D90 Camera Kit and Laptop

How to Navigate the D90, eTrex GPS and RoboGeo

Revised: 14 Dec 2015

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D90 Switches and Buttons

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

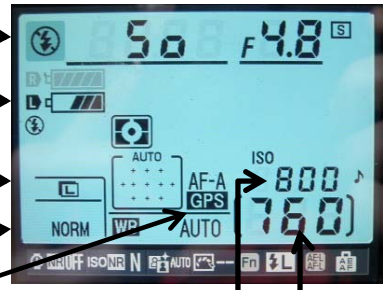
Large Picture Size

JPEG Setting to JPEG Normal

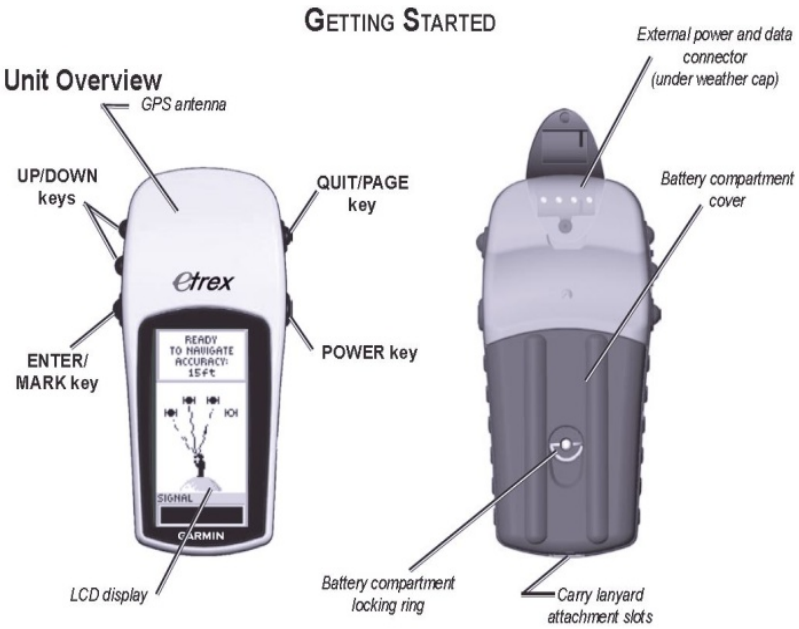
GPS Active and Locked onto the Network

ISO Set to 800

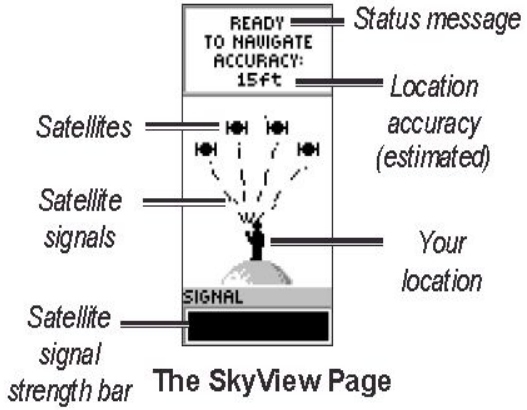
Memory capable of storing 2100 photos (2.1K)



