

D90 Camera Kit and Laptop

How to Navigate the D90, eTrex GPS
and RoboGeo

Revised: 31 Jan 13

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D90 Switches and Buttons



Multi Selector and OK Push Button
Focus Selector Lock
Info Push Button



Mode Selector
Set to Auto
with No Flash

The Menu Display is navigated by pressing the up, down, left and right arrows on the Multi Selector. The Multi Selector also has an "OK" button located in its center.

To reset the camera to default settings, press and hold the +/- and AF buttons (green dots) for two seconds

D90 Menu Navigation

Use the multi selector (circular ring with arrows and OK button) to navigate menus

Left icons are the menu listings

From top to bottom

Playback menu

Shooting menu

Custom Setting menu

Setup menu

Retouch menu

Recent settings

Sub menus are shown to right of icons



Use left/right arrow to move between the menu listings and the menu items. Use up/down arrows to move up and down and OK to select an item.

D90 Date and Time Setting

- Make sure you have the screen on the previous page.
 - When World Time is shown at the top, the time zone, daylight time setting, UTC offset, date and time are displayed
 - The correct display is: Daylight time Off, London – Casablanca, UTC 0, and the correct date and time per the GPS
 - To change any item highlight with the up/down arrow and hit OK
- **Beware: When the date and time screen is open the camera clock is stopped**
 - To move between the date and time fields use the left / right arrows - to change a field use the up / down arrows
 - **When the OK button is pressed the time is set and you will be back at the World Time page**
 - **When all is set double check the World Time screen to ensure that the date and time to the second is as close to the GPS as you can get it**

Press Info Button to Show Data

Automatic Mode No Flash

Battery Condition

Large Picture Size

JPEG Setting to JPEG Normal

GPS Active and Locked onto the Network

ISO Set to 800

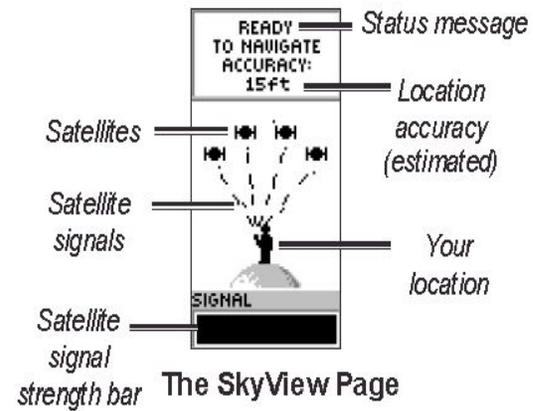
Memory capable of storing 2100 photos (2.1K)



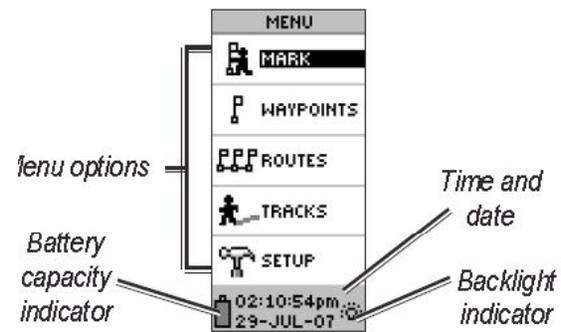
eTrex H Buttons and Menu Screen



SkyView Page



MAIN MENU



eTrex 10 Buttons and Menu Screen



①	Zoom keys
②	Back key
③	Thumb Stick™
④	Menu key
⑤	⏻/Backlight key



⑥	Mini-USB port (under weather cap)
⑦	Battery cover
⑧	Battery cover locking ring
⑨	Mounting spine



Use the “Thumb Stick” left/right - up/down to navigate the menu and press to select item



The “Thumb Stick” operates as a joy stick and press to enter
 “Backlight key” is also the on/off button – press and hold

To see the battery status press the “Backlight key”
 Press “Enter” to return to prior screen or it will time out in a few seconds

eTrex H vs. eTrex 10

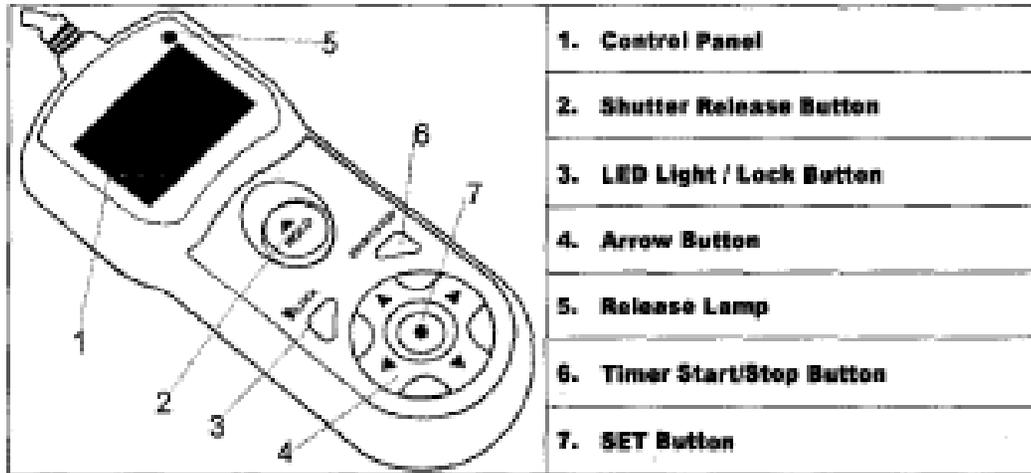
- The eTrex H can be connected to a PC and the track log downloaded using RoboGeo
- The eTrex 10 prompts to connect as a mass storage device. Select “yes” to this and then navigate to the Current.gpx file
- The Current.gpx file is located in the folder chain of Garmin/GPX/Current
- The current.gpx file can be copied to the PC as if it were an SD card, thumb drive or other USB storage device

Satechi Remote Shutter/Timer

Settings are not retained when device is turned off

Use left/right keys to select the item across the top of the display to be set and press the "Set" button

Device can be plugged directly into the GPS port on the D90 or through the GPS-1 via the large USB port and GPS into the GPS port



1. Control Panel
2. Shutter Release Button
3. LED Light / Lock Button
4. Arrow Button
5. Release Lamp
6. Timer Start/Stop Button
7. SET Button

For unlimited shots at a time interval the number "N" must be set to "--"

Press the "Set" button to hold the values until the unit is turned off – must reset when turned on again

Pressing the "Shutter Release Button" will trip the shutter.

