



Data Collection with a Digital Camera and GPS Receiver

This tutorial applies to: **ExpertGPS, GeoBuddy, EasyGPS**

Summary: Using a digital camera, a GPS receiver, and ExpertGPS, you can reduce the amount of time it takes to gather data in the field and distribute it to colleagues.

Geotagged Digital Photos

Modern digital cameras store a wealth of information inside each JPEG image they create. In addition to pixel data (the image itself), the JPEG format can store camera information (shutter speed, aperture, the time at which the photo was taken) as well as GPS information (latitude and longitude) and descriptive text (title, location, keywords). All of this non-image data is called *metadata*, and it allows you to use the JPEG image itself as a storage format for all of the data you collect in the field.

ExpertGPS has the ability to read metadata from your digital images, and to insert GPS information and textual descriptions back into the photos. The process of adding keywords or text to a photo is called *tagging*, and the process of assigning GPS information to a photo is called *geotagging*.

Geotagging in ExpertGPS relies on the fact that both your digital camera and your GPS receiver have clocks, and the camera stores timestamps with each photo it takes. Your GPS, meanwhile, is recording a timestamped tracklog as you conduct your field work. After you return from the field, ExpertGPS can compare the timestamps on your photos to the timestamped trackpoints in your GPS tracklog, and determine the exact location where each photo was taken.

Synchronizing Clocks

Your GPS receiver's clock is synchronized to the atomic clocks aboard every GPS satellite. Your digital camera's clock is not nearly as precise, and can drift over time. Before each field session, or at least once every 3 months, you should check that your digital camera's clock is set to the time displayed on your GPS. Many digital cameras only display hours and seconds. By setting the camera time just as the GPS clock rolls over from :59 seconds to :00, you can usually get your camera's clock within a second or two of the GPS. Consult your camera and GPS manuals for the steps needed to display and set the time.

In the Field

At the beginning of your session, you should ensure that the camera clock is in sync with the GPS, and allow your GPS receiver to get a solid lock on 4 or more satellites. Once the GPS has a lock, you can stow it in your pack or in a chest pocket on your jacket. You will not need access to the GPS for the remainder of your field work – there is no need to set waypoints along the way unless you need them for another purpose. You may want to clear your GPS tracklog and set it to record trackpoints at a frequent interval. The Automatic/Most Often tracklog setting on Garmin GPS receivers produces excellent results. (Garmin users: do not use the Save Track command on the GPS itself, as this discards the timestamp information from the saved track)

At each site to be documented, simply take a photograph, and take any notes you might need back at your computer when entering data about the site into ExpertGPS. You'll naturally pause a bit before and after you take the photo, and so even if your camera clock is off by a few seconds, the geotagged location should still be accurate.

Geotagging your Photos

Back at your computer, retrieve your GPS tracklog and save it to a new folder. Copy your digital photos to the same folder. At this point, you may want to delete duplicate or blurry shots.

In ExpertGPS, open the GPX file containing the GPS tracklog. Click Add Photos, and select all of the photos you just took. ExpertGPS will display the Geotag Photos dialog, and ask you to select the timezone in which the photos were taken. Your camera stores the time the photo was taken without mentioning the time zone, and ExpertGPS needs both pieces of information to properly match your photos to the GPS tracklog's timestamps. With the correct timezone selected, you should see the photo symbols on the map jump to their correct locations along your GPS track. If they are all stacked up at one end or another, or if the photos appear in the Photo List with a red arrow next to them, that's an indication to you that ExpertGPS cannot match their times against the GPS times using the current timezone setting.

Once the photos are in their correct locations on the map, click OK to dismiss the Geotag Photos dialog and keep the geotagging information with the photos.

Data and Keyword Entry

There are two ways to enter data for your photos. The first is through the Edit Photo dialog. Right-click a single photo, and click Edit Photo. Here you can give each photo a title, description, city/state/location, and a list of keywords. The second way to enter data is to use F2 editing in the Photo List. The Photo List displays columns of data for each photo, and you can use the left and right arrow keys to select a column to edit. You can also use Shift or Control-clicks to select a

range of photos to edit at once. Highlight the column you wish to change, and press F2. Enter the new text, and press Tab or Enter to make the change. You can quickly enter location data (city, state, country) for all of your photos this way.

Another field where you might want to enter data for multiple photos at once is the Keywords column. You might select all of the photos showing a specific species of tree and enter *tree*, *conifer*. For a smaller set of photos, you might want to enter an additional keyword *pine*. The default F2 behavior is to replace the existing text with the new text. To preserve *tree*, *conifer* and add the new keyword *pine*, type *+pine*. You can also type *-pine* to remove *pine* from the keyword list for any selected photo.

Saving your Changes

Photos that appear in yellow in the Photo List have had changes made to their metadata and need to be saved. When you save the GPX file, ExpertGPS will write the new GPS and text metadata back into the photos. This takes a few seconds – subsequent saves will be quicker.

At this point, the photos now have all of your data embedded within them. They do not need the GPX file or your GPS tracklog – all the information is stored in the JPEG files themselves.

Sharing your Data

To distribute your data to colleagues, to other ExpertGPS users, or to the general public, just email the JPEG files or place them on a Web site. The photo sharing site Flickr.com is fully compatible with JPEG metadata, and can even display a map showing where each of your geotagged photos was taken. ExpertGPS users can drag geotagged photos from an email or a folder on their computer and drop them on the map – they will automatically jump to their correct location.

Further Information

For further assistance with this topic, visit <http://www.topografix.com/tutorials.asp>