eTrex H Buttons and Menu Screen

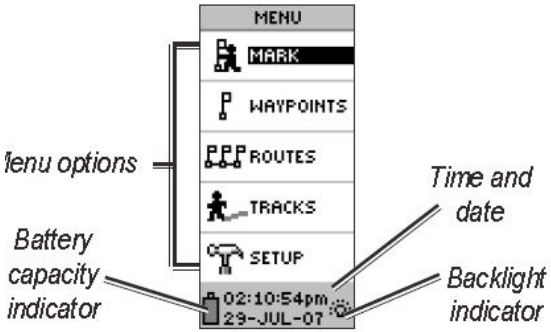


SkyView Page

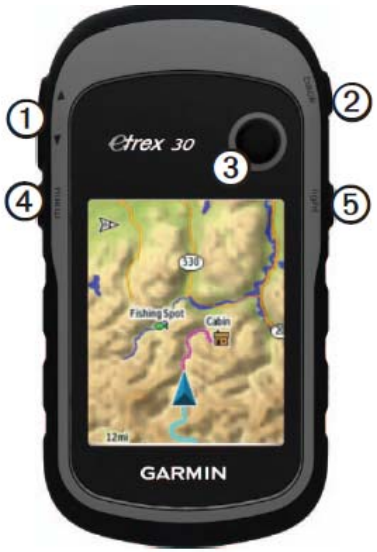


The SkyView Page

MAIN MENU



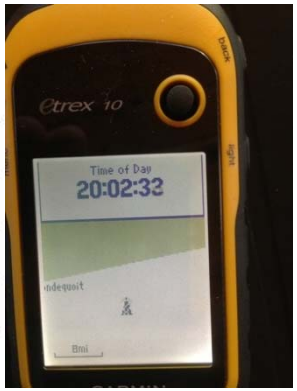
eTrex 10 Buttons and Menu Screen



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

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



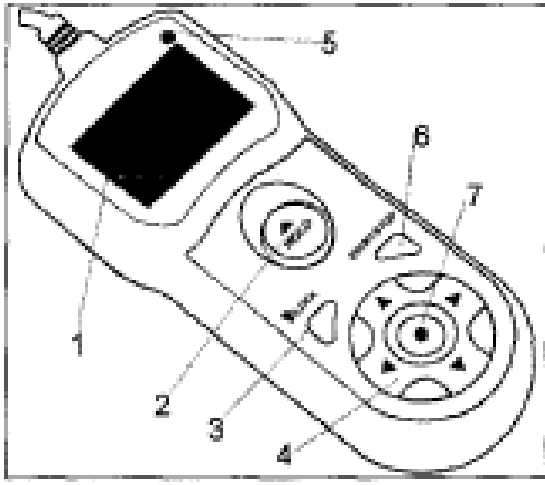
The "Thumb Stick" operates as a joy stick and press to enter
"Backlight key" is also the on/off button – press and hold

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 and then imported into RoboGeo

Satechi Remote Shutter/Timer



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

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 – press “Set” to save

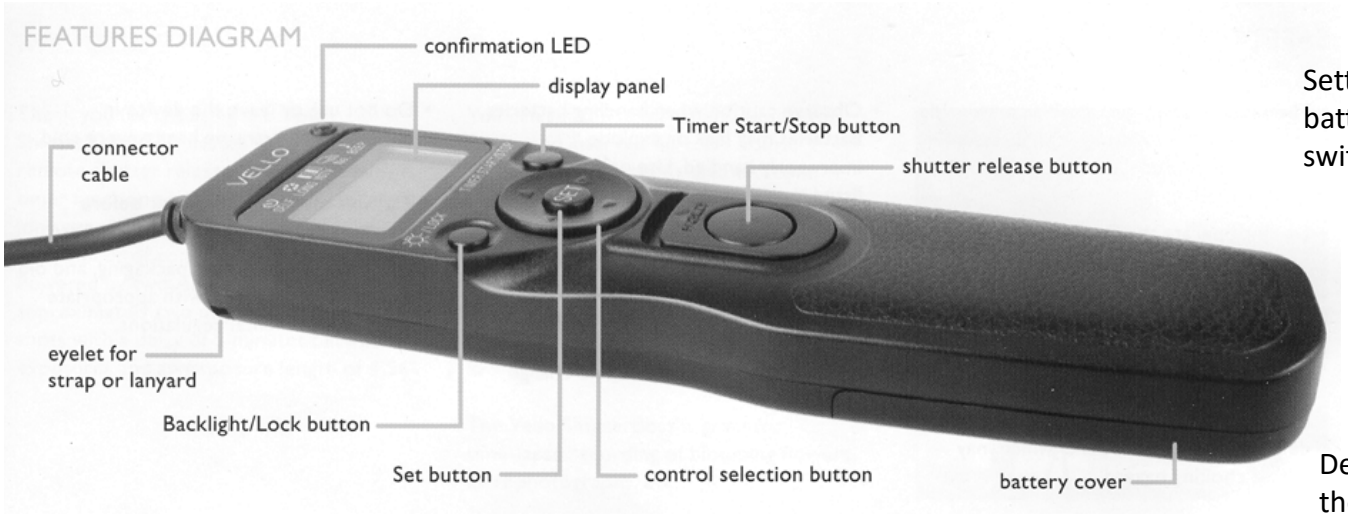
Device can be plugged directly into the GPS port on the D90 or through the GPS-1 via the large USB port and GPS into the GPS port

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

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 59min 59s
BU	It allows you to take time exposures up to 100 hours in length.	0s to 99hrs 59min 59s
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 59min 59s
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

Vello Remote Shutter/Timer



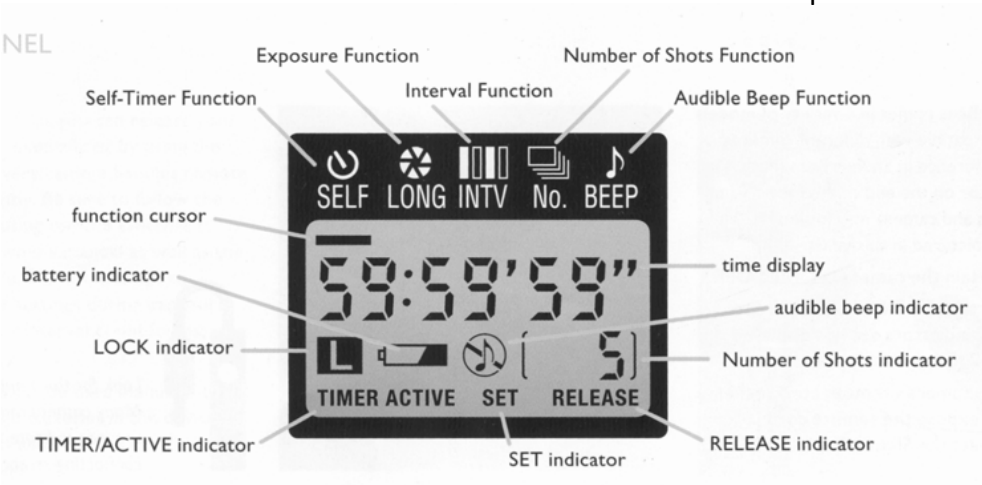
Settings are not retained when batteries removed. No on/off switch