Option	Description	Supported Setting
DE	Just like the self timer on your camera. The TM timer remote switch allows you to set any delay (in 1 second increments) up to 99 hours, 99 minutes and 99 seconds.	0s to 99hrs 99min 99s
BU	It allows you to take time exposures up to 100 hours in length.	0s to 99hrs 99min 99s
INT	The Interval Timer can be set to any time period up to 100 hours as well. If you set it to 10 minutes, for example, one exposure will be taken every 10 minutes until either the film runs out or the Exposure Count limit has been reached.	1s to 99hrs 99min 99s
N	This setting permits you to set the number of exposures that will be taken, up to 399 shots.	1 to 399 shots, --(unlimited)
	Speaker ON/OFF	ON/OFF

Setup Checklists for GPS

eTrex H Settings

Menu

Mark - used to record a location

Waypoints - user defined points can be used to define a track

Routes - usually defined on a computer and then uploaded

Tracks

Track Log

Clear - clear before each sortie

Setup

Recording = On

Interval = Time

Value = 00:00:02 (2 seconds - 5.6 hours before roll over)

Wrap when full = Yes

Save - save a track log - need not be saved to download to computer

Setup

Time

Time Format = 24 Hour

Time Zone = London

UTC Offset = 00:00

Daylight Savings Time = Off

Units

Position Format = hdd*mm.mmm'

Map Datum = WGS 84

Units = Nautical (aircraft use knots and NM)

Mag Variance = Local (012 degrees W average for NY)

Angle = Degrees

Interface

I/O Format = Garmin (for importing track logs to compute)

System

Mode = WAAS

Language = English

eTrex 10 Settings

Menu - more items but these are of interest here

Map - to display the map and the time (if properly set)
While on the map page press menu then Setup Map
Data Fields = 1 Large
Change Data fields - set to time of day

Setup

System

Satellite System = WAAS/EGNOS on

Language = English

USB Mode = Garmin

Tracks

Track Log = Record, Do Not Show

Record Method = Time

Recording Interval = 00:00:02 (2 seconds)

Time

Time = 24 hour format

Zone = Europe - Western

Daylight Savings Time = No

Position Format

Format = hddd* mm.mmm'

Map = WGS 84

Satellite - view number of satellites in use

Note: To clear the current track, go to Track Manager on the Menu screen, select Current Track and then delete.

Downloading the track log does not work with RoboGeo. With the eTrex turned on connect it to the PC via the USB cable and download the current track from the device "Garmin". When the eTrex prompts for going to Mass Storage select Yes. Open the Garmin folder and then the GPX folder followed by the Current folder. Copy the Current.gpx file to the desired desktop folder.

To view battery status, press the light button. Press the enter button (joy stick) to exit or wait a few seconds.

Setup Checklists for D90

D90 Settings

Lens autofocus switch to AF (left side of lens)
Camera autofocus switch to AF (left side of body near lens)
Lens optical stabilizer switch to ON (left side of lens)
Camera mode switch to Auto with no flash (top left of camera, one click counterclockwise of auto)
Camera focus selector switch to L (on lower right back of camera)
Verify camera is set to proper settings
Turn on
Press Menu
Move to setup menu
Move down to world time
Hit OK button
Verify that the screen says London, UTC 0, correct date, daylight savings time off. **This must match the eTrex GPS see below to set.**
Hit menu button to clear
Note: when the date/time screen is open the camera clock is stopped

To synchronize camera time to GPS
Time to the second on the GPS is on the menu page
On the camera world time menu
Down arrow to date and time
Hit right arrow near OK to move cursor to the field that needs setting
Use up/down arrow to change value
Set the camera to 10-15 seconds ahead of the GPS
Hit OK when the GPS rolls to 1 second prior to the camera value
If you are not taken back to the World Time screen the value was not set
Take a picture of the time on the GPS to be used later if needed for correcting a few seconds
To reset the camera, press and hold the +/- and AF buttons (green dots) for two seconds - date/time will not be changed
Anytime the camera is not on a solid level surface, place the strap around your neck to avoid dropping it on pavement or out a window.

Satechi Remote Shutter Release and Timer

Turn unit on
Use the right/left keys to move the black line under INT
Press the set button (center of left/right, up/down arrows)
Use right/left keys to move to the value to be set
Format is HH:MM:SS
Use up/down keys to set each value
Press the set button to save.
Use the right/left keys to move the black line under N
Press the set key
Use the up/down arrows to set the number of images or set to - - for unlimited
Press the set key to save
To shut off the beep move the black bar under the speaker symbol
Press set
Up/down keys toggle sound on/off
Press set
The large button marked HOLD can be pressed to release the shutter
Press the start/stop button to start or stop the sequence

Note - if the unit is turned off all settings are lost

Before and After Sortie Checklists

Before sortie departure checklist

Note both GPS and camera will be set to **UTC time**

NO daylight savings time

UTC offset = 0

Time zone London

eTrex

Check battery condition - new should run 15 hours, take spares

Clear Track log

Set camera time as close as possible to GPS time

Make sure setup items are as specified

Track recording on

Track interval 2 seconds unless higher resolution needed

2 second track interval will enable 5.6 hours of logging

Clear the track log while outside and satellites acquired just prior to departure - this will avoid log records with no coordinates that may cause issues later

Camera

Check battery condition - take the spare or put two in the multi battery pack

Synchronize the time as close as possible to the GPS

Note at 120 knots a 1 second error is 200 feet

A photo of the time on the GPS can be used later if more precision is required

Verify that SD card is in place and empty

Attach the Nikon GPS

Nikon GPS alone can be used if direction of travel is not needed

The eTrex track log will enable direction of travel

PC software will take care of the camera offset

Do NOT obstruct the focus ring when taking photos

The zoom ring is nearest the camera, focus is outer ring

General

Allow GPS 5 minutes to acquire satellites after power up

Camera may be shut off to save battery if not needed for several minutes

After sortie checklist

eTrex

Clear track log **AFTER** downloaded to computer

Verify turned off

Return to carry case

Camera

Verify all parts returned

Batteries

Lens cap

Accessories

Verify SD card installed and cleared **AFTER** images downloaded to computer

Verify turned off

Return to carry case'

At end of day - whenever equipment will not be used for a few hours

Charge camera batteries

Discard dead AA batteries

Replace used AA batteries

Verify all parts returned to proper location in Pelican case

To Preview Photo's

- Press the playback button (top left on rear)
- Image on the left below comes up initially
- Press up arrow on multi selector to see the second and third screen – third screen confirms GPS working



