



ILRIS-3D
Matching Viewer Guide
Version 1.0 Beta 3



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1 About Matching Viewer

Matching Viewer is an ILRIS-3D utility for aligning range data with digital camera color images.

This guide describes the Matching Viewer workflow:

- Getting Started
- Parsing the scan (Parser)
- Selecting boresight options (Matching Viewer)
- Loading the source files (Matching Viewer)
- Selecting common features (Matching Viewer)
- Calculating boresight angle (Matching Viewer)
- Draping the digital photo (Parser).

2 Getting Started

Before you begin using Matching Viewer, make sure you have:

Hardware

- ILRIS-3D
- Camera mount
- Calibrated camera.

Collected Data

- Survey data with corresponding digital camera image.

Software

- Parser program
- Matching Viewer program.

3 Parsing the ILRIS Survey Data with Parser

1. Open the Parser program.
2. Select **File > Load > Scan Project**. A file selection window appears.
3. Browse to, and **Open** the scan project file. The scan project appears in the parser window (Figure 1).

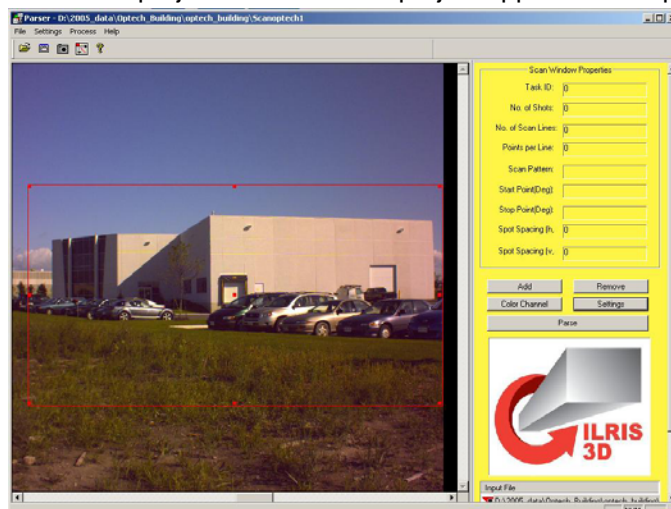


Figure 1: Parser window

4. Select **Settings > Output File**. The Output File settings appear (Figure 2).

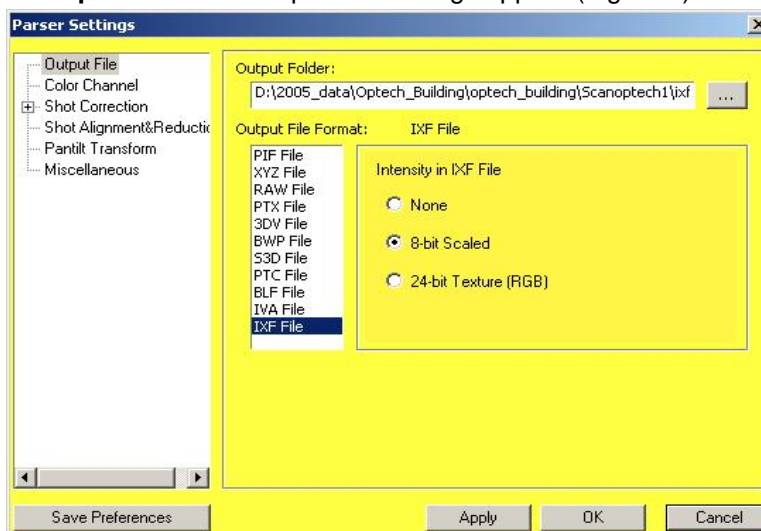


Figure 2: Output file settings

5. In the **Output File Format** section, select **IXF File**.
6. Under **Intensity in IXF File**, select **8-bit Scaled**.

7. In the Parser Settings list, select **Shot Alignment & Reduction**. The Shot Alignment & Reduction settings appear (Figure 3).

