

EasyGeoTagger (EasyGT) User's Guide - [DRAFT]

DRAFT: For use with EasyGeoTagger beta version 0.4.0

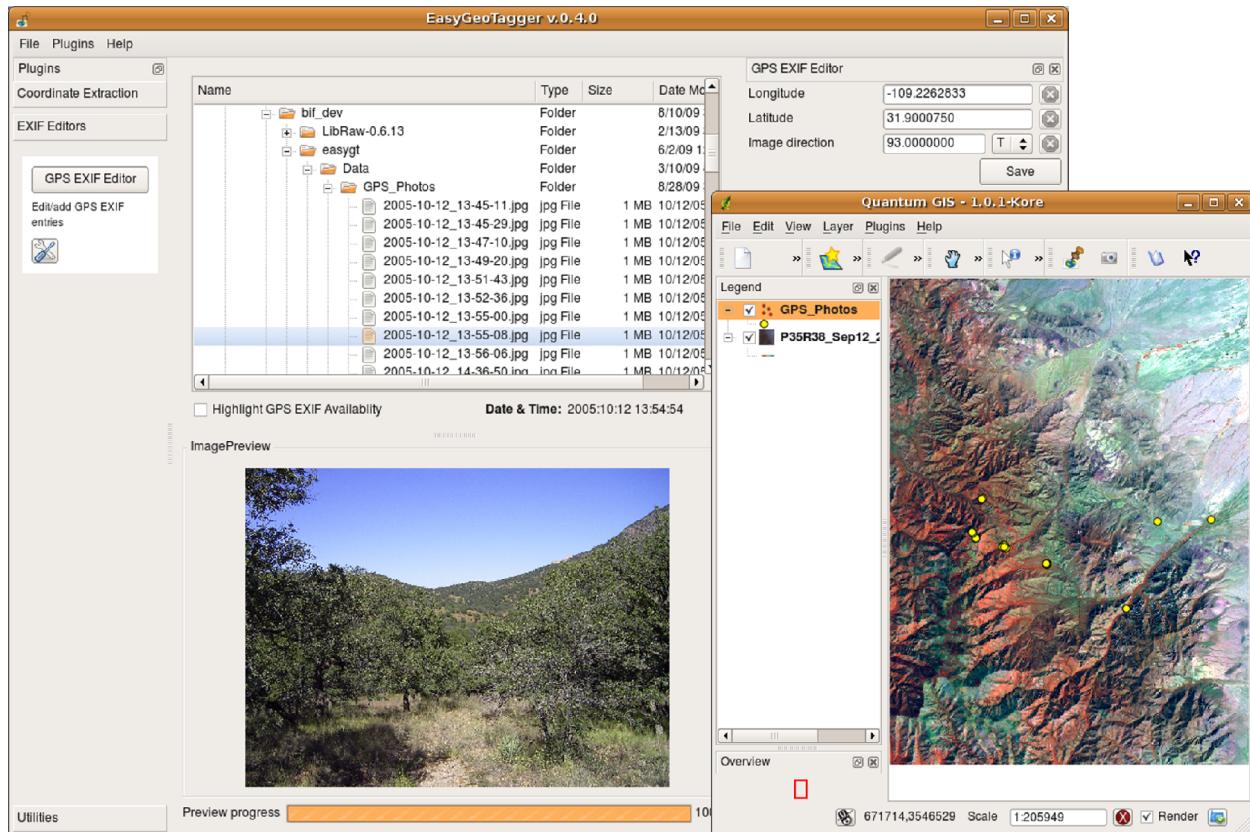


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1. About EasyGT

EasyGeoTagger (EasyGT) is an open source software application for geotagging digital images that runs on Linux, OSX and Windows. Geotagging is the process of embedding geographic coordinates (i.e., latitude and longitude) and other spatial attributes into a digital image. This geographic information can be used to document, for example, the location where the photographer took the image and the direction the camera was pointing. Geotagged images can be used to identify and monitor changes in a landscape over time, which makes EasyGT a powerful tool for conservation and natural resource management initiatives. Our goal in developing EasyGT is to simplify the process of geotagging digital images and to promote photo-monitoring and the effective use of ground-based digital imagery in scientific initiatives focused on identifying and quantifying changes in the Earth's terrestrial and marine environments