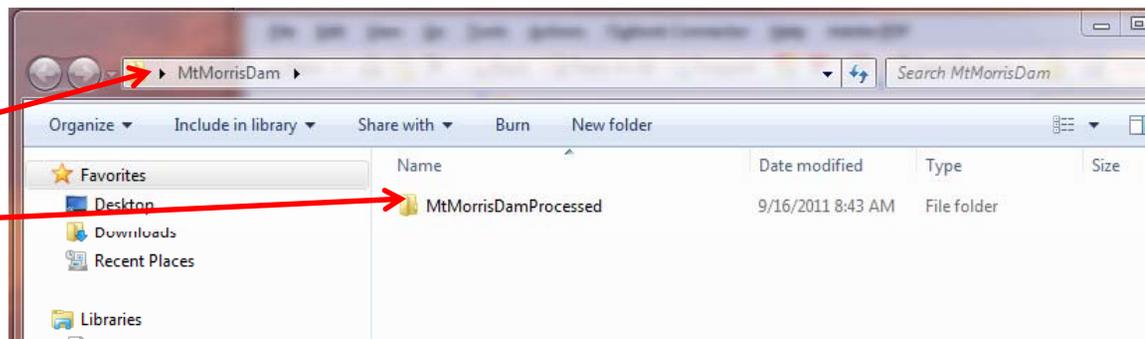
Create Folder for Images on Laptop

- Right click in any blank space on the desktop and select New and then Folder
- A folder with the name New Folder will appear on the desktop
- The folder name will be highlighted and you can type a meaningful name if you do not click elsewhere first. If the New Folder name is not highlighted, right click on the folder and then select Rename
- Open the new folder and right click to create a folder within this folder
- The inner folder should have the same name as the main folder with the word Processed added to the end

When new main
folder is opened

Main folder

Sub folder

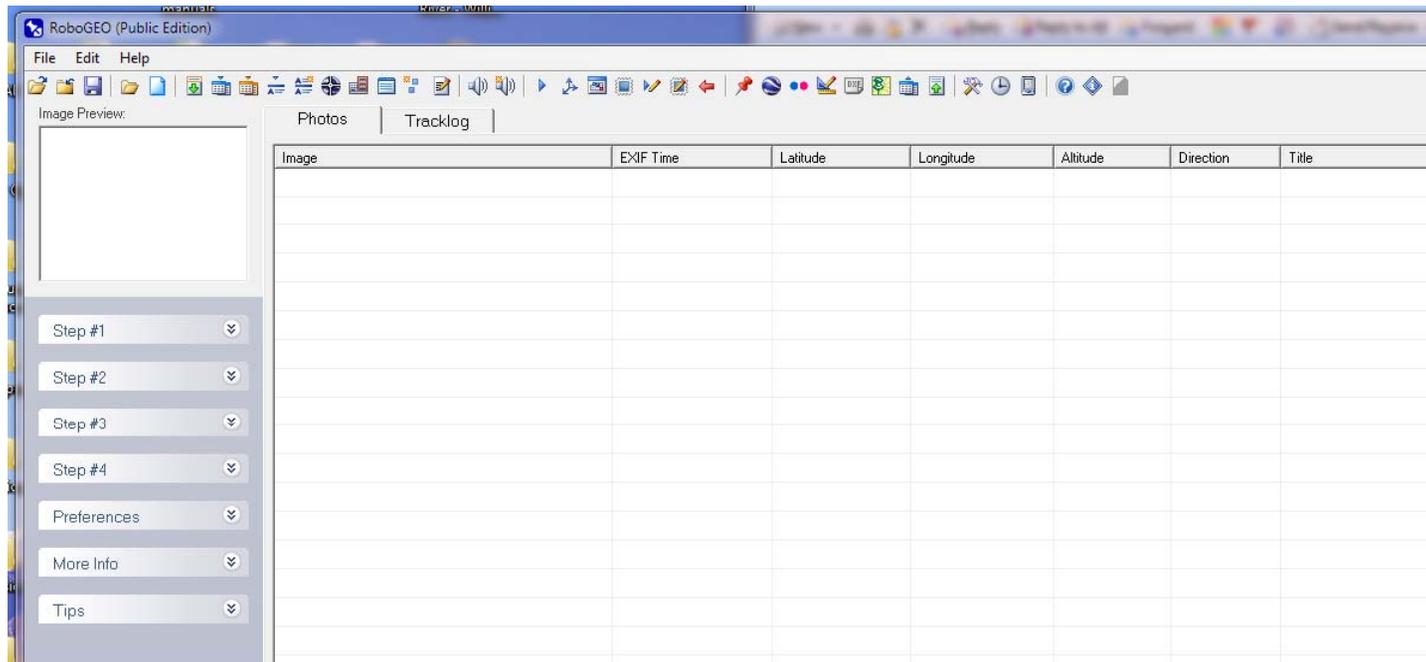


Download Images from Camera

- The SD card can be removed from the camera and inserted into the laptop. **Copy** the images to the new main folder created on the desktop
- An alternate method is to use the USB cable to connect the camera to the laptop and **copy** the images to the folder
- The track log will be stored in the new main folder using RoboGeo
- All images will be **deleted from the SD card AFTER** they are safely on the laptop
- When the mission is over and any and all images are uploaded to an online storage space or delivered to our end customer they can be deleted from the laptop. Keep images and track logs until we are sure they are no longer needed on the laptop.