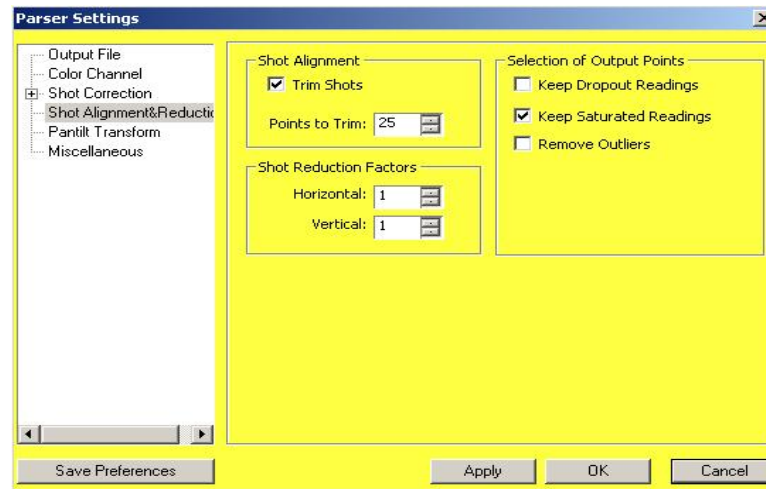


Figure 3: Shot alignment & reduction settings

8. Verify that the **Trim Shots** box is checked, and set **Points to Trim** to 25.
9. In the Parser Settings list, select **Miscellaneous**. The Miscellaneous settings appear (Figure 4).

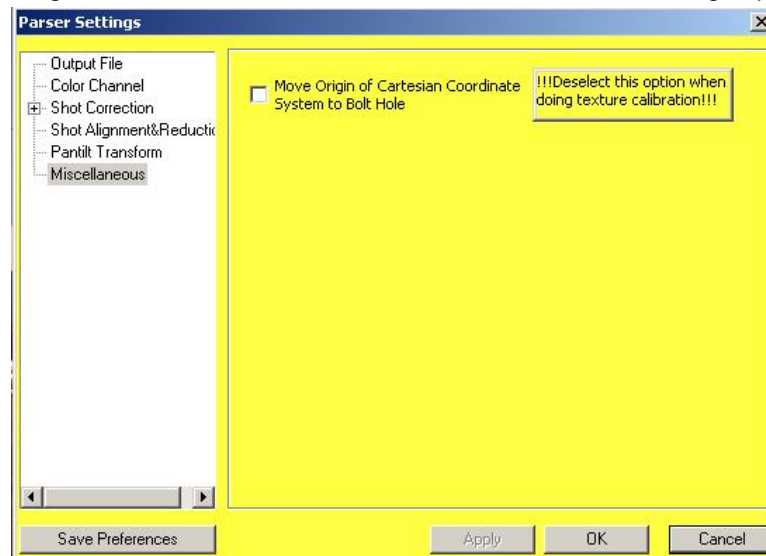


Figure 4: Miscellaneous settings

10. Verify that the check box is disabled.

11. In the Parser Settings list, select **Pantilt Transform**. The Pantilt Transform settings appear (Figure 5).

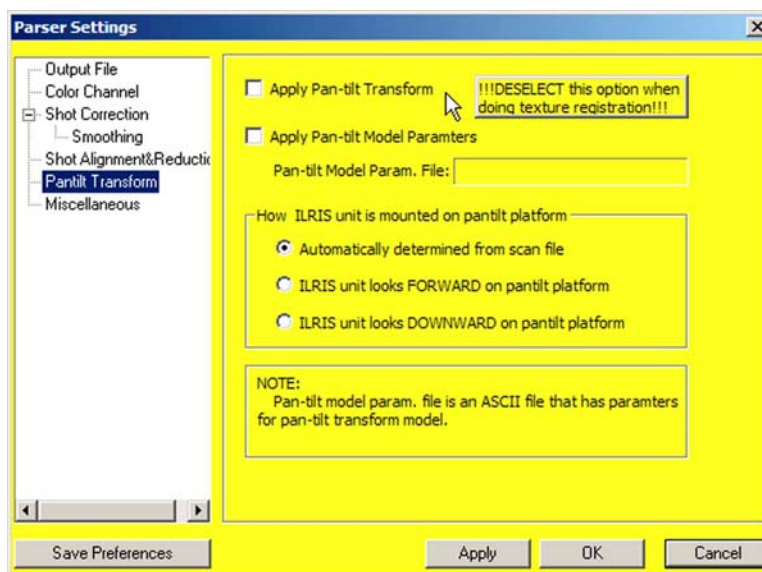


Figure 5: Pantilt Transform settings

12. Verify that the **Apply Pan-tilt Transform** check box is disabled.
 13. In the Parser Settings window, click **OK**.
 14. In the Parser window, click **Parse**.
- Note:** Remember where the parsed data is saved. You will need to load it in Matching Viewer.
15. Close Parser and continue to the next procedure, **Setting Boresight Options in Matching Viewer**, page 5.

4 Setting Boresight Options in Matching Viewer

1. Open the Matching Viewer program.
2. Select **Function** (Figure 6), and choose:

Boresight – Orientation

Camera is fixed to the ILRIS-3D system and it has not been taken out of the Camera Mount.

Boresight – Position+Orientation

Camera has been taken out of the Mount between scanning positions.