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

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

For unlimited shots at a time interval the number "No" must be set to "- -"

Pressing the "Shutter Release Button" (under word Hold) will trip the shutter.

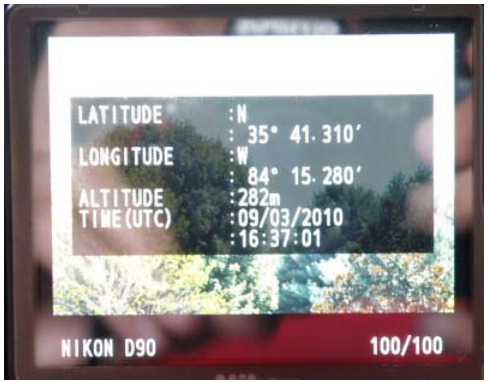


Setup Checklists for GPS
Setup Checklists for D90
Before and After Sortie Checklists

Check lists for setting up the eTrex 10 and eTrex H GPS's and the D90 camera are provided in a separate document. The step by step process for using RoboGeo is also included in D90KitCheckListAndSettings.

To Preview Photo's

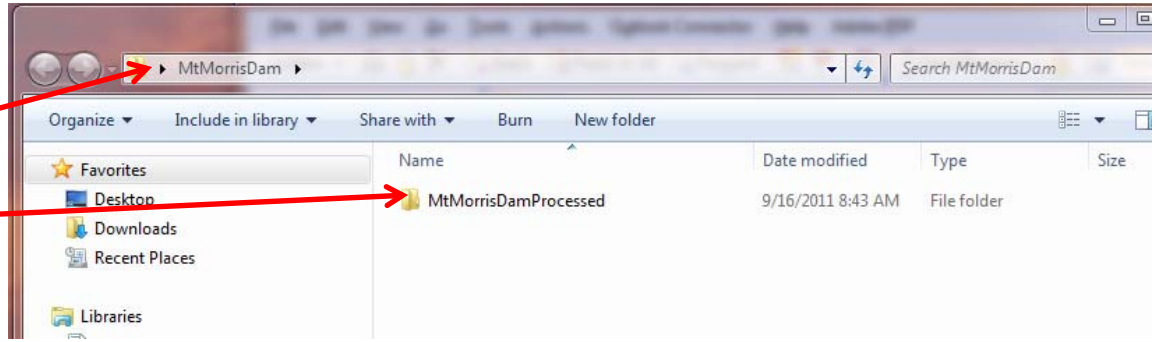
- Press the playback button (top left on rear)
- Image on the left below comes up initially
- Press up arrow on multi selector to see the second and third screen – third screen confirms GPS working