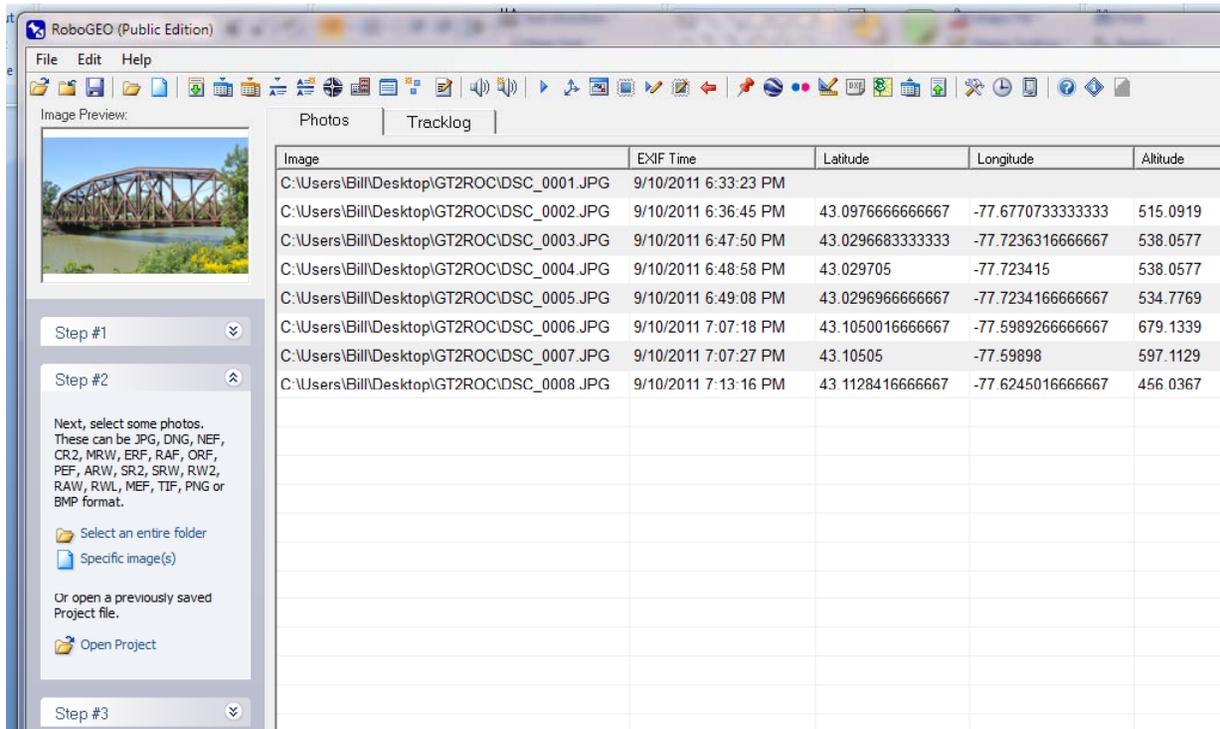
Initial RoboGeo Screen

- The startup screen



Load Images

- Click on Step 2 and select either an entire folder or specific images
- Click on an image row in the grid to see a thumbnail image
- Data shown below is the result of having the Nikon GPS attached to the camera – GPS was not locked on for the first image

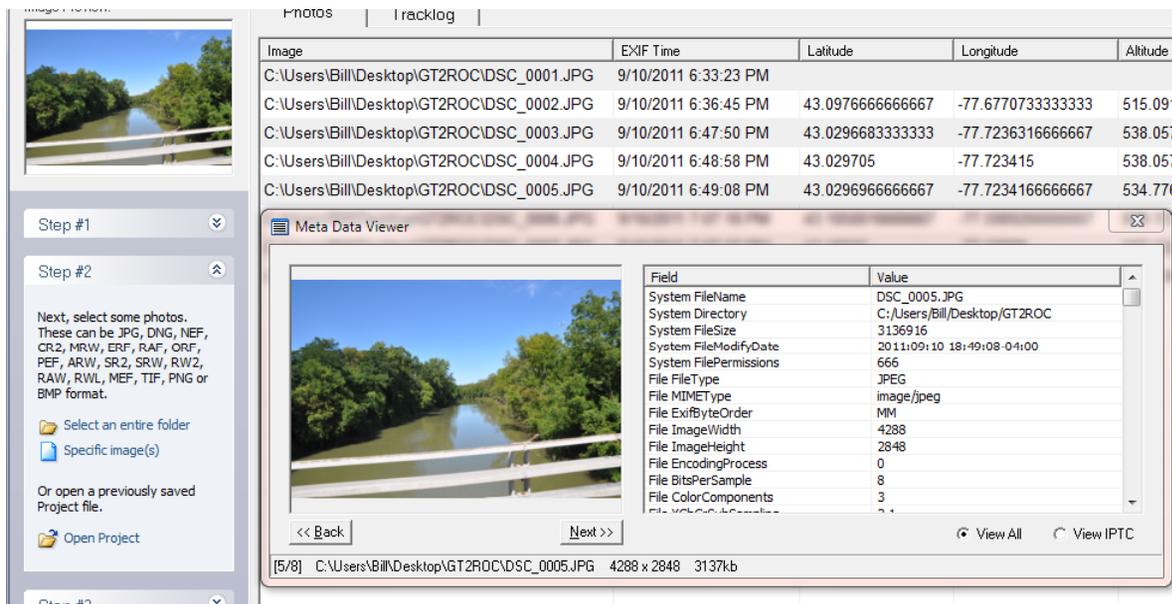


The screenshot shows the RoboGEO (Public Edition) software interface. On the left, there is an 'Image Preview' window displaying a photograph of a bridge over a river. Below the preview, the 'Step #2' section is active, showing instructions: 'Next, select some photos. These can be JPG, DNG, NEF, CR2, MRW, ERF, RAF, ORF, PEF, ARW, SR2, SRW, RW2, RAW, RWL, MEF, TIF, PNG or BMP format.' There are three options: 'Select an entire folder', 'Specific image(s)', and 'Or open a previously saved Project file.' with an 'Open Project' button. The main area on the right is a 'Tracklog' table with columns for Image, EXIF Time, Latitude, Longitude, and Altitude. The table contains eight rows of data for images DSC_0001.JPG through DSC_0008.JPG.

Image	EXIF Time	Latitude	Longitude	Altitude
C:\Users\Bill\Desktop\GT2ROC\DSC_0001.JPG	9/10/2011 6:33:23 PM			
C:\Users\Bill\Desktop\GT2ROC\DSC_0002.JPG	9/10/2011 6:36:45 PM	43.0976666666667	-77.6770733333333	515.0919
C:\Users\Bill\Desktop\GT2ROC\DSC_0003.JPG	9/10/2011 6:47:50 PM	43.0296683333333	-77.7236316666667	538.0577
C:\Users\Bill\Desktop\GT2ROC\DSC_0004.JPG	9/10/2011 6:48:58 PM	43.029705	-77.723415	538.0577
C:\Users\Bill\Desktop\GT2ROC\DSC_0005.JPG	9/10/2011 6:49:08 PM	43.0296966666667	-77.7234166666667	534.7769
C:\Users\Bill\Desktop\GT2ROC\DSC_0006.JPG	9/10/2011 7:07:18 PM	43.1050016666667	-77.5989266666667	679.1339
C:\Users\Bill\Desktop\GT2ROC\DSC_0007.JPG	9/10/2011 7:07:27 PM	43.10505	-77.59898	597.1129
C:\Users\Bill\Desktop\GT2ROC\DSC_0008.JPG	9/10/2011 7:13:16 PM	43.1128416666667	-77.6245016666667	456.0367

