# Geotag Digital Photos from GPS Logs

The Create Geotagged Image Database process in TNTmips provides an automated procedure for geotagging digital photos that were acquired concurrently with position logs from a Global Positioning System (GPS) device. This procedure determines map coordinates for each photo in the Image List using the date and time recorded in the EXIF (Exchangeable Image File) header of the photo's JPEG file and the times and positions recorded in one or more GPS log files. The logs can contain continuous track data or discrete waypoints coinciding with each photo acquisition. The process can directly read log files in NMEA 0183, GPS Exchange (GPX), and Microimages formats. You can also import logs from any formatted text file by specifying the structure and format of the file. You can set the Geotag process to interpolate photo coordinates between the pair of GPS positions with the closest bracketing times, or to simply assign the coordinates from the closest GPS position.

GPS logs record times in Coordinated Universal Time (UTC), whereas EXIF header times for your digital photos depend on the current clock setting of your camera. The Options section of the Create Geotagged Image Database window allows you to set a time offset to adjust log times to match the camera time. Many GPS units provide an option to show the accurate GPS time on the display, so you could determine the required time adjustment by taking a calibration photo of the GPS screen showing the GPS time, then compare that time with the time recorded by the camera in that photo's EXIF header.

Logs in NMEA, GPX, and MicroImages formats can be added to the list using the Add Logs icon button.

You can also import logs from other formatted text files by specifying the file structure.
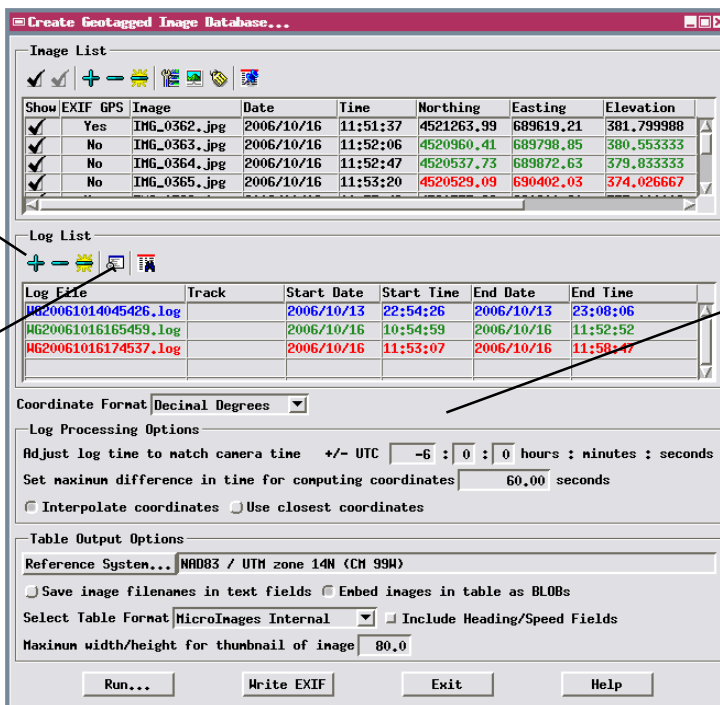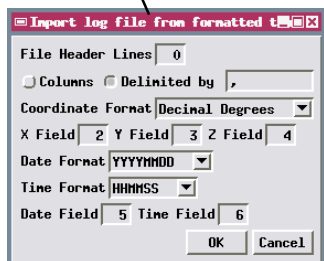
Latitude and longitude coordinates are automatically computed and shown in the image list after you select the desired images and GPS logs, and are automatically recomputed when you change any of the geotagging options. Each entry in the Log List is shown in a different text color; these colors are also used in the coordinate field entries in the Image List to indicate which log was the source for the coordinates shown for each photo.

Photos that already have geotag information in their EXIF headers are indicated in the image list by the entry "Yes" in the EXIF GPS field, and those stored coordinates are automatically shown in the Latitude and Longitude fields in black text. These existing values are not automatically replaced in the image list when coordinates are computed or recomputed from the selected logs. The menu opened by the Image Options icon button provides options that allow you to choose either computed or existing EXIF coordinates for the photo you have currently selected in the image list.

The Database Pinmap icon button opens a window that allows you to display the assigned photo positions overlaid on a georeferenced raster of your choice. If the GPS-derived positions are not sufficiently accurate, the Database Pinmap window provides selection and point tools that allow you to manually adjust the postion of any of the photos (as discussed in the Technical Guide entitled *Digital Photos: Manually Geotag Digital Photos*). A general overview of the geotagging process is provided in the TechGuide entitled *Digital Photos: Geotagging Digital Photos*.

In most cases you must specify a time adustment to correct for the time reference difference between the accurate GPS log times (referenced to UTC) and the relative camera clock times recorded with the image files. A digital photo of the GPS display with the current time lets you directly compare the GPS time to the camera time to establish this adjustment.

You can use the Image Options menu to choose how to assign coordinates for photos that already have geotag information in their EXIF header or to transfer coordinates from one photo to another.