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

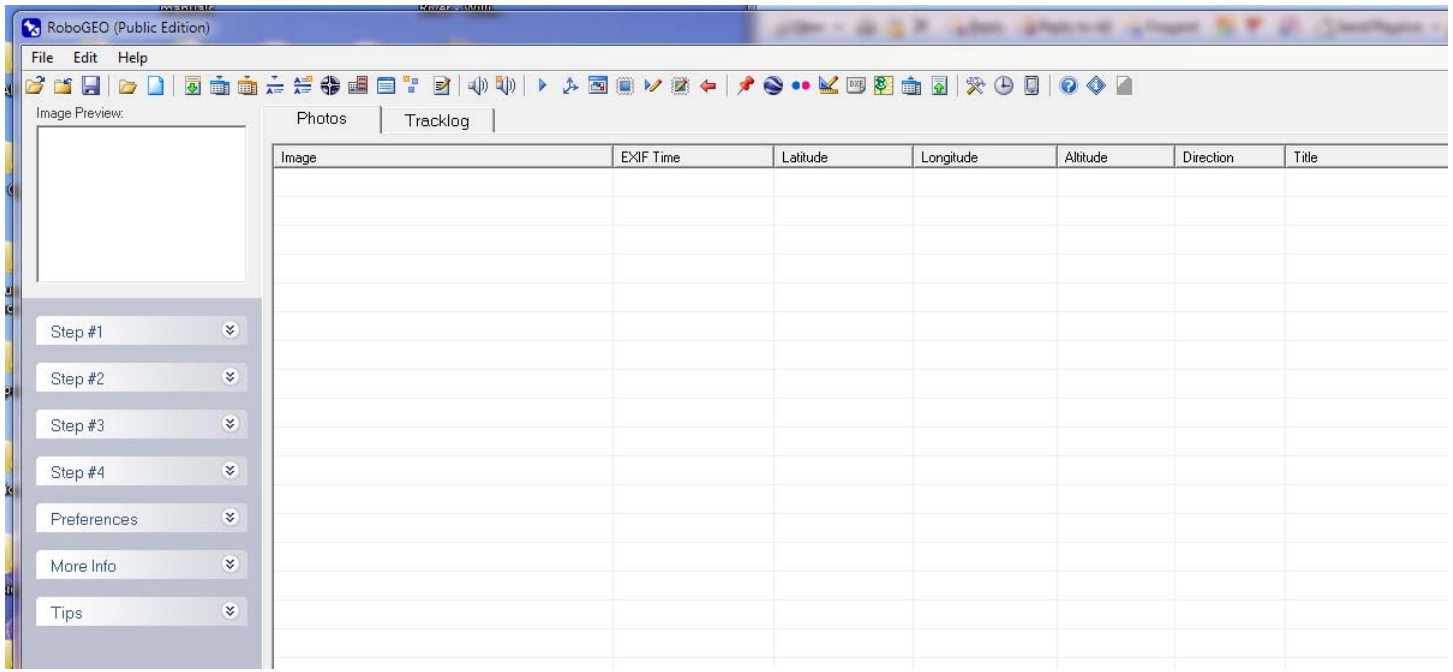


Download Images from Camera

- 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
- Desktop shortcuts are provided that will reset RoboGeo to factory