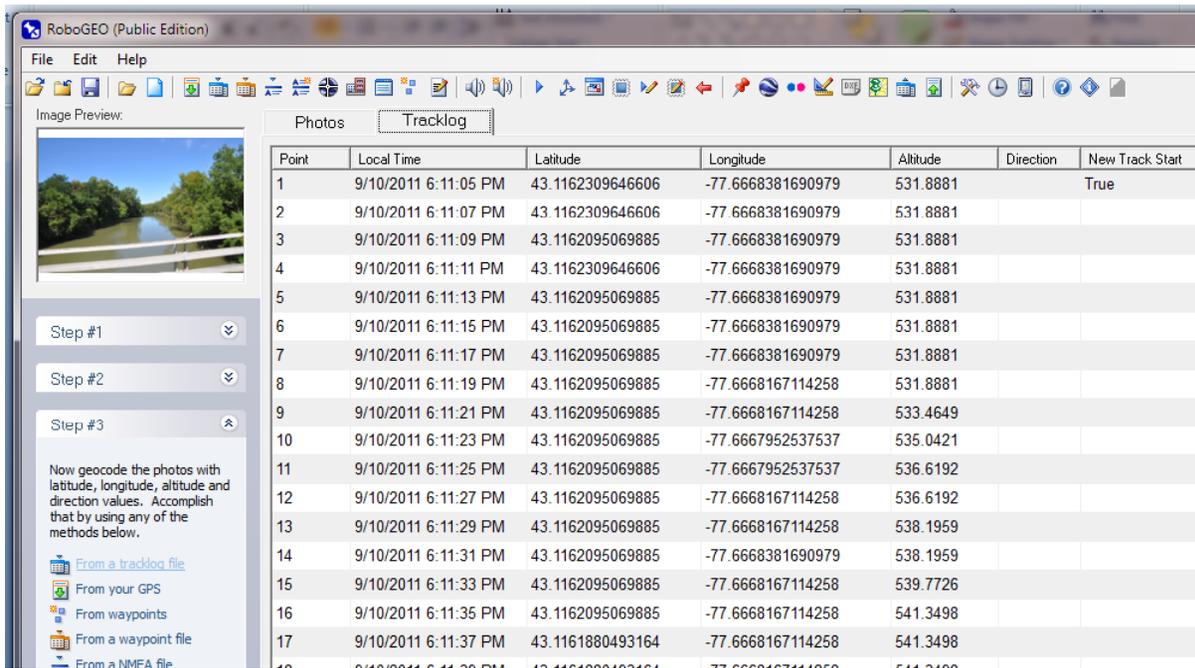
To View Meta Data – for the curious

- To see the meta data (EXIF information) right click a file name and select View Meta Data and then the original data or what will be written if processing is done can be selected



Load Track Data

- Click on Step 3 to load the track data from a GPS or file
- Click the Tracklog tab to see the data

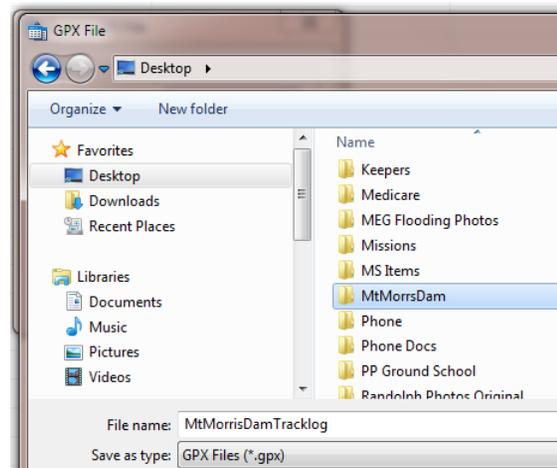


The screenshot shows the RoboGEO (Public Edition) interface. The 'Tracklog' tab is active, displaying a table of track data. The table has the following columns: Point, Local Time, Latitude, Longitude, Altitude, Direction, and New Track Start. The data points are as follows:

Point	Local Time	Latitude	Longitude	Altitude	Direction	New Track Start
1	9/10/2011 6:11:05 PM	43.1162309646606	-77.6668381690979	531.8881		True
2	9/10/2011 6:11:07 PM	43.1162309646606	-77.6668381690979	531.8881		
3	9/10/2011 6:11:09 PM	43.1162095069885	-77.6668381690979	531.8881		
4	9/10/2011 6:11:11 PM	43.1162309646606	-77.6668381690979	531.8881		
5	9/10/2011 6:11:13 PM	43.1162095069885	-77.6668381690979	531.8881		
6	9/10/2011 6:11:15 PM	43.1162095069885	-77.6668381690979	531.8881		
7	9/10/2011 6:11:17 PM	43.1162095069885	-77.6668381690979	531.8881		
8	9/10/2011 6:11:19 PM	43.1162095069885	-77.6668167114258	531.8881		
9	9/10/2011 6:11:21 PM	43.1162095069885	-77.6668167114258	533.4649		
10	9/10/2011 6:11:23 PM	43.1162095069885	-77.6667952537537	535.0421		
11	9/10/2011 6:11:25 PM	43.1162095069885	-77.6667952537537	536.6192		
12	9/10/2011 6:11:27 PM	43.1162095069885	-77.6668167114258	536.6192		
13	9/10/2011 6:11:29 PM	43.1162095069885	-77.6668167114258	538.1959		
14	9/10/2011 6:11:31 PM	43.1162095069885	-77.6668381690979	538.1959		
15	9/10/2011 6:11:33 PM	43.1162095069885	-77.6668167114258	539.7726		
16	9/10/2011 6:11:35 PM	43.1162095069885	-77.6668167114258	541.3498		
17	9/10/2011 6:11:37 PM	43.1161880493164	-77.6668167114258	541.3498		
18	9/10/2011 6:11:39 PM	43.1162095069885	-77.6668167114258	541.3498		

