The Rio de Janeiro State University - UERJ
Laboratory of Photogrammetry and Remote Sensing
The E-Foto project

The Stereoplotter Module

Authors: Patricia Farias Reolon and Lia de Souza e Simões Figueiredo
Revision: Jorge Luís Nunes e Silva Brito

Introduction

The Stereoplotter Module of the e-foto software performs the three-dimensional photogrammetric plotting of terrain features from a stereoscopic model. This operation plots the outline of natural and man-made objects in the stereoscopic model. Those objects are the cartographic features. To perform the photogrammetric drawing, it is necessary to have the stereoscopic model properly oriented to a three-dimensional referential system of the terrain. For representing the features, there are 3 graphic primitives: **Points**, **Lines** (streets, for example) and **Polygons** (buildings, for example). Before running this module, it is necessary to have the parameters of both the interior and exterior orientations of the overlapping images used in the stereo-pair calculated and saved.

After starting the e-foto software, its start up screen will appear, as shown in figure 1. Before starting the integrated **Stereoplotter** Module, a project file (*.epp) with both the interior and exterior orientations of all images must be loaded.

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Figure 1 – The e-foto start up screen.

Creating a Photogrammetric plotting

There are several options on the **Project** menu. Choose the option **Load File or Last Project** to load the file containing the interior and exterior orientation parameters previously calculated. It is possible to navigate between folders to find the requested file. Choose the desired file, as shown in figure 2.

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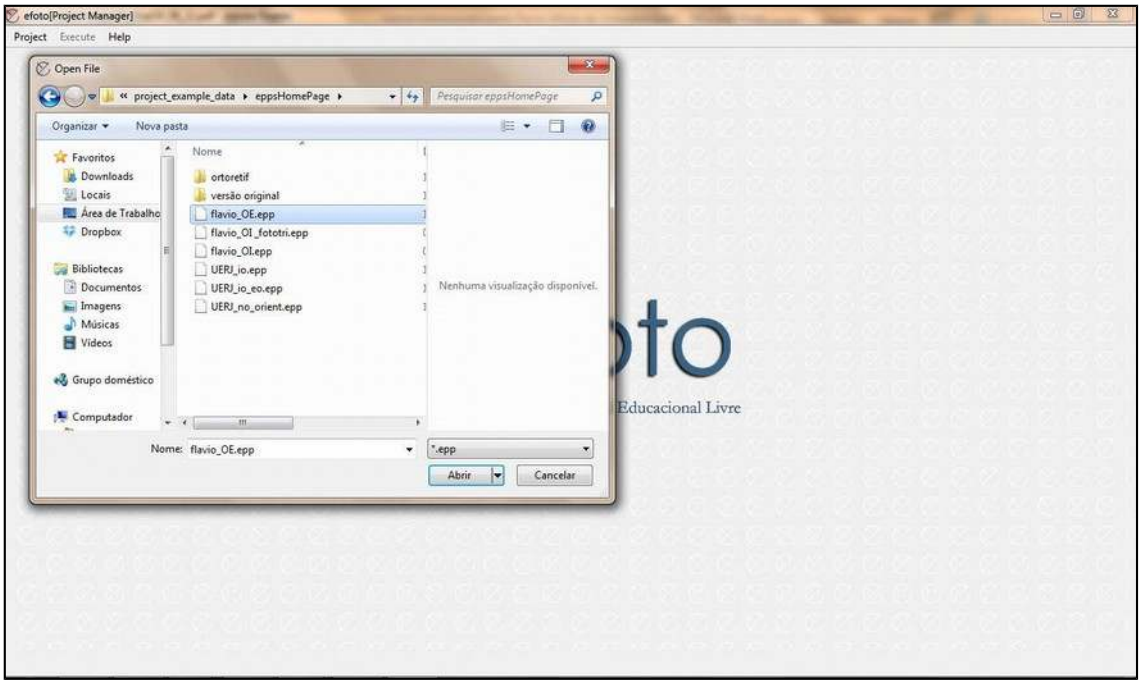

Figure 2 – The loading of an epp project previously created, where both interior and exterior orientation have already been done.

After loading the epp file, the project manager screen will be available, as seen in figure 3. Click in the **Execute** menu, then in the **Stereoplotter** option to run the Stereoplotter Module. You may also perform this operation by pressing the keys "**Control+P**" simultaneously.