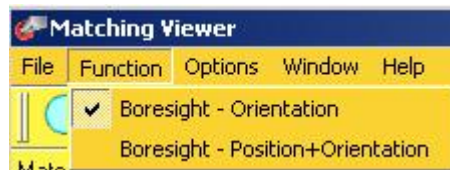


Figure 6: Function menu

3. Continue to the next procedure, **Loading the Source Files**, page 6.

5 Loading the Source Files

1. Select **File > Matching**, or press **CTRL+M**, or click the ⇄ icon. The Matching window appears (Figure 7).

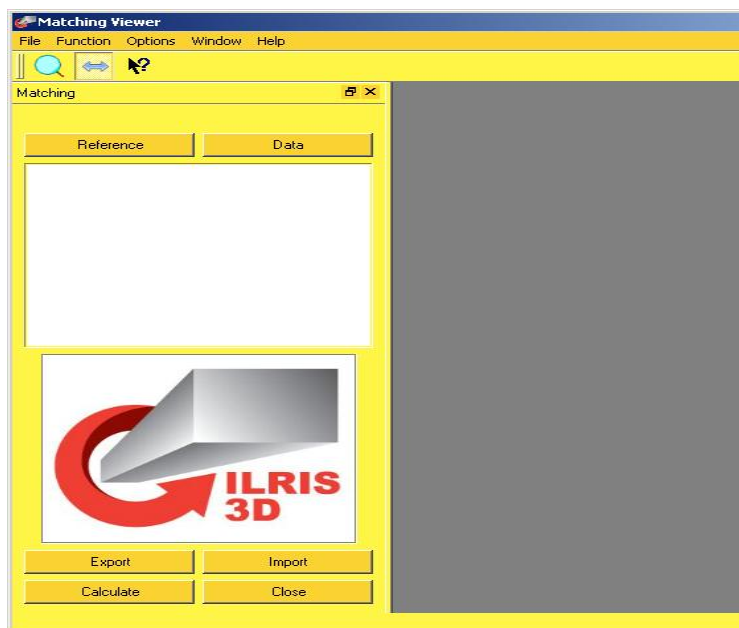


Figure 7: Matching window

2. Click **Reference**. A file selection window appears (Figure 8).

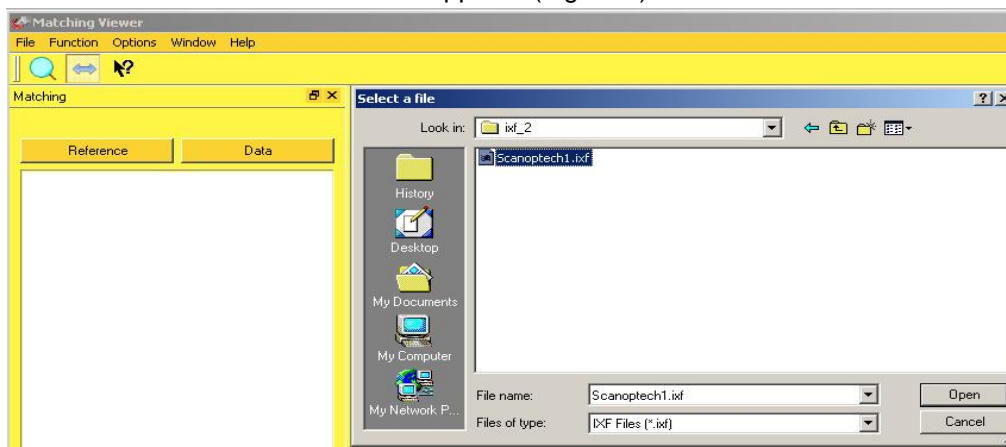


Figure 8: File selection window for source 1

3. Under **Files of type**, select **IXF Files (*.ixf)**.

4. Browse to the folder where your scan data was saved in **Parsing the ILRIS Survey Data with Parser**, page 2, and **Open** the file. A 2D, 8-bit grayscale intensity scan appears (Figure 9).