Save the Track Log

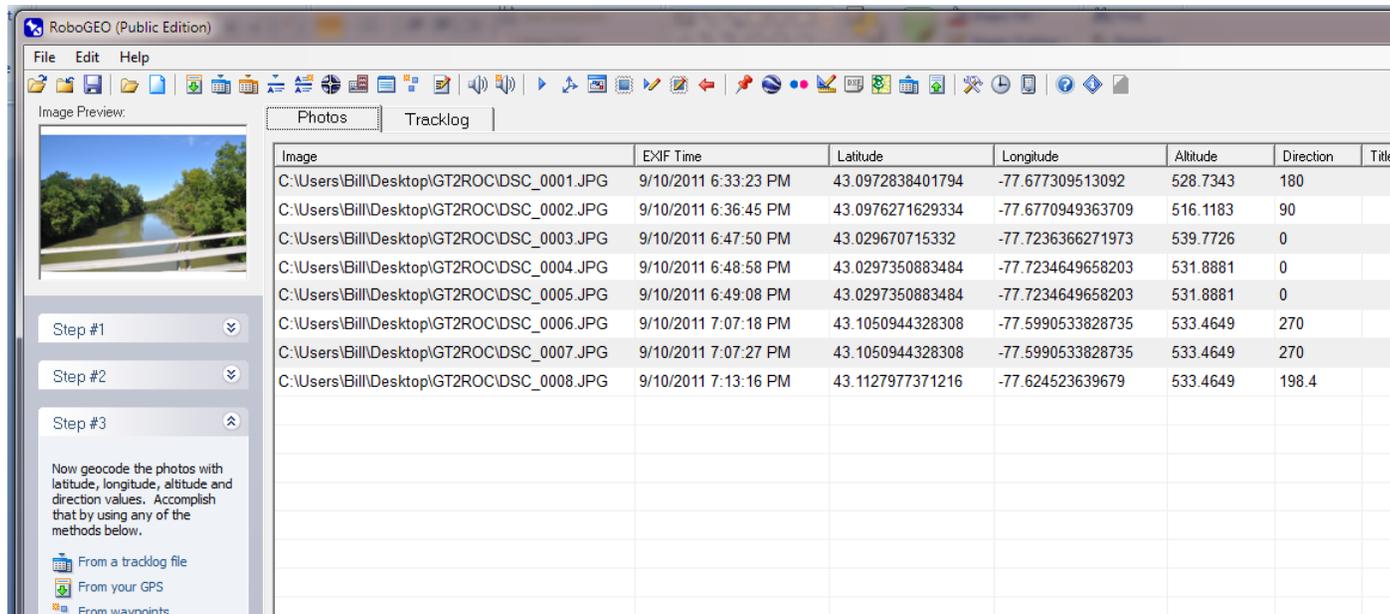
- After the track log is downloaded from the GPS
- In RoboGeo Step 4 click on Export a GPX File
- Make sure that the location for the file is in the new main folder created on the desktop
- A file name similar to the new main folder name with “tracklog” on the end will make it distinctive from others



Note selection of Desktop, the new main folder name and file name

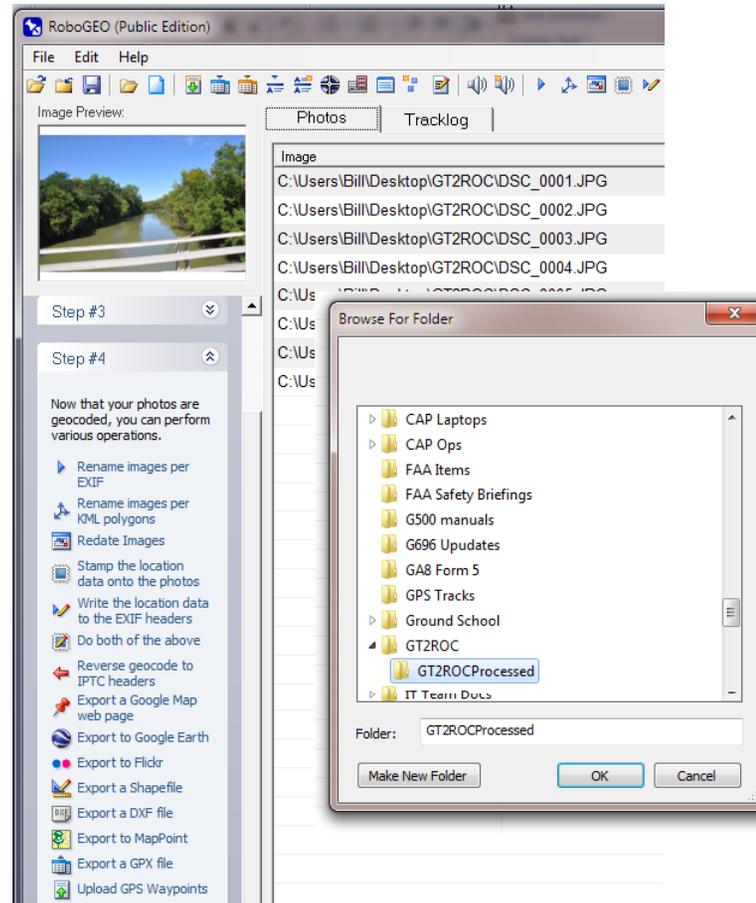
Track Log supplies Direction of Photo

- Note that the direction is now shown on the Photos tab and the first image now has lat/long from the track log
- Direction of travel over the ground is derived from the track log and the camera offset is added to this value
- Type the title desired to appear on the top of the image



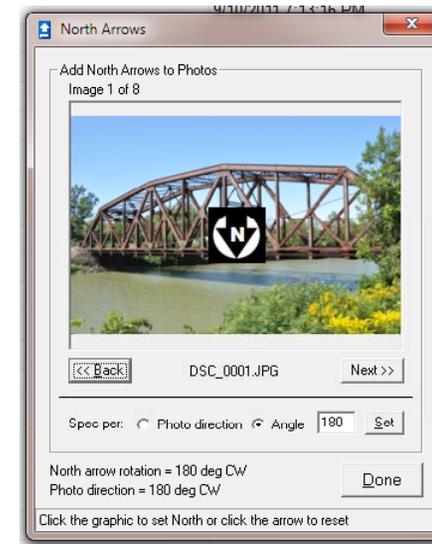
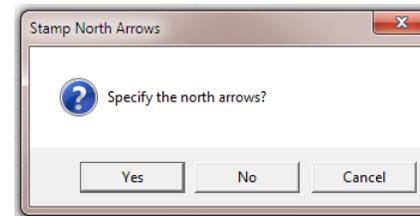
Process the images

- Click on Step 4 to rewrite the meta data and stamp the images, click **Do Both of the above UNLESS** the customer does NOT want the annotation on the image - in this case only write the location data
- Place processed images in a second folder so original images are retained
- Retaining the original images enables re-processing if errors are encountered



Checking North Direction

- After selecting the folder for the processed images you will be asked if you want to specify the north arrow – say yes
- The next window will allow reviewing all images with the north arrow direction shown
- To adjust north arrow click on image where north really is