defaults every time it is started and then apply the CAP specific settings for shooting out the left window or right



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

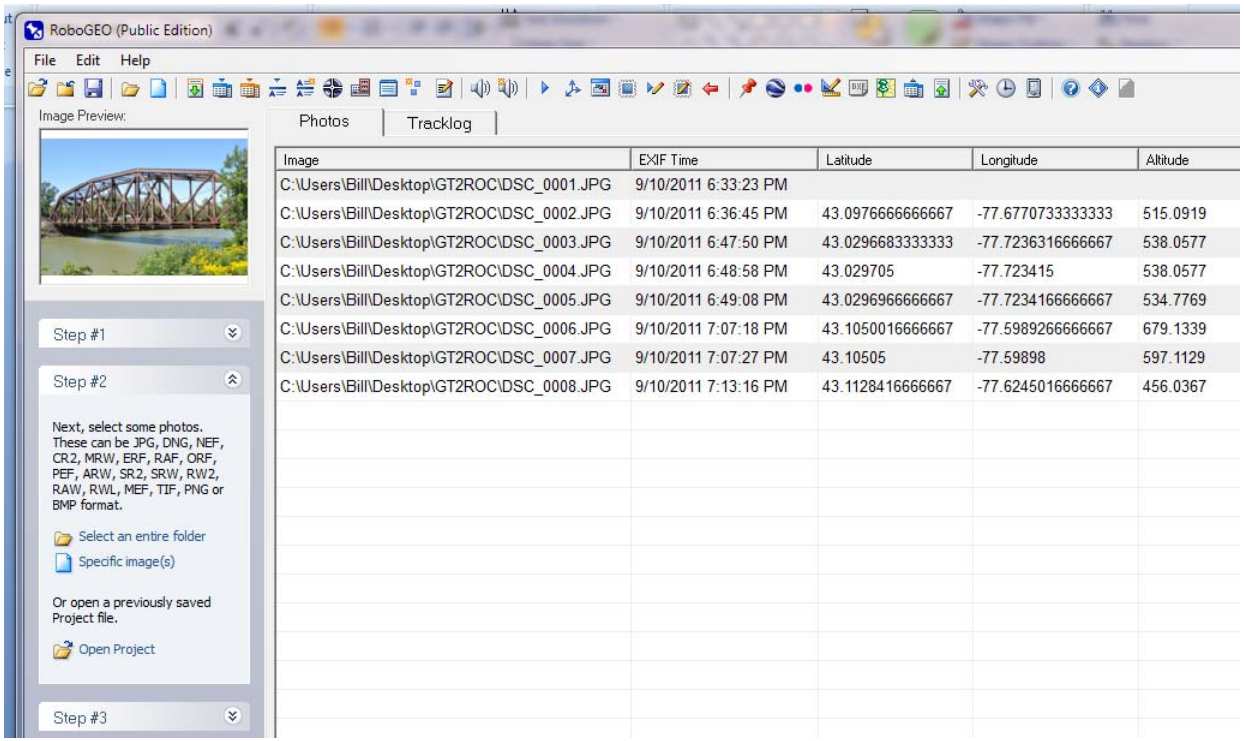
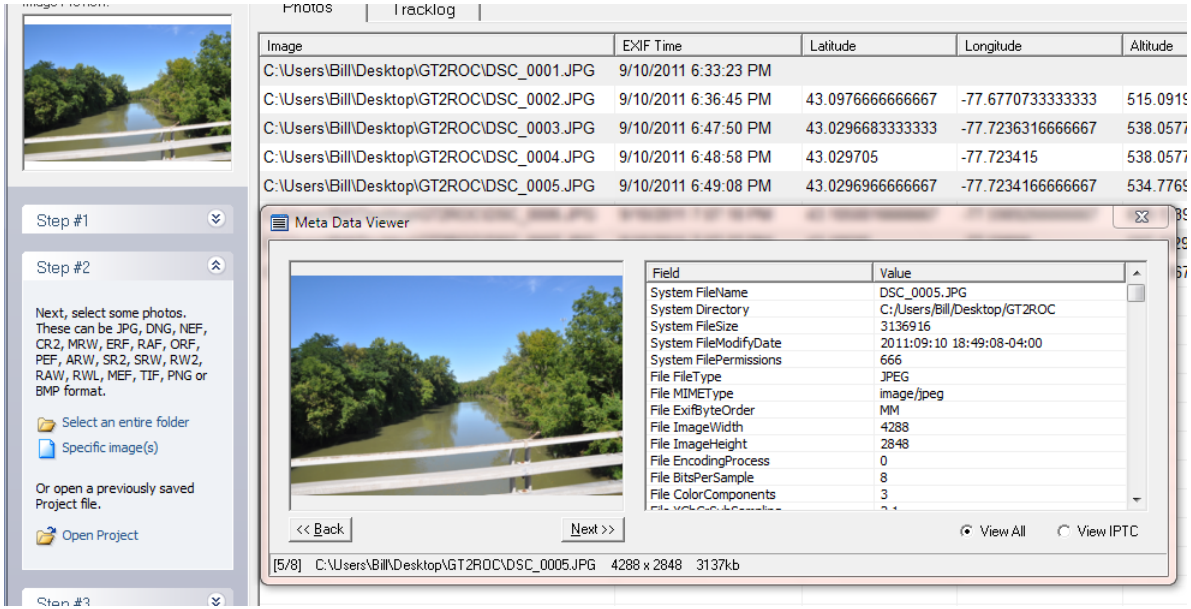