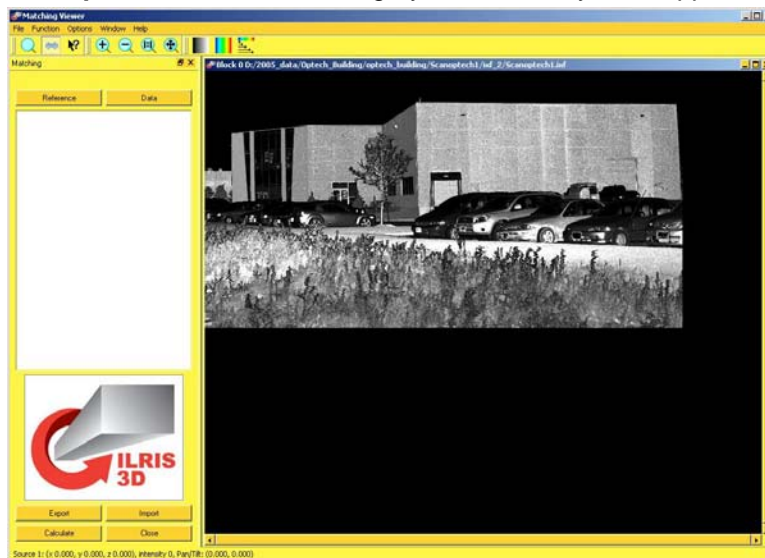


Figure 9: Intensity data opened in Matching Viewer

5. Click **Data**. A file selection window appears (Figure 10).

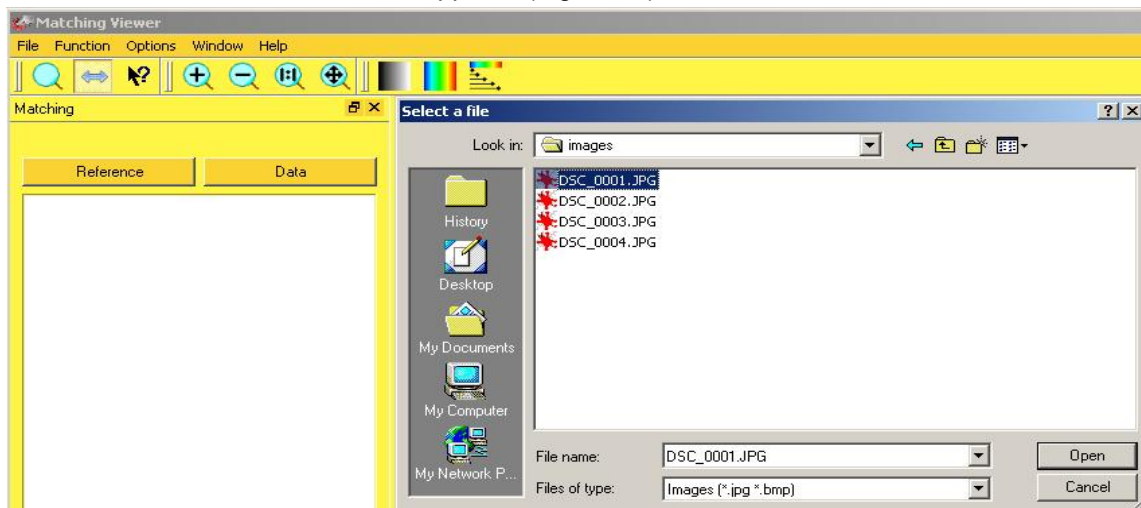


Figure 10: File selection window for source 2

6. Under **Files of type**, select **Images (*.jpg, *.bmp)**.
7. Browse to the folder where your digital camera image data was saved in the previous section, and **Open** the file. A full-color digital camera image of the scan appears (Figure 11).

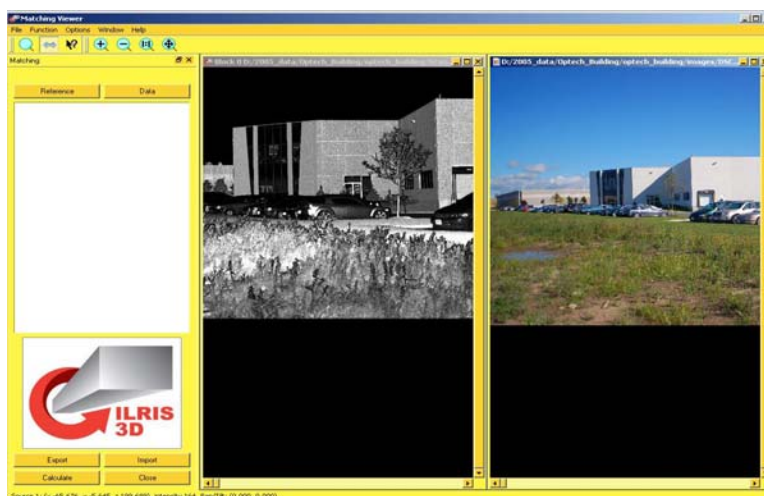


Figure 11: Full color image below the intensity image

- Continue to the next procedure, **Selecting Common Features**, page 8.

6 Selecting Common Features

After opening the source files, you can select the common features of the scan intensity data and the digital camera image to calculate the boresight angle. You need at least **5 point pairs** to calculate a proper calibration. Try to spread out your point pairs across the entire image.

6.1 Using Mouse Controls

To adjust the **zoom** factor of an image, use the mouse scroll wheel. Additional zoom commands are available on the Matching Viewer toolbar.