EasyGT also comes with additional plugins that greatly extend the capabilities of **QuantumGIS (QGIS)**, a free and open source desktop geographic information system. EasyGT includes a native QGIS data provider and accompanying plugin (LoadExifDataset) that allows a directory of geotagged images to be treated as vector (i.e., point) data source. Together with the **Event Visualization Tool (eVis)**, natural resource managers, conservation practitioners and general enthusiasts have access to powerful suite of free tools for editing, mapping, and displaying digital images in a geographic context.

With EasyGT, geotagging is...just easy.

2. Conventions used in this guide

- Pulldown menu commands appear in ***bold italics***
- Sequential pulldown menu commands are concatenated using ">" (i.e., ***File → Open***)
- Window and dialog titles and titles or headings for parameter input objects (radio buttons, text boxes, drop-down menus) are in **bold** (i.e., **Mode**: dropdown list)
- Window and dialog tabs will be in **bold** but they will be followed by "tab" (i.e., Click on the **Channels** tab)
- Parameter inputs (either typed in or selected from a list) are printed using a **bold Courier font** (i.e., Enter **My Project** into the **Project Name** text box)
- The term "click" will be used to specify a left-mouse click and "right click" will be used to specify a right-mouse click.

3. Installing EasyGT

Ubuntu

A Ubuntu stand alone binary is not yet available. You can however easily build EasyGeoTagger from source by following the directions on the [EasyGeoTagger Trac site](#).

Windows XP and Vista - OSGeo4W

In order to use EasyGT with the OSGeo4W distribution, you will need to make sure several packages are installed

- Start the OSGeo4W setup program
- Select Advanced Install

- Answer the subsequent of the questions based on your setup until you get to the "Select Packages" screen
- Make sure the following packages are installed under the "Lib" tree
 1. Exiv2
 2. SIP
 3. PyQt4
 4. Python-win32

Double click on the EasyGeoTagger_0_3_0_OSGeo4W.exe and select the root folder of your OSGeo4W install.

Windows XP and Vista - Stand alone application

A Windows stand alone binary is not yet available.

Mac OSX

A Mac OSX binary is not yet available.

4. Using EasyGT

EasyGT can be used as a stand alone application or as a QGIS plugin.

4.1. Using EasyGT as a stand alone application

Ubuntu

To launch EasyGT, open a terminal and type, **easygeotagger**

Windows XP and Vista - OSGeo4W

Double click the EasyGT shortcut on your desktop, or select Start → *EasyGeoTagger* → *EasyGT*

Windows XP and Vista - Stand alone application

A Windows stand alone binary is not yet available.

Mac OSX

A Mac OSX binary is not available in this release.

4.2. Using EasyGT as a QGIS plugin

The EasyGT QGIS plugin offers the same functionality that the stand alone version but allows you to transmit coordinates to the EXIF editor by clicking on the map canvas. EasyGT also includes a native data provider and accompanying plugin (LoadExifDataset) that allows a directory of geotagged images to be treated as vector (point) data source.

Ubuntu

If you have followed the build instruction on the wiki, simply start QGIS!

