

Geotagging Images

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What is Geotagging

When you are traveling, it is all too easy to forget where your pictures were taken, especially several years afterwards. Or maybe you want to return to the same spot later, but you don't remember exactly where it was. Other times you may prefer to conceal the location for reasons of privacy or secrecy. Geotagging is a way to add GPS metadata to image files to document exactly where they were taken.

Most smart phones and a few cameras have internal GPS unit which they use to embed GPS data in images they capture. However, most high-end cameras do not have an internal GPS, so you need to capture GPS data separately in the field and merge it with your images later. There are several ways to do this, but this document describes one particular workflow I have found reliable.

Step 1 – Record a GPS track

While you can use stand-alone GPS units or watches to record GPS data, I have found it more convenient to use a smart phone instead. All you need is an app that can record a GPS track as a GPX file (the standard format for storing and exchanging GPS data). For Android, I use the app [GPS Logger Pro](#) which you can download from the Google Play Store for a minimal fee. There are similar apps for the iPhone such as [GPX Master](#) and [Open GPX Tracker](#), but I do not have personal experience with them.

IMPORTANT: Before you record any GPS tracks, you need to accurately synchronize your camera's date and time to GPS time, because the time each photo was taken is used to identify the location in the GPS track. There are two synchronization methods you can use – for more information, see Time Zone below:

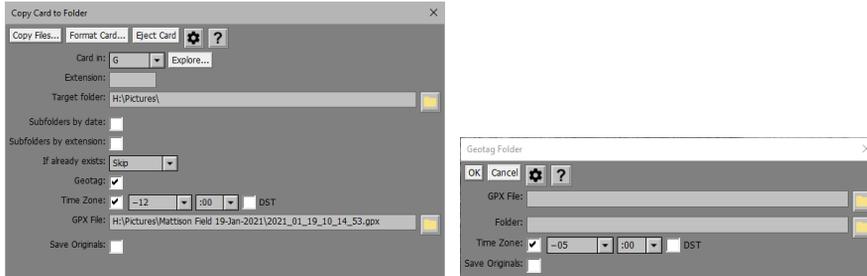
- 1) Set your camera's date, time, time zone and daylight savings time to match the local date and time your phone is showing.
- 2) Set your camera's date, time, time zone and daylight savings time to GMT (Greenwich Mean Time) which is what GPS uses internally. You can get current GMT via web sites such as: <https://www.timeanddate.com/time/zones/gmt>

Once the tracking app is installed and the clocks are synchronized, all you need to do is remember to start tracking at the beginning of your photo shoot and to stop tracking at the end (harder than it sounds since you will likely be distracted). I have on occasion resorted to taping a note to my camera bag. The app records your location at regular intervals while it is running. Some apps let you adjust the sampling interval – if you are moving around quickly, you might want to select a shorter interval.

When you get home, export the track from your phone as a GPX file and save a copy along with the images from the photo shoot for future reference purposes. GPS Logger Pro can copy the GPX file to cloud storage such as Dropbox or Google Drive which makes it easy to transfer the file to your desktop computer.

Step 2 – Geotagging your Images

The process of geotagging your images involves determining the location for each image based on the time it was taken and then updating each image with the corresponding GPS metadata. Geotagging is integrated into Picture Window's File/Copy Card to Folder command. This lets you geotag RAW, TIFF or JPEG files as you copy them from the camera card to a folder. Or, you can geotag a folder of image files after copying them using the File/Geotag Folder... command.



Whichever method you use, the idea is the same – you specify a GPX file and a folder. The image files in the folder are first examined to determine the time and date they were taken. This information is then used to locate the corresponding location from the GPX track, interpolating as necessary between recorded locations. Finally, each image file is rewritten with its location information attached in the form of EXIF metadata. The actual geotagging is handled by ExifTool which can handle several different GPS file formats (see below), but GPX is recommended as it is the most universal. Here is a complete list of all the currently supported GPS formats:

- GPX
- NMEA (RMC, GGA, GLL and GSA sentences)
- KML
- IGC (glider format)
- Garmin XML and TCX
- Magellan eXplorist PMGNTRK
- Honeywell PTNTHPR
- Bramor gEO log
- Winplus Beacon .TXT
- GPS/IMU .CSV
- DJI .CSV
- ExifTool .CSV file

Time Zone

GPX files always record time as GMT (Greenwich Mean Time). GMT never changes due to daylight savings time, so it is always the same no matter where you are.