To Create Google Earth File

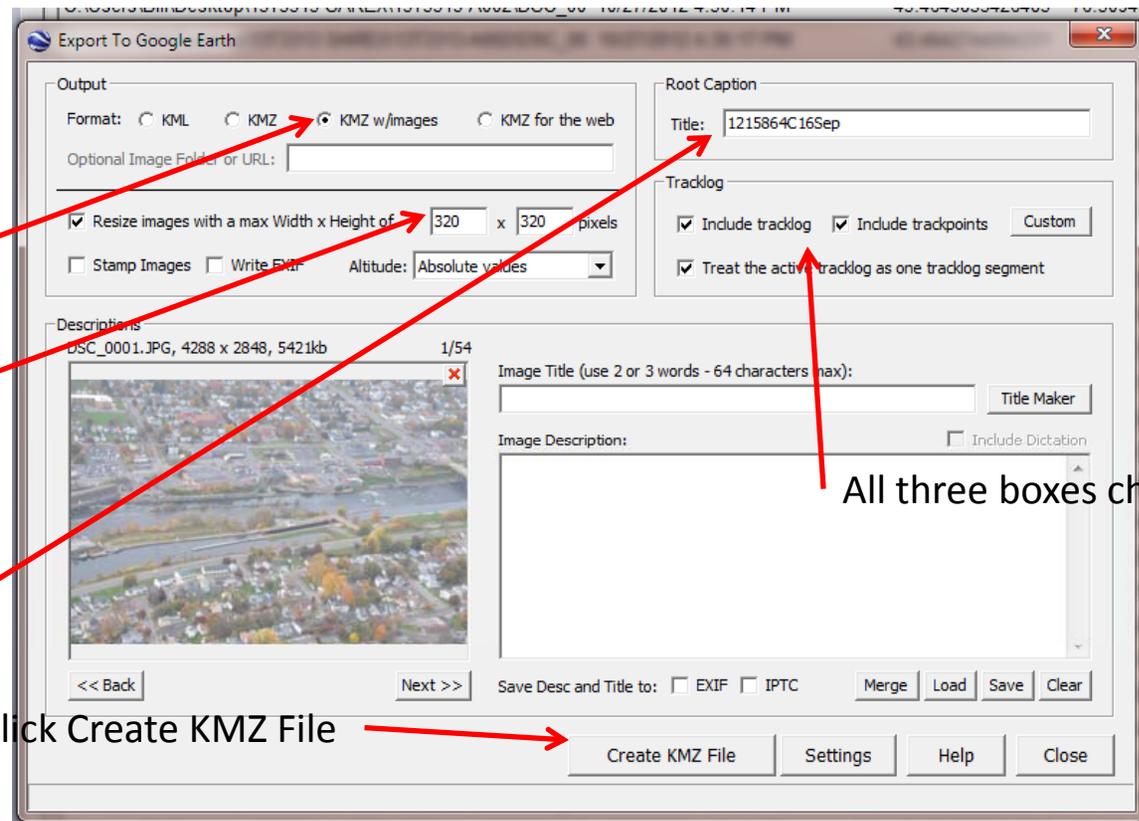
- In RoboGeo Step 4 click on Export to Google Earth
- The following window will open
- After verifying the settings and clicking create a new window will open - place the file in the “processed” folder or other known location

Click radio button
KMZ w/images

Use default 320x320 for
minimal file size. Larger
file size will have higher
resolution images

Type a desired title

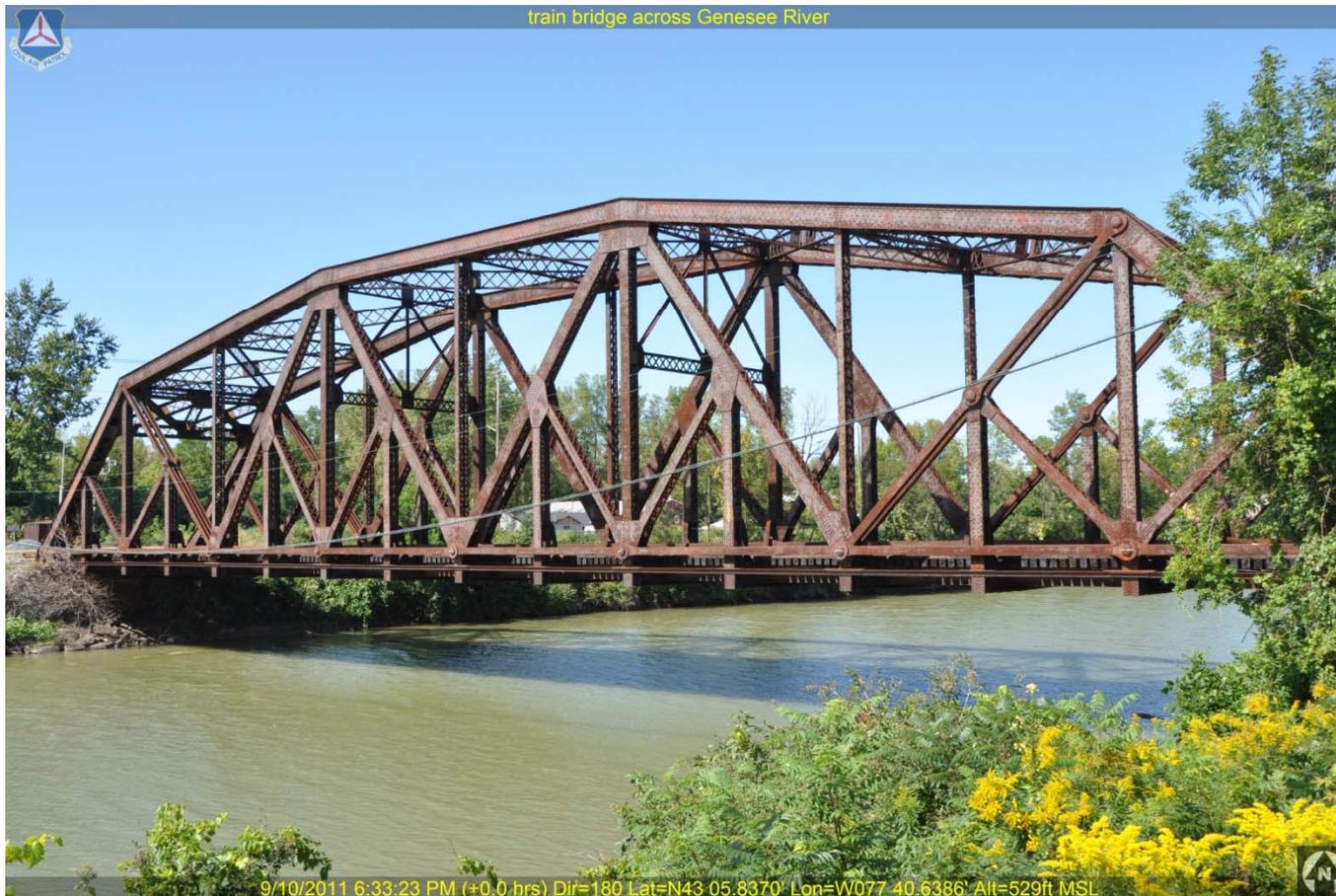
When settings are correct - click Create KMZ File



All three boxes checked

Fully Processed Image

- CAP logo and title across the top
- Date, time, lat, lon, dir, alt, N arrow across the bottom



RoboGeo Specific Steps

RoboGeo Specific Steps

Create a folder on computer desktop with a name that is meaningful to others (eg MtMorrisDam)

Within this folder create a second folder with the same name followed by "Processed" (eg MtMorrisDamProcessed)

Copy the images from the camera to the base folder (eg MtMorrisDam). A USB cable can be used or remove the SD card from the camera and insert into the computer to copy them to the folder above.