Windows XP and Vista - OSGeo4W

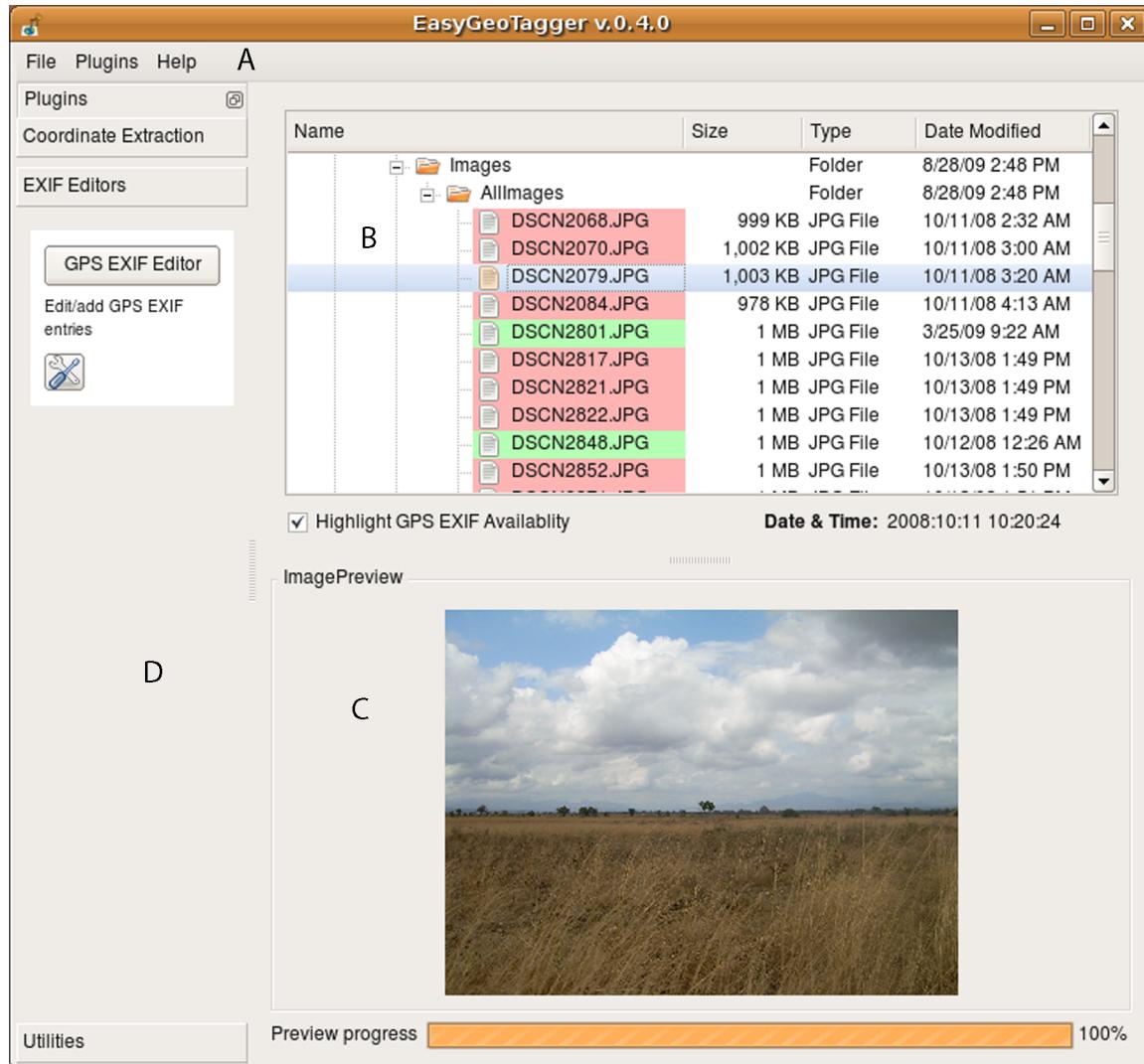
This requires that **OSGeo4W** is installed on your computer. Start QGIS by double clicking the desktop icon or select Start → *OSGeo4W* → *Quantum GIS 1.0*

Windows XP and Vista - MinGW A MinGW build of QGIS is not yet available.
Build

Mac OSX A Mac OSX binary is not yet available.

4.3. Understanding the interface

The EasyGT interface consists of menu items, a file browser, an image preview window, and a plugin selection area.



A. *Menu items* – The **File** menu can be used to exit EasyGT. The **Plugin** menu provides the ability to load new plugins without having to restart the application.

B. *File browser* – The **file browser** dialog is used to select directories and specific image files to be processed. A checkbox labeled **Highlight GPS EXIF Availability** below the **file browser** dialog will color files green if geotagging information exists in the file and all other image files will be colored red. When highlighting is activated there may be a slight delay in highlighting files as well as browsing, which will vary between computers. The data and time information stored with the image is also displayed under the file browser. Clicking on an image will display it in the **Image Preview** window and will select it for processing by a plugin.