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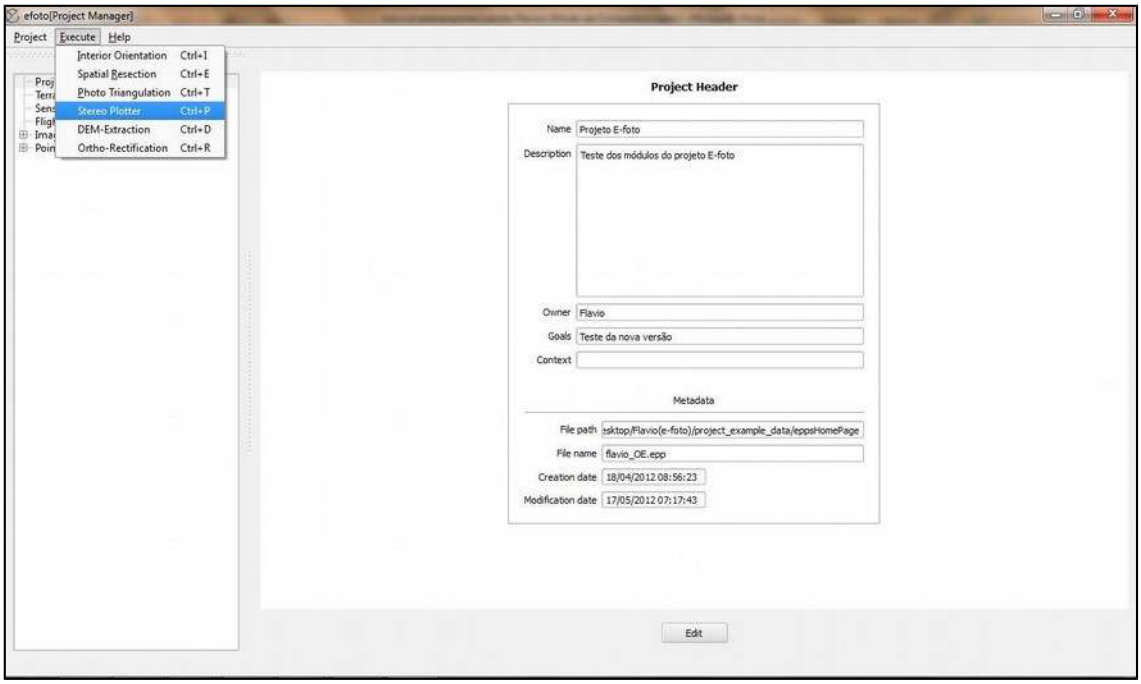

Figure 3 – Project manager screen and Stereoplotter module execution.

After loading the Stereoplotter Module, its main interface will appear, as shown in figure 4.

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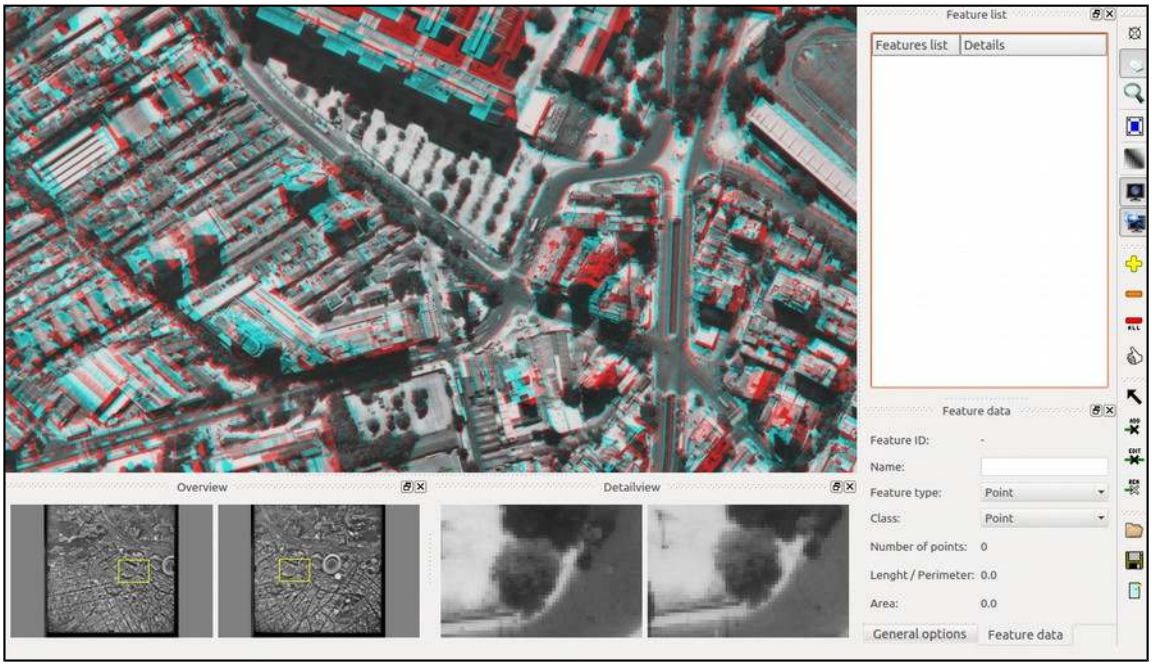

