicking it in the Project Tab) > go to the Color Plugin Tab > Select add images. READ THE PROMPT and confirm that the correct images are being imported/applied to the correct scan. 28 images should appear below the scan in the Project Tab

COLOR MAPPING PT 2

6. Next check the camera calibration file by clicking on the  Camera Calibration button or by going to Plugins – Color – Camera Calibration menu. Select the MCAM file from the USB drive that accompanies the Z+F Imager (file extension ext.xml). The MCAM file stores the intrinsic calibration file for the Z+F MCAM camera. It is good to place a local copy of the MCAM file in your project file.

7. Next check the color Properties . Make sure that “Map Fast” and “Use Mask” are unchecked. On the left, choose the scans that you wish to apply color mapping to. Note that the associated Greycards and pictures should also be selected. For export format, choose what is appropriate for your desired end product. While deriving the extrinsic calibration confirm that the appropriate scan and images are selected (click ‘Deselect all’ below both the scans and the images, then select the scan for which you are calculating the calibration. Once the scan is selected, the correct images populate)

Export Formats:


JPG and TIFF: Will create a separate image file that will be referenced by the XYZ data. Possibly useful for color correcting the panoramic image file.


ZFS: Creates an XYZRGB data set – As a default use the ZFS file format


Next choose the Camera Calibration file and apply whitebalance correction if desired. Click OK.

COLOR MAPPING PT 3

8. Now we are going to calculate the extrinsic calibration for the camera and associated images. The extrinsic calibration file calculates the subtle differences that occur from putting the camera on the scanner. In other words, whenever you mount the camera to the scanner, its position is going to vary slightly – these are the camera extensics. Therefore once you calculate extensics for a single scan, the same extrinsic file can be applied across multiple scans that have been acquired with camera in the same position (in other words the camera CANNOT have been removed from the scanner).

9. Now open a scan file and the run the Extract and Match Feature Points command.  Click OK on the Automatic option to Calculate Extrinsic. The total resulting error should be less than 3 pixels, if it isn't see process below to manually add more points or attempt to Extract and Match Points on another scan within the project. DO NOT overwrite the original MCAM file, rename it. NOTE: If insufficient points are extracted with the Coarse setting, try the Fine setting. Depending on the nature of the scan data, these settings may give higher or lower error, and one setting may extract sufficient points when the other setting will not.

10. Now that we have the extrinsic file, we can Generate Color Scans  which actually uses the extrinsic camera calibration file to map the images onto the scan. Do this only for the scan that you used to calculate the feature points and then verify the color mapping quality. If you are satisfied with the color

mapping quality, you can then run the Generate Color Scans  command for the entire project. If the color mapping results are not adequate, then complete the steps in the next two tabs to manually add more feature points for the color mapping process.

CONTINUE TO...

If you are satisfied with the automated color mapping quality and have generated your Color Scans, you can continue to [Z+F Laser Control: Filtering and Exporting Your Data](#)

If the color mapping results are not adequate, then continue to [Z+F Laser Control: Manually Identifying Feature Points](#) to manually add more feature points for the color mapping process.

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