C. *Image preview window* – When an image file with a format recognized by EasyGT is highlighted in the file browser it will be displayed in the **Image Preview** window. A progress bar under the **image preview** window displays the display progress. This is particularly helpful with large images.

D. *Plugin panel* – To select a plugin click on the plugin group description button to display the plugins in that group. To active the plugin click on the button with the plugin name. This version has three plugin groups: Coordinate Extraction, EXIF Editors, and Utilities.

5. Plugin description

EasyGT relies on plugins to provide its functionality. Plugins are grouped by functionality. In this version of EasyGT there are three plugin groups: Coordinate Extraction, EXIF Editors, and Utilities. Within each group there can be multiple plugins and each has a brief description of what it does. As EasyGT development continues more plugins will be added.

5.1. EXIF editor

There is one plugin related to editing EXIF data.

5.1.1. GPS EXIF editor

The GPS EXIF Editor plugin is the interface to add and edit EXIF information (i.e., metadata stored with the image). This plugin must be activated for other plugins that update or edit EXIF information to work.

Clicking on the **GPS EXIF Editor** button opens a data entry form on the right-side of the EasyGT window.

GPS EXIF Editor

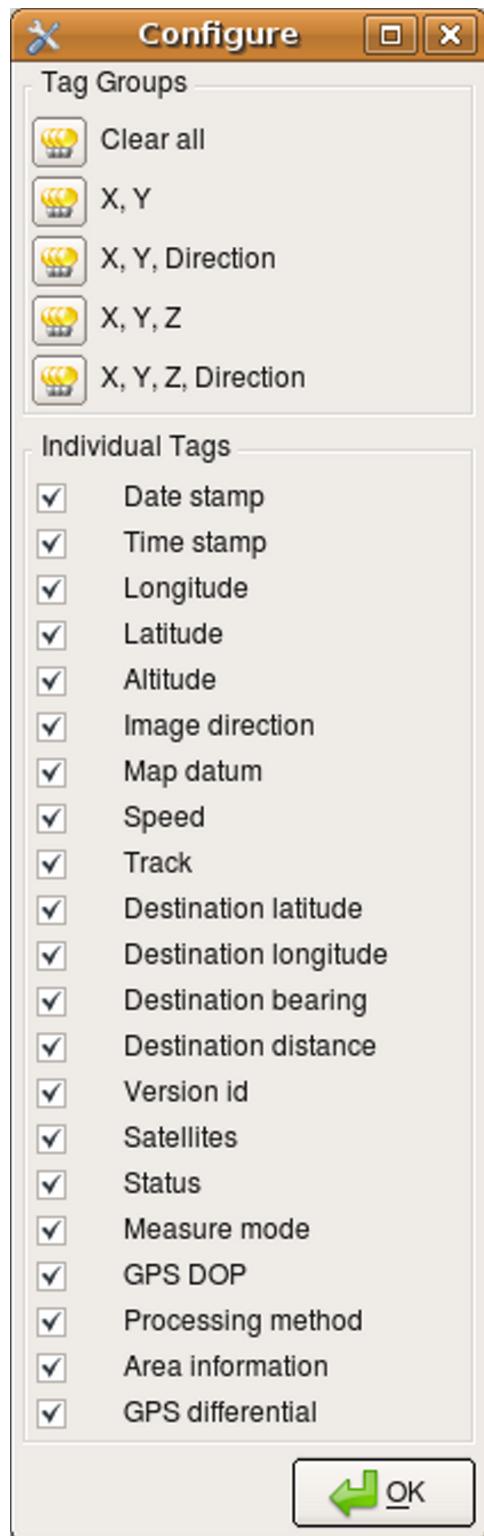
Date stamp	<input type="text"/>	
Time stamp	<input type="text"/>	
Longitude	<input type="text"/>	
Latitude	<input type="text"/>	
Altitude	<input type="text"/>	
Image direction	<input type="text"/>	
Map datum	<input type="text"/>	
Speed	<input type="text"/>	
Track	<input type="text"/>	
Destination latitude	<input type="text"/>	
Destination longitude	<input type="text"/>	
Destination bearing	<input type="text"/>	
Destination distance	<input type="text"/>	
Version id	<input type="text"/>	
Satellites	<input type="text"/>	
Status	<input type="text"/>	
Measure mode	<input type="text"/>	
GPS DOP	<input type="text"/>	
Processing method	<input type="text"/>	
Area information	<input type="text"/>	
GPS differential	<input type="text"/>	

Save

To modify the fields displayed in the form click on the Configure icon  to open the **Configure** dialog.