Figure 4 – The interface window of the Stereoplotter module.

NOTE: For a fine adjustment of your stereo viewing, hold the "Shift" key while dragging the image to move the left image. Hold the "Control" key while dragging the image to move the right image. If you are just a beginner in stereo vision, we encourage you to try to adjust stereoscopic vision either wearing a pair of anaglyph glasses or doing it monoscopically.

As soon the program starts, the first pair of the stereo-pair list will load – in this example, the stereo-pair are the images 016 and 017. If you want to work with another stereo-pair, go to the **General options** tab and modify the "Pair" option (please see figures 5 and 5a). If you want to change the stereo view mode, use the "Stereo mode", "Left anaglyph", "Right anaglyph" and "Stereo mode" options. To view the whole images, click on the "**Fit View**"  button.

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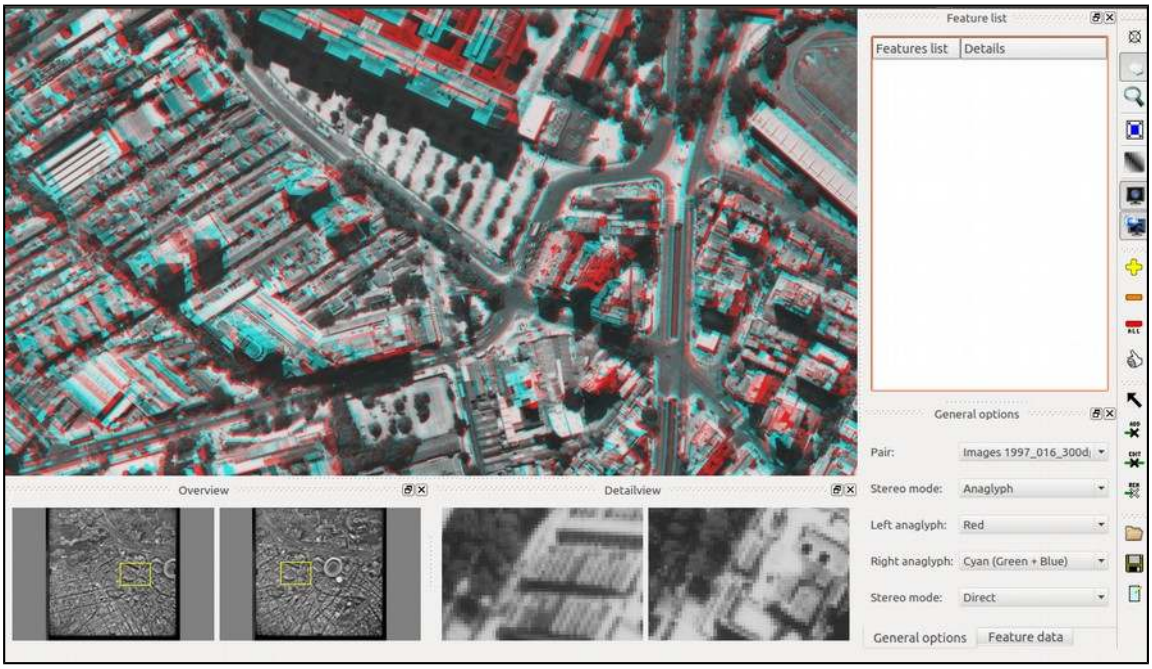

Figure 5 – The "General options" of the Stereoplotter module.