Commonly, you set the time, date, daylight savings time, and time zone in your camera to match your local time zone. However if you do this, unless the offset between local time and GMT is correctly taken into account, you will be unable to synchronize camera time and GPS time, and geotagging will fail.

Or, you can set your camera's time, date and time zone to GMT so the camera and GPS are automatically synchronized.

Many cameras record the time zone in their image file metadata. If this is the case, the Time Zone setting is ignored and the time zone from the image file is used instead, so it is important that you set it correctly before any photo shoot. For example, the menus in Sony A7 series cameras have separate commands for Date/Time Setup and for Area Setting. The way this is intended to be used is that when shooting in a different time zone, you leave the time and date settings unchanged but simply change the Area Setting which lets you set both a GMT offset and DST. This offset is subsequently saved in the image file metadata where it can be accessed automatically by the geotagging software to synchronize with GMT. Canon, Nikon, and Fuji cameras generally have a Time Zone setting. Panasonic calls it World Time. Olympus cameras apparently do not have a time zone setting. Check your camera manual for more information.

If your camera does not embed time zone information in its image files, checking the Time Zone box lets you specify the time zone your camera was set to as an offset from GMT (Greenwich Mean Time). If DST is checked, an hour is effectively added to the time zone offset to account for daylight savings time.

Another way to avoid synchronization problems is to keep your camera's time, date and time zone permanently set to GMT and set Time Zone to +00:00 (GMT). This avoids many potential synchronization pitfalls, but the image times shown will be in GMT instead of local time.

Here are time zone offsets for some common locations:

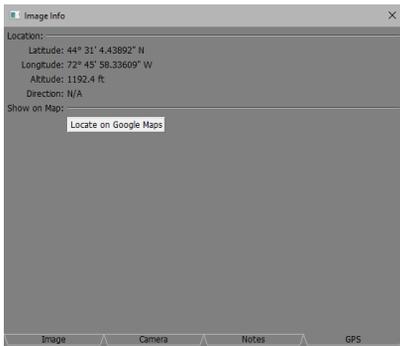
-11:00 Midway Islands Time	+03:00 Eastern African Time
-10:00 Hawaii Standard Time	+03:30 Middle East Time
-09:00 Alaska Standard Time	+04:00 Near East Time
-08:00 Pacific Standard Time	+04:30 Afghanistan Time
-07:00 Mountain Standard Time	+05:00 Pakistan Lahore Time
-06:00 Central Standard Time	+05:30 India Standard Time
-05:00 Eastern Standard Time	+06:00 Bangladesh Standard Time
-04:00 Atlantic Standard Time	+07:00 Vietnam Standard Time
-03:30 Canada Newfoundland Time	+08:00 China Taiwan Time
-03:00 Brazil Eastern Time	+09:00 Japan Standard Time
-01:00 Central African Time	+09:30 Australia Central Time
+00:00 Greenwich Mean Time	+10:00 Australia Eastern Time
+01:00 European Central Time	+11:00 Solomon Standard Time
+02:00 Eastern European Time	+12:00 New Zealand Standard Time

Save Originals

When geotagging, you can choose to save copies of the original un-geotagged images along with the geotagged versions by checking this box. The original files are renamed by appending “_original” to their filenames. If Save Originals is not checked, the original image files are deleted once the geotagging operation terminates successfully, and only the geotagged files are left.

Step 3 – Accessing location information

Once GPS location metadata has been attached to your images, you can view it in Picture Window by right-clicking on the image or its thumbnail and selecting Image Info... from the popup menu. Once you get to the Image Info dialog box, click on the GPS tab – this will display the GPS coordinates for the image:



To see the picture location on a map, click the Locate on Google Maps button. This brings up a web browser set to Google Maps with a red marker set at the GPS coordinates where the photo was taken.