Data can be typed directly into the fields or other plugins can be used to transmit information to the editor from files or maps. When data in an editor field changes, the X (NEED IMAGE) icon will become active. Clicking this icon will discard the current changes.

To save the EXIF data in the **GPS EXIF Editor**, into the currently selected image, click on the **Save** button.



Default selections can be made by clicking on one of the **Tag Groups** at the top of the dialog or customized selections can be made by checking or un-checking the checkboxes for the individual tags. When the tag selection is done click on **OK** to close the **Configure** dialog and display the selected fields in the **GPS EXIF Editor** pane.

5.2. Coordinate extraction

Coordinate extraction plugins all data from alternative sources to be selected and transmitted to the editor plugins.

5.2.1. Google Map

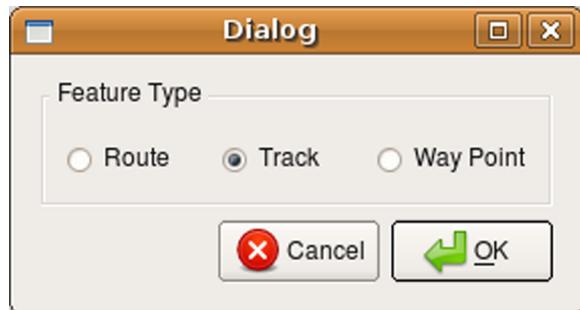
Clicking on the Google Map plugin opens a window that displays a map if the computer is connected to the Internet. The controls in the upper right corner of the map window allow you to display a map, a satellite image, or a hybrid with a satellite image background with map layers overlaid. The controls in the upper left corner of the window control zooming (+ and - buttons) and panning using the arrow buttons. You can also zoom into an area by double-clicking with the left mouse button. To pan you can click and hold the left mouse button then drag the image. To record the latitude and longitude coordinates for a point right-click on the point of interest and the coordinates will appear in the text boxes below the image. Click on the **Save Coordinates** button at the bottom of the Google Map window insert the coordinates into the **GPS EXIF Editor**. As long as the **GPS EXIF Editor** pane is open and you have selected a valid image to be geotagged you will see these coordinates appear in the “Longitude” and “Latitude” fields.



5.2.2. GPS Data

Currently the GPS data reader will allow you to read in a delimited text, GPX, or KML file with routes, waypoints or track data. You can load your GPS data into the **Data Table** window by clicking on the **GPS Data** plugin button. To open a GPS file click on the **Open File** icon in the upper right corner of the

Data Table window. This will open a small dialog listing the three data providers currently supported: Delimited Text, GPX, and KML.



Select the radio button that corresponds to your data type then click on the **OK** button. This will open a **file selection** dialog. After selecting the file you want to use click on the **Open** button. Another dialog will open that allows you to select the feature type (Route, Track, or Way Point) you want to use or reader specific options. After making your selections click on the **OK** button to load the GPS data from the file into the **Data Table** window.

The Data Table window shows a grid of 8 rows of GPS data. The columns are labeled: Altitude, Date Time Stamp, Latitude, Longitude, and Track Name. The "Track Name" column for all rows is colored orange. Row 1 has the value "ACTIVE LOG". Rows 2 through 8 have the value "ACTIVE LOG ...".

	Altitude	Date Time Stamp	Latitude	Longitude	Track Name
1	462.531372	2008:10:15 07...	-6.850916	37.664484	ACTIVE LOG
2	460.608765	2008:10:15 07...	-6.850916	37.664484	ACTIVE LOG
3	463.973389	2008:10:15 07...	-6.850916	37.664484	ACTIVE LOG
4	460.128174	2008:10:15 07...	-6.850916	37.664484	ACTIVE LOG ...
5	459.647583	2008:10:15 07...	-6.850916	37.664484	ACTIVE LOG ...
6	528.381836	2008:11:08 10...	-6.850916	37.664484	ACTIVE LOG ...
7	527.420410	2008:11:08 10...	-6.850916	37.664484	ACTIVE LOG ...
8	1106.614746	2008:11:10 12...	-6.850916	37.664484	ACTIVE LOG ...