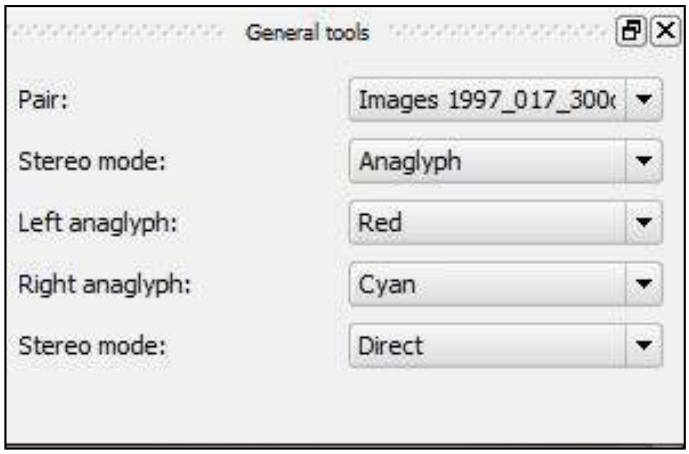

Figure 5a – The options for setting up the stereoscopic vision on the Stereoplotter module.

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NOTE:

(1) If you have polarized glasses, you may change the "stereo mode" (figure 5a) accordingly.

(2) To activate/deactivate overview and detail windows, click on their respective buttons:

After choosing a stereo-pair, you may start the photogrammetric stereo plotting using points, lines or polygons. Now, let's begin with an example of a building stereo-plotting using the polygon feature. In figure 6, the **Feature tools** and **Feature data** are highlighted. Figures 6a shows the **Feature data** in detail.

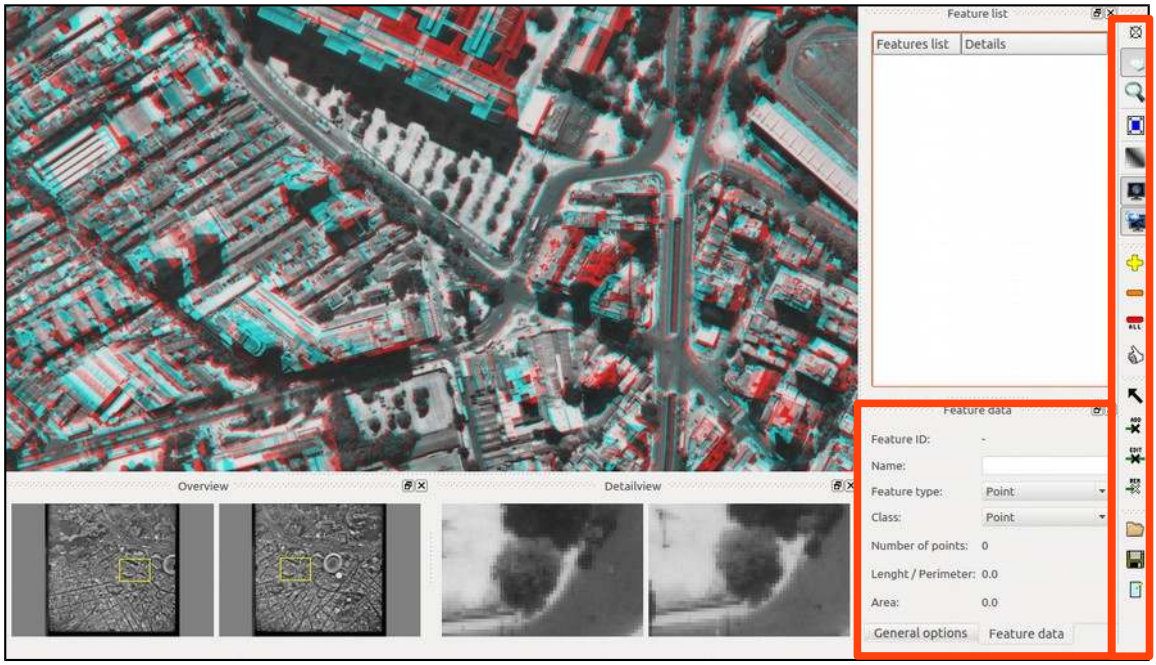

Figure 6 – The windows of the "Feature data" and "Feature tools" of the Stereoplotter module