Image	EXIF Time	Latitude	Longitude	Altitude
C:\Users\Bill\Desktop\GT2ROC\DSC_0001.JPG	9/10/2011 6:33:23 PM			
C:\Users\Bill\Desktop\GT2ROC\DSC_0002.JPG	9/10/2011 6:36:45 PM	43.0976666666667	-77.6770733333333	515.0919
C:\Users\Bill\Desktop\GT2ROC\DSC_0003.JPG	9/10/2011 6:47:50 PM	43.0296683333333	-77.7236316666667	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

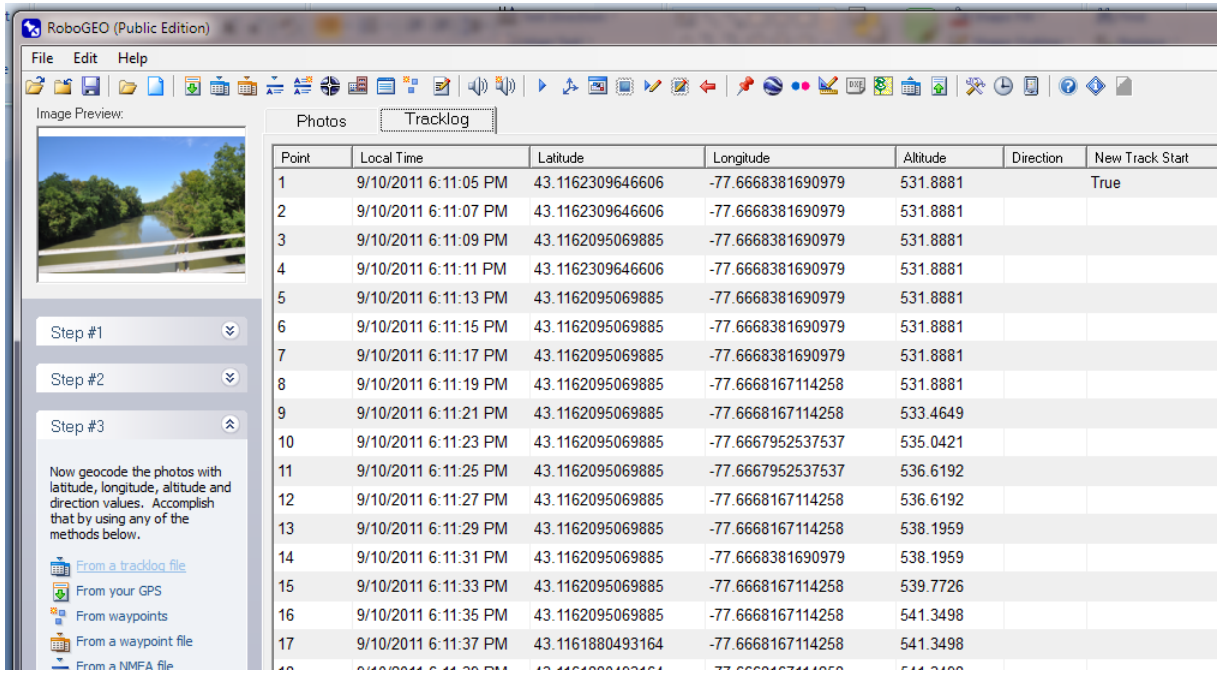
To View Meta Data – for the curious

- 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

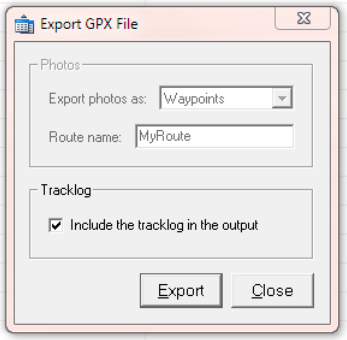
- Click on Step 3 to load the track data from a GPS or file
  - The log can be loaded directly from the eTrex H
  - For the eTrex 10 the file is downloaded and then imported
- Click the Tracklog tab to see the data

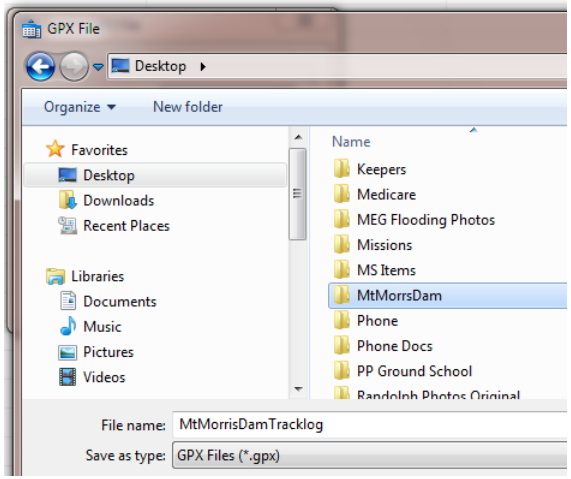


Point	Local Time	Latitude	Longitude	Altitude	Direction	New Track Start
1	9/10/2011 6:11:05 PM	43.1162309646606	-77.6668381690979	531.8881		True
2	9/10/2011 6:11:07 PM	43.1162309646606	-77.6668381690979	531.8881		
3	9/10/2011 6:11:09 PM	43.1162095069885	-77.6668381690979	531.8881		
4	9/10/2011 6:11:11 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		