Below the table are buttons for "Set Time Offset" (With Picture, Manual), "Interpolate", and "Send Row to Editor".

Rows of data can be removed from the table by clicking on the row number in the column on the left side of the table and then click on the **Delete Row** icon .

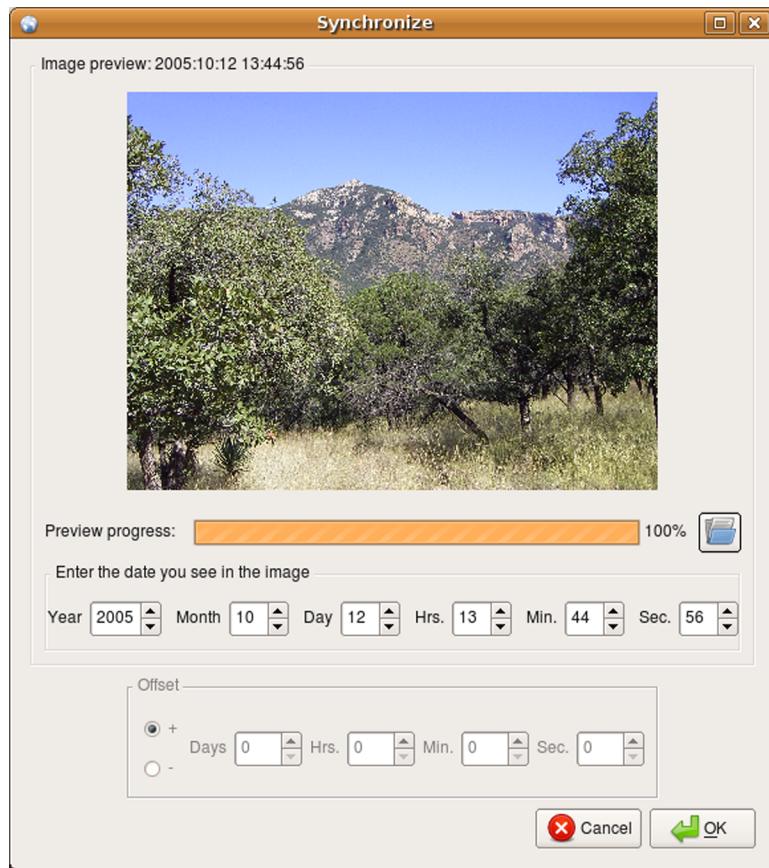
Each column has a default heading but the column heading must be assigned to or associated with EXIF fields before further processing. To set a column heading click on the heading and then select the correct field from the Available Fields dropdown menu. When a heading in the **Data Table** is set the heading label is colored green.

If the Date Time Stamp heading is set the **Set Time Offset** buttons become active. By setting an offset it is possible to correct discrepancies in time between the GPS data and time data stored with an image. The time offset can be set manually or by using an image of a GPS receiver that shows the time and date displayed on the GPS receiver's screen. Keep in mind that the GPS receiver records UTC time and this may differ from what is actually displayed.

To set the time offset manually click on the **Manual** button at the bottom of the **Data Table**. This will open the **Synchronize** dialog.



To set the time offset using a picture of a GPS receiver screen that displays the time click on the **With Picture** button. This will open the **Synchronize** dialog with an option to display an image. Click on the File Open icon to open the **Open Image File** window. Select the image that you want to use for synchronization and click the **Open** button. The image will be displayed in the **Synchronize** window and the time data recorded with the image (this is based on the clock inside the camera that acquired the image) will be displayed above the image. Use the text boxes below the image to enter the time (UTC) recorded by the GPS receiver. If this time displayed has been adjusted for local time then it will be necessary to account for the difference between UTC and local time.