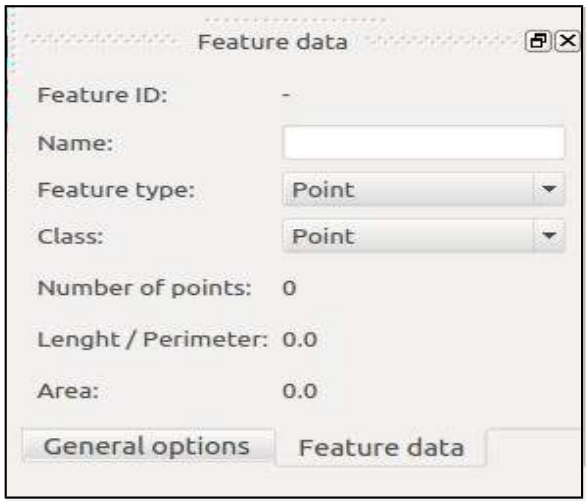

Figure 6a – Feature data in detail

When you click on the button  the e-foto will open a new box that will allow you to choose the name of your feature, its type (point, line or polygon), and class (Figure 7). There are no classes available for feature points. Thus, the feature **line** of the Stereoplotter module offers the following classes: undefined, paved street, unpaved street, trail, railway, river, and bridge. For **polygons** the following classes are offered: undefined, house, building, industrial, club, station, wasteland, square, park, forest, lagoon, and pool.

In Table 1 it is possible to see all the buttons of the Stereoplotter module and their respective functionalities.

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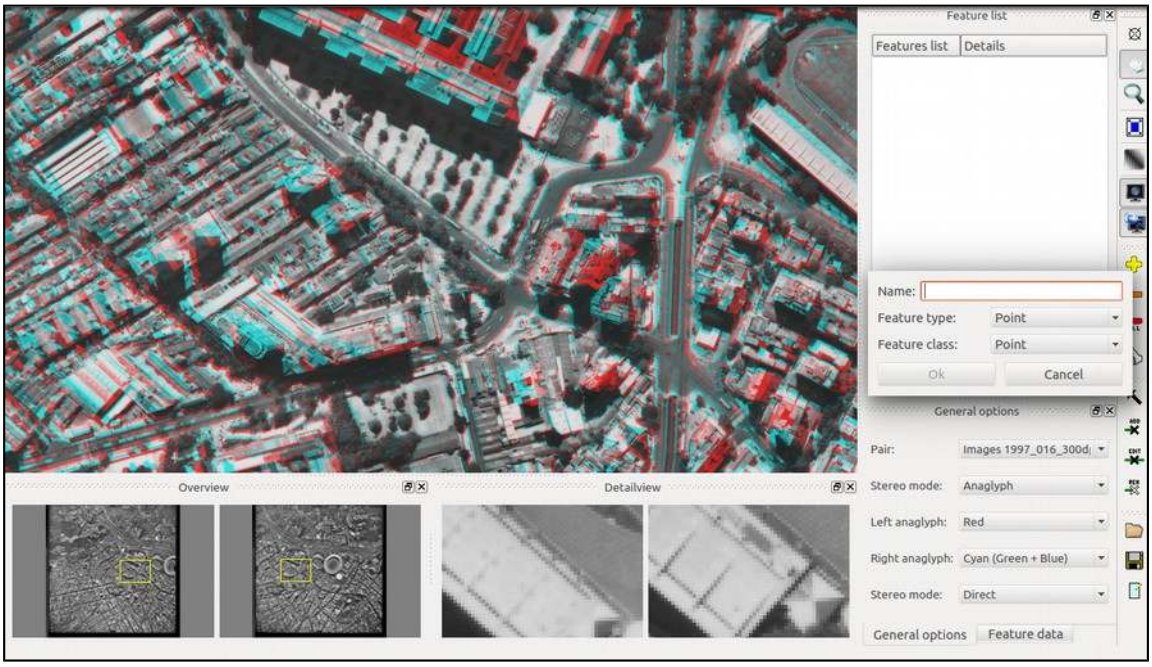

Figure 7 – Adding a new feature

Table 1 – The functionalities of the buttons of the feature tools window of the Stereoplotter.

Button	Function
	**Add new feature** – Add a new feature.
	**Remove feature** – Removes the current feature.
	**Remove all features** – Deletes all features.
	**End feature** – Stop editing the current feature.
	**Select feature / point** – Selects a feature / point to be edited (current feature).
	**Insert point mode** – If held down, indicates that new points will be added to the current feature.
	**Remove point** – Removes the current point of the current feature.
	**Edit point mode** – If held down, indicates that the current points will be modified.

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Button	Function
	**Load features** – Loads all previous measured features.
	**Save features** – Saves the current work.
	**Export features as...** - Exports the features in *.txt and in *.shp

In figure 8 you can see the measurements of the four corners of the Maracanã's subway building and in figure 9 you can see its coordinates. This will result in the building top restitution. If necessary, use image calibration to make sure that the homologous points are precisely under the marks, in other words, that the stereoscopic measurement, floating mark is touching an upper corner to the Maracana's subway building.