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

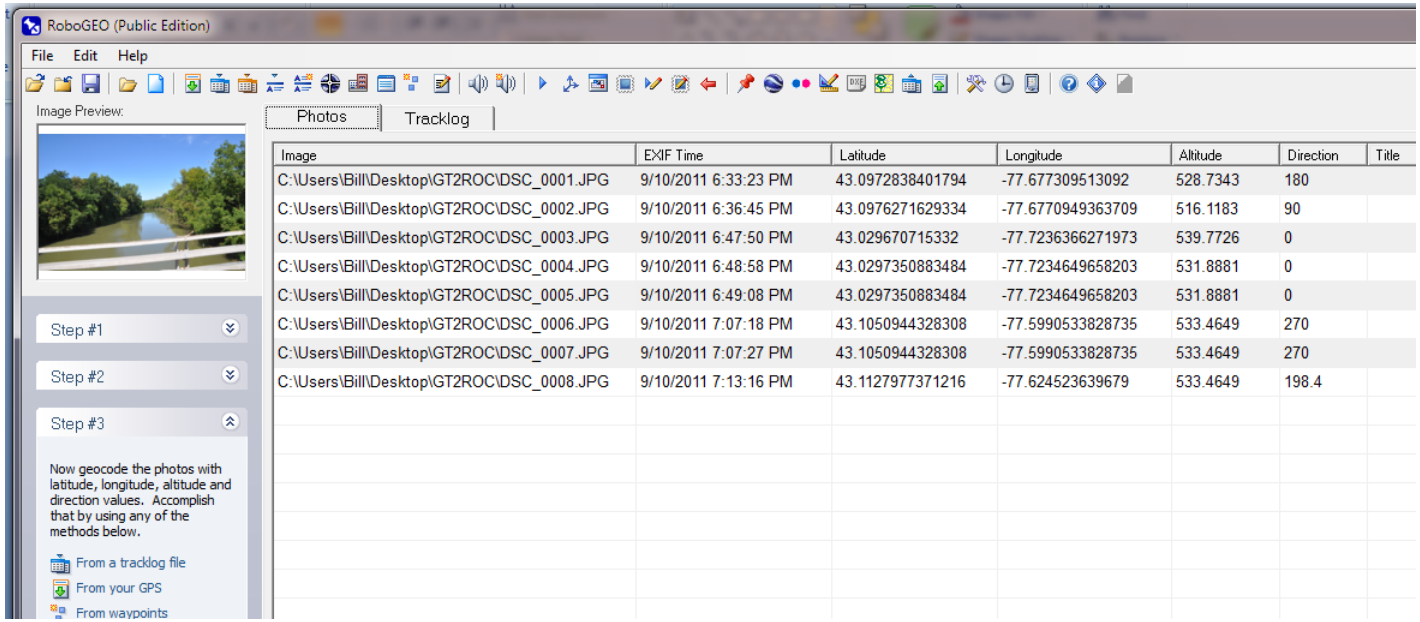


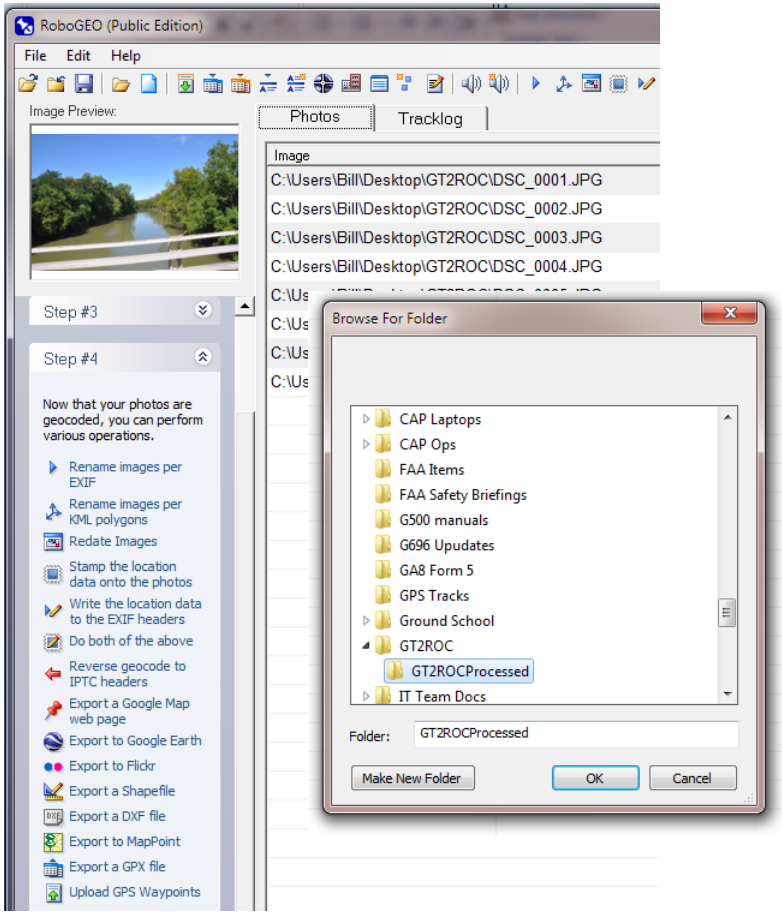
Image	EXIF Time	Latitude	Longitude	Altitude	Direction	Title
C:\Users\Bill\Desktop\GT2ROC\DSC_0001.JPG	9/10/2011 6:33:23 PM	43.0972838401794	-77.677309513092	528.7343	180	
C:\Users\Bill\Desktop\GT2ROC\DSC_0002.JPG	9/10/2011 6:36:45 PM	43.0976271629334	-77.6770949363709	516.1183	90	
C:\Users\Bill\Desktop\GT2ROC\DSC_0003.JPG	9/10/2011 6:47:50 PM	43.029670715332	-77.7236366271973	539.7726	0	
C:\Users\Bill\Desktop\GT2ROC\DSC_0004.JPG	9/10/2011 6:48:58 PM	43.0297350883484	-77.7234649658203	531.8881	0	
C:\Users\Bill\Desktop\GT2ROC\DSC_0005.JPG	9/10/2011 6:49:08 PM	43.0297350883484	-77.7234649658203	531.8881	0	
C:\Users\Bill\Desktop\GT2ROC\DSC_0006.JPG	9/10/2011 7:07:18 PM	43.1050944328308	-77.5990533828735	533.4649	270	
C:\Users\Bill\Desktop\GT2ROC\DSC_0007.JPG	9/10/2011 7:07:27 PM	43.1050944328308	-77.5990533828735	533.4649	270	
C:\Users\Bill\Desktop\GT2ROC\DSC_0008.JPG	9/10/2011 7:13:16 PM	43.1127977371216	-77.624523639679	533.4649	198.4	