To send the data from a row in the Data Table window to the EasyGeoTagger GPS EXIF Editor (see section 5.1.1) first select the row by clicking on the column number on the left side of the table. When the row is selected click the **Send Row to Editor** button and the data in the columns which have had their headers set and are displayed as green header for the selected row will be sent to the current editor.

The data table also has an Interpolate feature. If you set the **Latitude**, **Longitude**, and **Date Time Stamp** fields, the **interpolate** button will become active. Clicking the **interpolate** button will cause the table to

be sorted by Date Time Stamp, then new entries will be inserted between existing entries so there is an entry in the table for every second. On the **Latitude**, **Longitude** and **Date Time Stamp** fields will be interpolated, all other fields will remain blank. Interpolation can take some time, so be patient.

5.3. Utilities

5.3.1. EXIF to CSV

This plugin creates a comma separated values (CSV) formatted file from a directory of geotagged images. The CSV file will include GPS-related attributes from the image EXIF information for each image in a directory that has GPS EXIF attributes. To select a directory you can either select a file in the **EasyGT file browser** or just select a directory. In either case the output CSV file will include attributes from all of the images in the directory. The output CSV file name will be: Dir_Export_Date_Time.csv where: Dir = The name of the directory, Export = The word “Export”, Date = The date the CSV file was created in YYYYMMDD format, Time = The time the CSV file was created in HHMMSS format.

5.3.2. Save as JPEG

This plugin will convert the currently selected image to a JPG and copy any EXIF data in the original image. The process is collision proof. If the image is already a JPG a new version will be created to prevent overwriting an existing image.

5.3.3. Python Console

The Python console allows real time Python scripting of EasyGT. Your Python code can be a single line command or multi line.

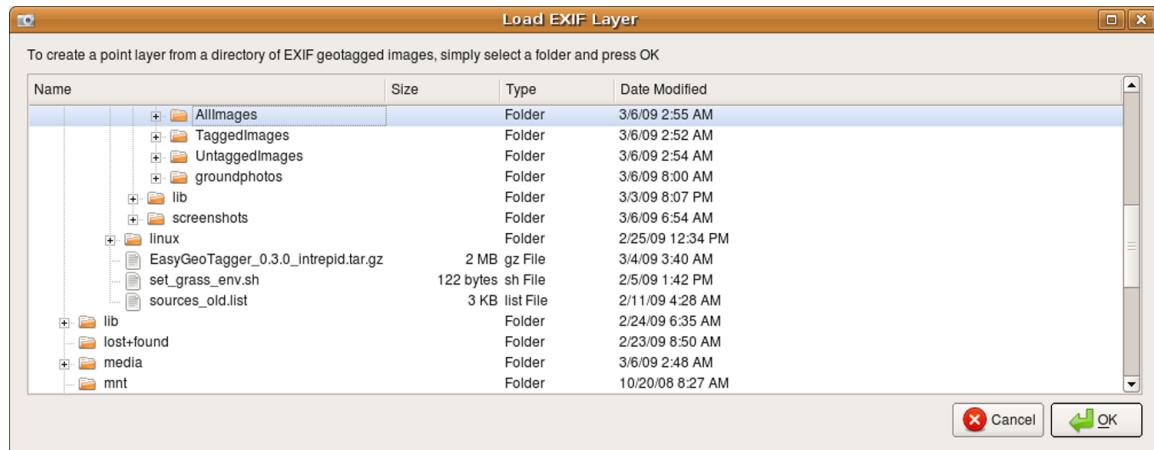


6. QGIS enhancements

When using EasyGT via a plugin in QGIS there is some additional functionality not available from the stand alone version. This includes the capability of getting coordinates from a layer displayed in QGIS and automatically displaying the location of all geotagged images in a directory. Before using EasyGT with QGIS it is necessary to install and configure the QGIS EasyGeoTagger and LoadExifDataset plugins using the process described in Section 4.2.

6.1. Display locations of geotagged images in a directory as a QGIS layer

Click on the **LoadExifDataset** icon  or select **LoadExifDataset** from the QGIS plugins menu. The **Load EXIF Layer** dialog will open. To select a directory you can either select a file or a directory. In either case, when you click on the **OK** button the location of the coordinates for all of the geotagged images in the selected directory (or the directory of the file you selected) will be displayed in the QGIS map canvas and the layer will be visible in the QGIS legend.