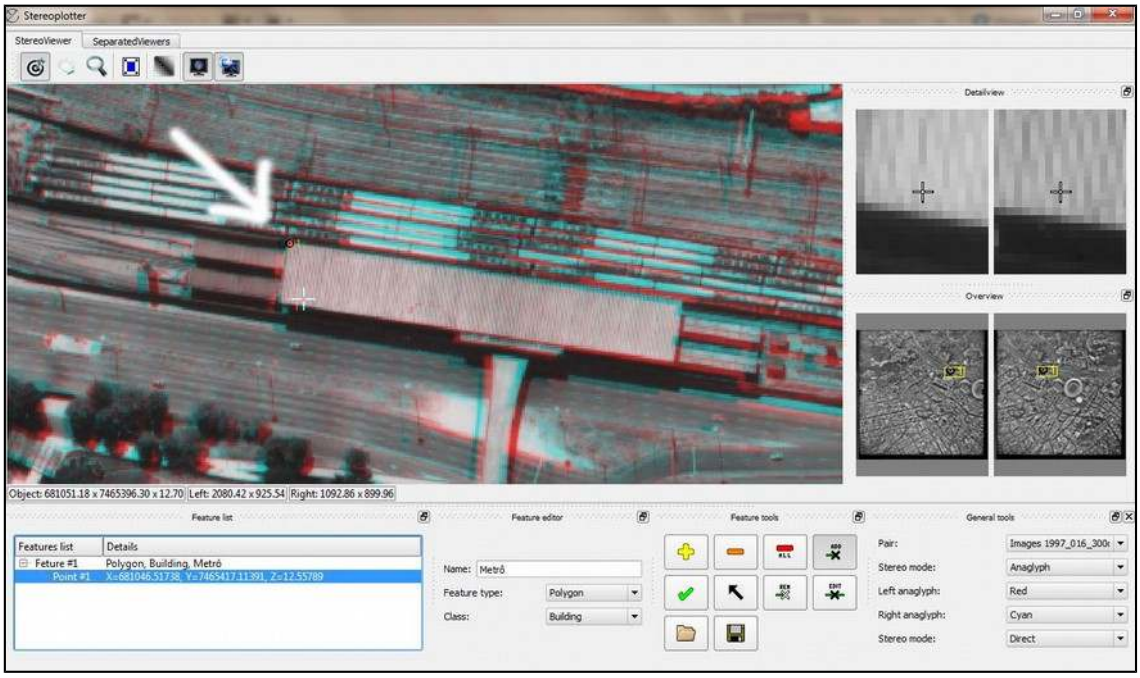

Figure 8 – Measuring the first point on Maracana's subway building.

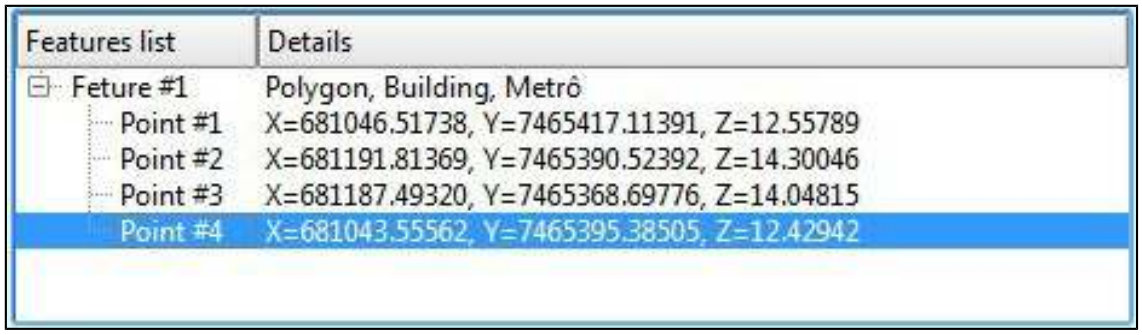

Figure 9 – Ground coordinates calculated for each of the four corners of the Maracanã subway building.

Next, click on the **End feature** button to stop the measurement. If you want to modify a feature, for example, add or delete a point, edit the name, type or class, or even delete one or all features, go to table 1 to see the proper buttons to use for modifications.

To save your work, click the **Save** button (see table 1). You will need to choose the name and the path of the file to be saved. Please note that all features will be saved in the *.spf (Stereoplotter features file) format, but it is possible to export your work in *.txt or in *.shp (ESRI Shape File format).

Any contribution for correcting and improving this tutorial is very welcome. Please send your comments and/or suggestions to the e-foto team at http://www.efoto.eng.uerj.br/forum

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