To **pan** the image, hold down the mouse scroll wheel and the image follows the mouse movements.

To **select a point**, click the left mouse button.

To **pair points**, click the right mouse button. Pairing works when you have a point selected in both the intensity image and the digital camera image.

6.2 Selecting Common Point Pairs

1. Zoom to isolate a common feature (see Figure 12). For the most accurate match, zoom until you see individual pixels in both the scan and digital camera image.

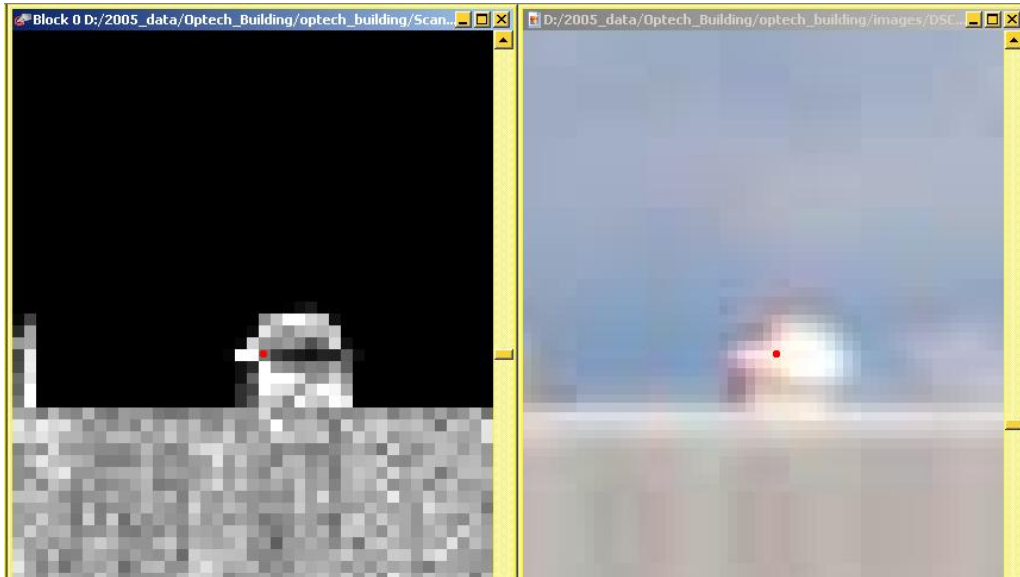


Figure 12: Zoomed images showing common features

2. In the scan and the digital camera image, left-click to select the pixel that best represents the common feature of your object. The selected pixel appears as a blue dot.
3. To associate the pair, right-click anywhere in either image. The point coordinates appear in the Matching Window (Figure 13), and the paired points appear red.

If this is the first pair, the Camera Calibration file selection window appears (Figure 14). Browse to the camera calibration file with the internal camera parameters, and click **Open**.