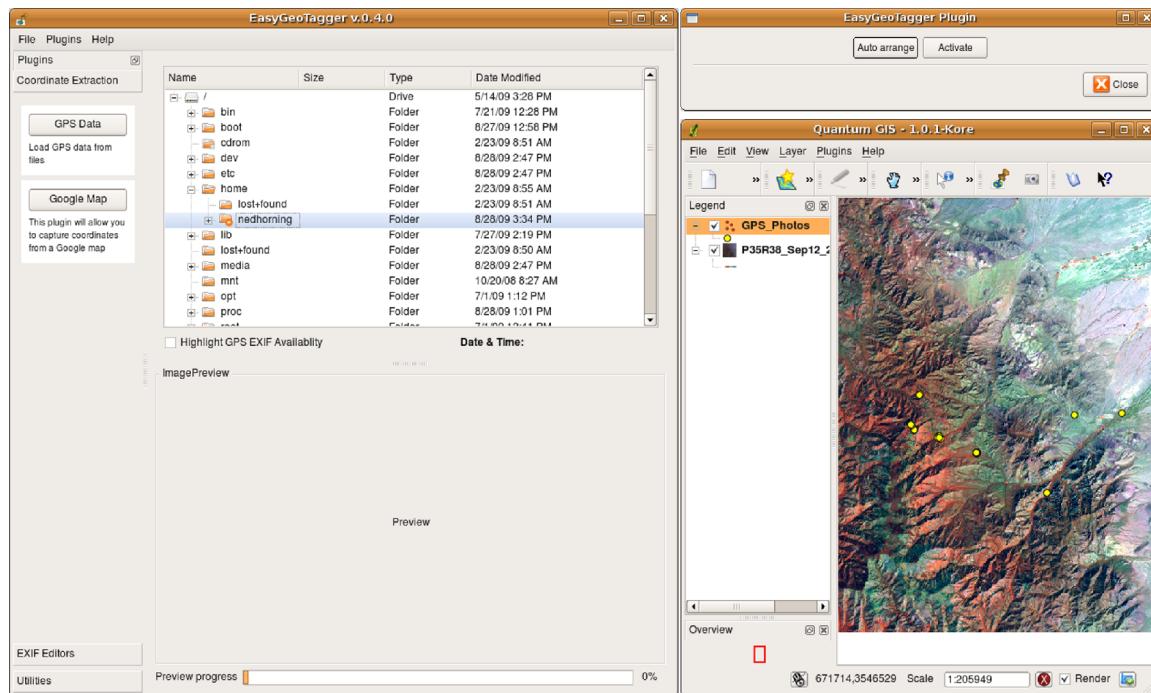
6.2. Collecting coordinates from a QGIS layer

Click on the **EasyGeoTagger** icon  or select **EasyGeoTagger** from the QGIS plugins menu. The **EasyGeoTagger** interface and the **Auto arrange/Activate** buttons will appear.



Click on the **Auto arrange** button to automatically arrange the windows so they fit on the screen with all of them being visible. You can manually move or resize the windows although there is a minimum size for each window. To add coordinates to an image you must first navigate to the image you want to add coordinates to using the file browser in the **EasyGT file browser**. When selected it will be displayed in the image preview window. Next, click on the **EXIF Editors** plugin button in the EasyGT plugin section and then click on the **GPS EXIF Editor** button to open the editor on the right side of the EasyGT interface. Click on the **Activate button** in the **Auto arrange/Active** dialog to activate the link between EasyGT

and QGIS. Now when you click on the QGIS map canvas the coordinates (latitude and longitude) will be displayed in the **GPS EXIF Editor** dialog.



7. Citations

If you cite this document we ask that you include the following information:

Horning, N., P. Ersts. 2009. EasyGT (0.4.0) User's Guide. American Museum of Natural History, Center for Biodiversity and Conservation. Available from <http://biodiversityinformatics.amnh.org/>. (accessed on today's date).

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