Attach the eTrex to the computer via the serial cable (port on right rear of Dell laptops) - see notes regarding the difference for the eTrex H and eTrex 10.

Open RoboGeo

Go to step 2 and open all images in the folder or selected images

Go to step 3 and import the track log from the GPS

In RoboGeo go to File, Export, Export GPX file and save it to the main folder above (eg MtMorrisDam)

If all photo names remain in black lettering the geo tagging is complete. File names in red are not complete most likely due to time mismatch between image time and a close track point.

The Direction in the grid will be the result of the track segment direction plus the camera offset (270 degrees is our default but may have been changed by others).

To change the camera direction relative to the track (which is the GPS track over the ground) click on File, Preferences, expand TrackLogs and click on PhotoDirFromTrackLogOffset. Change the value to the proper value and click Save Value. **Note this will be the value for all processing until it is changed again.** Fill in the "Title" for each image on the Photos grid. These can be copied and pasted using Ctrl+v and Ctrl+c or using the mouse click to copy and paste.

Go to step 4 and select "Do both of the above" to write the meta data and label/stamp the images.

This will prompt for a folder and choose the sub folder (eg MtMorrisDamProcessed).

A window will open asking if you want to include the north arrow. If all images have a direction a message will tell you this. You can continue or review all images. If an arrow is not correct you can click on the image and the arrow will point to where you clicked.

At this point you should have original images in the base of the new folder plus the track log and the processed images in the one with "Processed" on the end of the folder name.

To produce a KMZ file with embedded images (this is a fully portable file that can be viewed on any PC using Google Earth): In step 4, click on Export to Google Earth. On the popup window click the radio button for KMZ w/images, leave image size at 320x320, altitude at Absolute values, insert a desired Title, and click Create KMZ File. When the next window opens select the location for the file - recommend putting this in the "processed" folder created earlier.

To reset the RoboGeo configuration to our common values: Open RoboGeo then click on File and then Preferences. Click on File at the top of the preferences window and click reset. This will reset all to the RoboGeo defaults. Click on File again and then Open and then Local File. Select the RoboGeoConfigCAP.rcf file which is kept in the desktop folder called RoboGeo Manuals.

Updates to the RoboGeo configuration file are posted at <http://nywg.cap.gov/operations/operations.htm> along with updates to these instructions and check lists.

Notes

eTrex H vs eTrex 10 - The eTrex H can be connected and the track log retrieved using RoboGeo. The eTrex 10 will prompt to connect as a mass storage device. Say yes to this prompt and navigate to the Current.gpx file located in the folder chain of Garmin/GPX/Current.

What Else in on the Laptop

Dell E5510 Laptop - General

Installed items

Microsoft Windows 7, 32 bit

Microsoft Office 2010, 32 bit

Adobe Reader X

Cute PDF Writer - "print to" to create pdf docs

AVG Antivirus

RoboGeo - image tagging software

Garmin Map Source - display GPS tracks

FileZilla - ftp client

Google Earth - view images and tracks on a map

¶

Cute PDF Writer is installed as a printer and to create a pdf document simply print to this device.

¶

RoboGeo is image tagging software that will also write meta data to an image file. Images can be imported as specific files or an entire folder. Track logs can be imported to be used to provide latitude, longitude, altitude and the track heading is derived from the log. The default offset for the camera pointing angle is 270 degrees (shooting out the left side of the aircraft) relative to the track over the ground.

¶

With very close synchronization of the camera and GPS time the coordinates from the track log will be displayed for the appropriate image. The software will compute the track over the ground as a reference for the image direction. If the photos are taken out the right window or at some angle other than 270 degrees relative to the ground track, the "preferences" have a setting that will apply this to all images. A standardized configuration file has been loaded and the goal is to have all using the same settings. The one allowable exception is the camera direction but it must be checked for each set of images.

¶

Create a folder on the desktop with a name for the subject of the images. Create a folder in the folder with the same name with the word "processed" on the end and this is where the geo tagged images will be placed. **Always preserve the original images.**

¶

Download the track log from the GPS and "export" it to the image folder for future use. The images will be geo coded based on matching track point times to image times, plus the track direction and camera offset.

¶

The result will not be the utmost in accuracy but should be sufficient for most purposes. A track point every two seconds while traveling at 120 knots is 400 feet.

¶

The "title" must be entered manually for each photo and this is what will appear on the top of the image. Latitude, longitude, altitude and camera direction can be manually entered if GPS data is not available. Cut and paste works for repeating titles.

¶

Garmin Map Source will display the track log on a low resolution map. Products such as DeLorme Street Atlas and Topo can also import the logs if finer map detail is desired. Click Start, Garmin and Map Source to start this program.

¶

An **ftp site** has been set up that can used as needed to upload images. The site is <ftp://nywcap.org> and requires a login and password.

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FileZilla has a site called NYW configured with the host, login and password. Click the connect button. A folder should be created for each set of images and the folder name should be short but meaningful. Things like Sortie 10 don't help much. GreatFallsDam tells others something. In some cases a folder with the mission number may be in order and subfolders for the photo subjects. This site can be used so someone at another location can pull down the images and the track log and assist with geo tagging and labeling images if they have the RoboGeo software.

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If necessary, the login and password for the ftp site can be provided to our customer. Contact Bill Hughes to arrange this.

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More References

- ARGUS

- Server side image processing login - <http://argus.ncr.cap.gov/sp/login.pl>

- CAP National photographer training

- Slide Deck
- http://nesa.cap.gov/curriculum_material/MAS/Aircrew%20-%20Airborne%20Photographer%20Course%20Slides%20APR%202010.ppt
- Reference Text
- <http://nesa.cap.gov/Documents/MAS%20Uploads/CAP%20Aerial%20Photography%20Reference%20Text%20Rev%20Apr10.pdf>
- Nikon D200 with GPS
- http://nesa.cap.gov/Documents/MAS%20Uploads/Aircrew%20-%20NikonD200_With_A_GPS.ppt