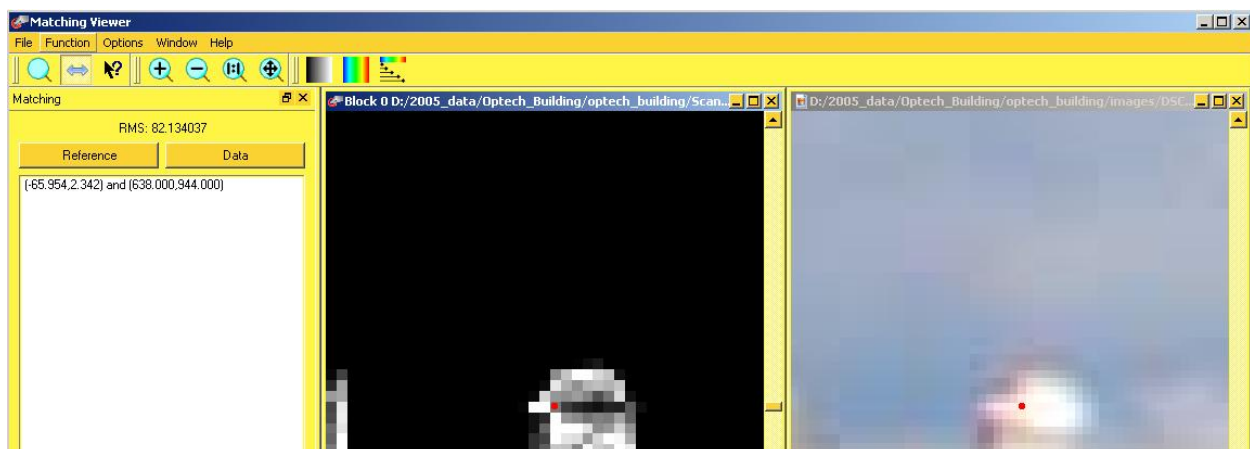


Figure 13: Point pair coordinates in matching window

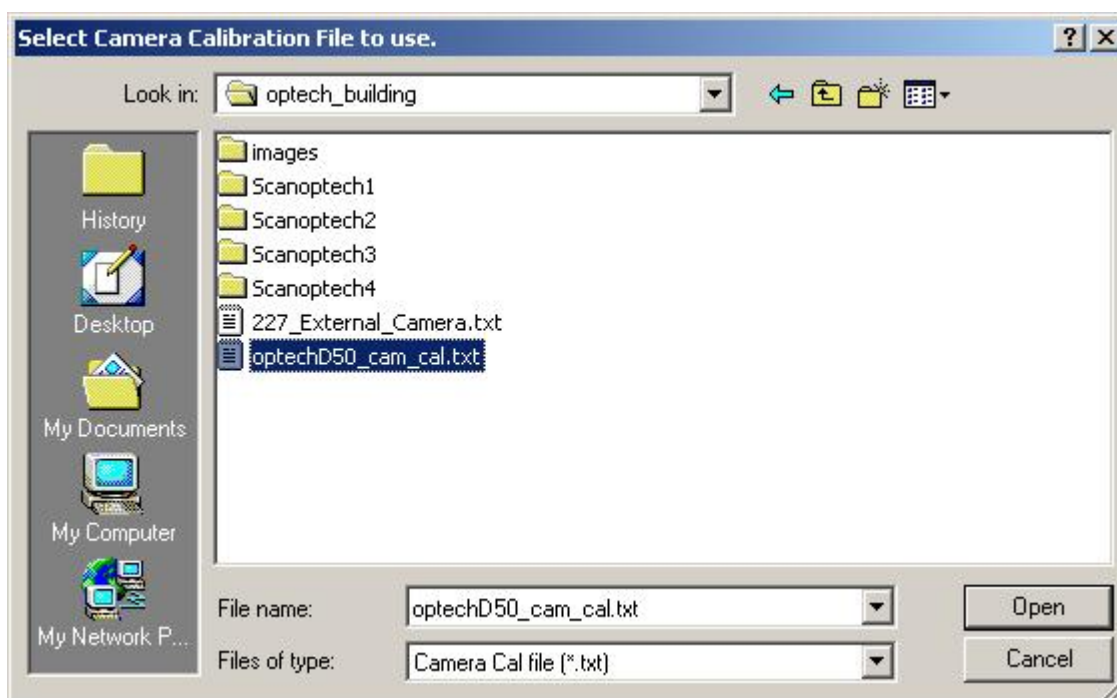


Figure 14: File selection window for camera calibration file

4. Continue selecting until you have at least 5 point pairs (Figure 15).

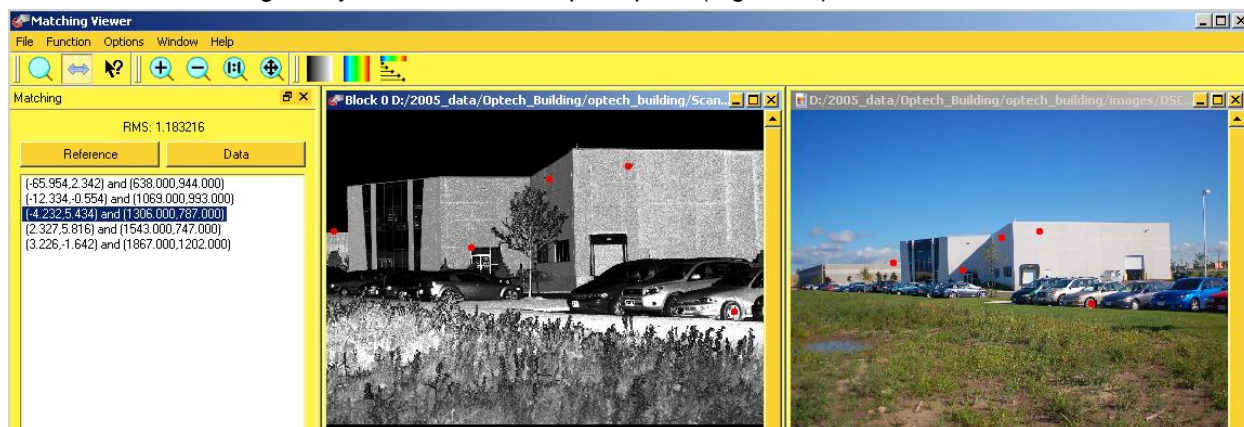


Figure 15: Multiple point pairs selected

5. Continue to the next procedure, **Calculating the Boresight Angle**, page 11.

7 Calculating the Boresight Angle

1. In the lower-left corner of the Matching Viewer main window, click **Calculate**. The calibration occurs.
2. When the calibration is complete, the Camera Cal window appears, showing an RMS value (Figure 16). If the RMS value is:
 - <2 Calibration is **good**.
 - 2-8 Calibration is **acceptable**.
 - >8 Repeat the steps in Selecting Common Point Pairs, page 9.