Correcting for Camera Time Error

- If RoboGeo cannot match track log time to image time, it will display those image names in red font and they will not be geo tagged
- To correct for camera time error
  - Select all images (click on first one, scroll to last one and hold shift key and click) – only highlighted images will be affected
  - In the Edit menu choose Edit Time / Manual
  - The correction is entered as @+ or – seconds of adjustment
  - 60 seconds in a minute, 3600 in an hour, 86,400 in day, 365 days in a year but add a day for any leap days in the error range
  - RoboGeo will CHANGE the photo time in the images loaded, e.g. changes the meta data
- If the track log was already loaded, reload it and verify that the geo tagging was done for all (if all have a direction it was successful)
- Using File / Sync Camera Clock will solve the geo tagging problem but does NOT change the meta data, does NOT display the new time on the photo tab in RoboGeo and will NOT stamp the correct time if "stamping location info" on the images
- It DOES change the camera offset preference so it will be applied every time images are loaded until the preference is reset to zero, even if RoboGeo is restarted

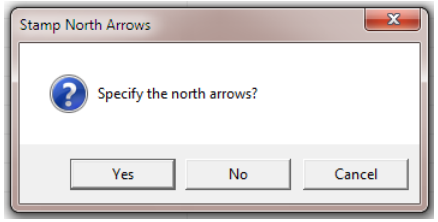
Process the images

- Note – this is a change as of 1 Jan 2016
- Click on Step 4 to rewrite the meta data by clicking Write the Location Data to the EXIF Headers – if the customer requests annotated images click Do Both of the above to write the location data to the image files and place the data on the image
- 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

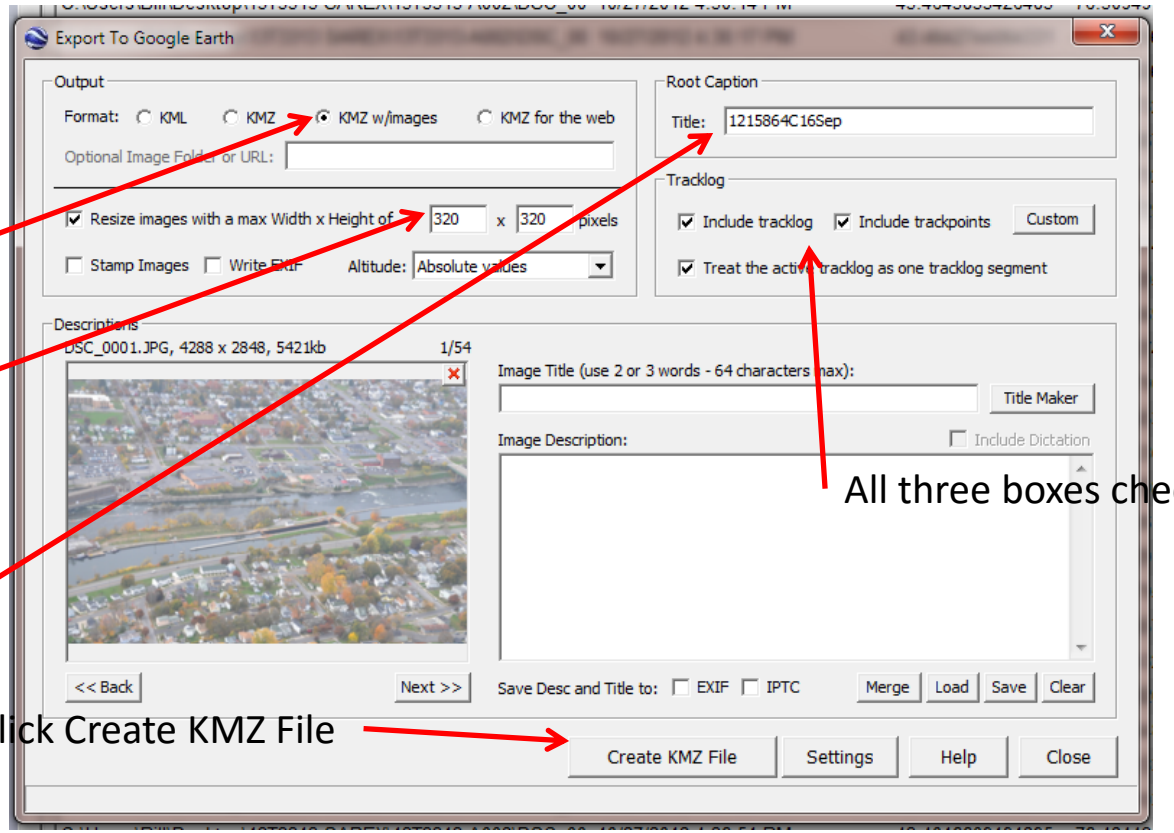
- In RoboGeo Step 4 click on Export to Google Earth
- The following window will open
- After verifying the settings and clicking create a new window will open - place the file in the “processed” folder or other known location

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 with Annotation

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

RoboGeo Specific Steps

- Specific steps for using RoboGeo are included in the document D90KitCheckListAndSettings

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 doc's¶
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.¶

¶

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.¶

¶

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

¶

More References

- This document, checklists and other reference and training material
  - http://nywcap.org/staff/operations/operations.htm
- 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