Figure 16: Camera cal window

3. Click **OK**. A file selection window appears (Figure 17).

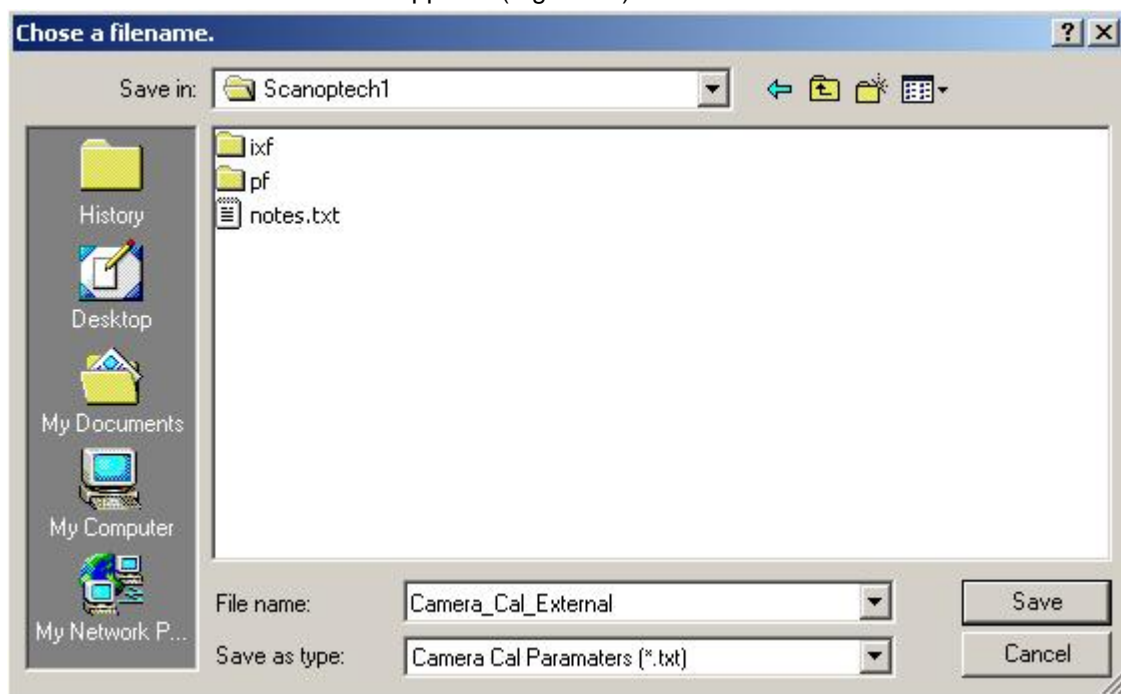


Figure 17: File selection window for camera calibration file

4. Save the new camera calibration file to a folder of your choice.

Matching Viewer generates a *.ccp, *.err and a *.txt file (Figure 18). The .txt file is the most important file because it contains the boresight angles, camera position, and camera distortion corrections. This file will enable the parser to drape the photo onto the scan.

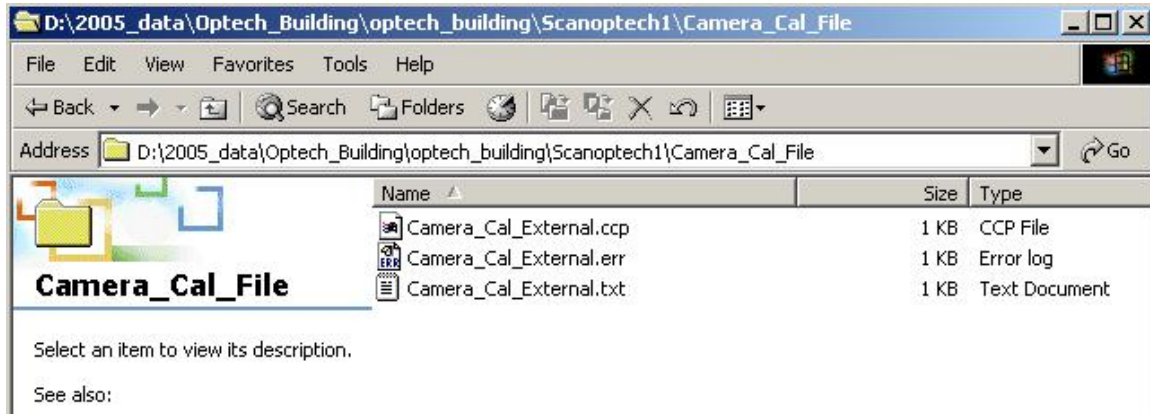


Figure 18: Generated files

5. Continue to the next procedure, **Draping the Digital Camera Image in the Parser**, page 12.

8 Draping the Digital Camera Image in the Parser

1. Open the Parser program.
2. Select **File > Load > Scan Project**. A file selection window appears.
3. Browse to the scan project file, and click **Open**. The scan project appears in the parser window (Figure 1).
4. Select **Settings > Output File**. The Output File settings appear (Figure 19).

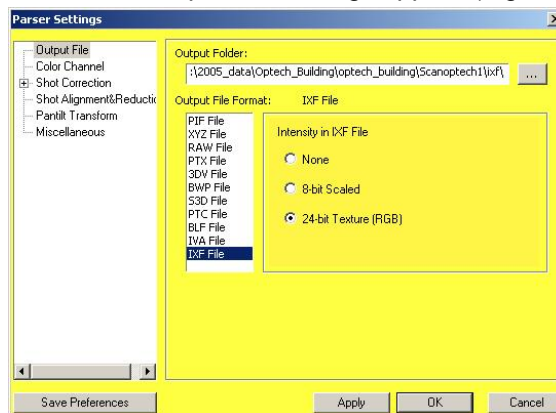


Figure 19: Output file settings

5. Under **Output File Format**, select **IXF File**.
6. Under **Intensity in IXF File**, select **24-bit Texture (RGB)**.
7. In the **Parser Settings** window, select **Color Channel**. The Color Channel settings appear (Figure 20).

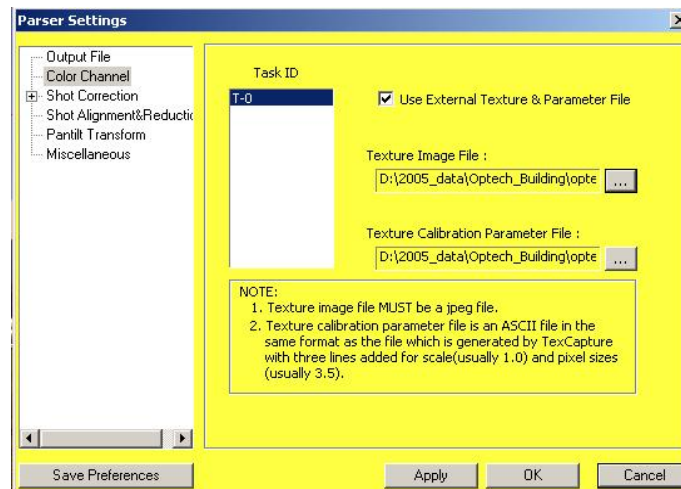


Figure 20: Color channel settings

8. Check the box for **Use External Texture & Parameter File**.
9. Under **Texture Image File**, browse to the digital camera image that corresponds to the loaded scan.
10. Under the **Texture Calibration Parameter File**, browse to the External Camera Calibration File that you created in the previous section.
11. Click **Apply** and **OK**.
12. In the main parser window, click **Parse**. The IXF file now displays the picture draped over the scan (Figure 21).

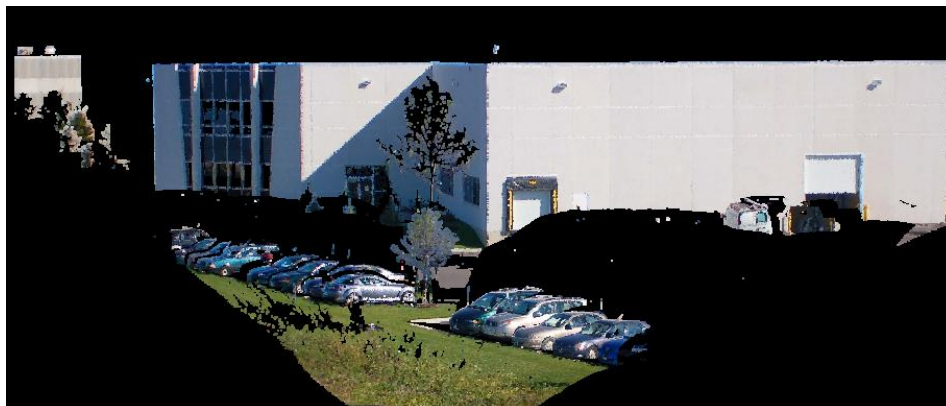


Figure 21: Successful drape