

GPS Data Collection on Incidents

This document contains information on how to use a Garmin GPS to record data on an incident. It includes: a list of things to consider when using a GPS on incidents; how to properly setup a GPS; and instructions on collecting track and waypoint data.

I. Considerations When Collecting GPS Data on Incidents Using GIS Mapping

- A. Contact GIS staff prior to going out and collecting data.
 - 1. In most cases, they can ensure that the GPS is set up properly.
 - 2. They will need to know if you are using a non-Garmin GPS unit – might not be able to download.
 - 3. Advise the GIS personnel if you are not using a Garmin GPS, but have software to download the unit. They can usually work with the data if they have the time.
 - 4. With the Situation Unit Leaders approval, the GIS personnel can inform you where there are gaps in their perimeter data. You can then use your GPS to record this data.
 - 5. If available, you might be able to get better, large format maps from the GIS staff.

- B. Manage personnel collecting GPS data on incidents.
 - 1. Assign data collectors to specific areas.
 - 2. Make sure the boundaries of each area are defined.
 - 3. Don't overlap areas. Duplicating data from several people becomes very confusing to GIS staff if notes differ.
 - 4. If fire is multi-jurisdictional, contact other agencies to see if they are collecting data.
 - a) This will reduce the chance of duplicate data collecting.
 - b) Work together and share data for better data collection efficiency.
 - c) Ensure that all personnel use the same data and documentation standards.
 - d) Federal agencies will usually have the fire flown to take aerial photos to capture current digital images.
 - 1) These can be very useful when printed and analyzed.
 - 2) Can be used to decide where to send personnel to collect data.

- C. Always take your GPS download cable to incidents.

- D. It's good to have an external antenna to use when recording GPS data while driving or flying on the incident.

- E. Take field notes to document the GPS data as you collect it.
 - 1. Don't wait until the end of the day to write your notes. It either won't happen or your memory will be very sketchy.

2. Record the GPS time when you start and stop recording track data. The GIS personnel can use that information to identify track data once it is downloaded.
 3. Can develop pre-made tables to record notes.
 4. Photos can be used in addition to notes.
 - a) Especially good for rehab and damage assessment.
 - b) Usually required for damage assessment.
 - c) Digital photos are good for documentation.
- F. When recording waypoints, average the points for better accuracy, especially in heavy canopy cover. Some Garmin GPS models are not capable of averaging. See Part IV of this document for instructions.
- G. When recording track data with the GPS:
1. Always clear the **Active Track** before you start recording data so that old data that was already downloaded is not mistaken for new data.
 2. It's preferable to set the **Record Mode** in the **Track Setup Logging** window to **Fill**, the **Interval** to **Distance** and the **Distance Value** to **0.01 miles**. This will record a track point every 53 feet.
 - a) Do not set the Record Mode to Wrap. This will cause the GPS to overwrite track points at the beginning of the track if GPS memory hits 100%. It wraps back around to the starting point and deletes the points starting with the first point. It will continue overwriting track points until you stop tracking.
 - b) If the Interval is set to Time, when you stop to talk to someone, the GPS will continue to record. This does not occur when GPS is set to Distance.
 - c) Some GPS units have a Resolution setting that will allow you to set your distance interval down to 1 foot.
 3. Don't turn GPS off to stop recording a track segment.
 - a) Instead, go to the **Track Setup Logging** window and switch the **Record Mode** to **Off**.
 - b) This will help avoid collection of unnecessary track points when the GPS is turned back on.
 - c) It's very difficult for the GIS personnel to interpret this data if erroneous data is captured.
 4. Know how many track points your GPS is capable of storing. This will help you determine how many miles you can record.
 - a) GPS III Plus – 1900
 - b) GPS 12XL – 1024
 - c) eTrex – 1536
 - d) eTrex Legend – 10,000 w-latest update
 - e) eTrex Vista – 10,000 w-latest update
 - f) GPS V - 3000
 - g) GPSMap 76S – 10,000 w-latest update

5. **DO NOT save the Active Track to a Track Log.** If there are more than 100 (750 in Legend, Vista and GPSMap 76S) track points in the Active Log, this will average it down to 100 (750 in models noted above) points in the Track Log. This will ruin your accuracy.
6. **DO NOT** back track where you have already recorded data. This will make a mess when the data is loaded into the GIS software.
 - a) Turn the Record Mode to Off if you need to veer off your intended course.
 - b) Flag where you stopped recording.
 - c) When you are ready to resume recording, turn the Record Mode to Fill, and continue on your course.

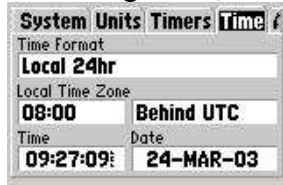
H. If you will be using a helicopter to GPS the fire perimeter:

1. Observe all safety measures given during pre-flight briefing.
2. Keep an eye out for and advise pilot of any hazards while flying (other nearby aircraft, power lines, towers, rock outcrops, etc.).
3. It's best to use the suction cup antenna on the front window (roof window if available).
4. Make sure that the GPS is turned on and has gotten 3D position before taking off.
5. It's good to ask the pilot if (s)he has ever GPS mapped a fire perimeter before taking off.
 - a) If pilot has flown GPS missions before, ask if they enjoy doing it.
 - b) If not, you might find another ship to use if available. That person will probably fly it so fast that you get very poor perimeter data.
6. Prior to takeoff, discuss method of flying along perimeter.
 - a) Discuss terminology to use while in flight (start, stop, pause, break, etc).
 - b) Clock-wise verses counter-clockwise flight around fire.
 - c) Flying low and slow is best.
 - d) Discuss what you want them to do when you encounter narrow pockets along perimeter.
 - e) Have pilot advise if they need to break away from the perimeter (to gain altitude, avoid sudden obstacles, etc.).
7. Maintain good communication with pilot while flying. Usually (s)he will want your help to find and keep on the perimeter.
8. If flying along fire perimeter where the fire is contained, but the burn is still hot, make sure the copter rotor wash doesn't blow hot embers across the fire line. Advise pilot to increase altitude and speed to prevent this from occurring.

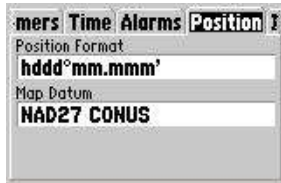
II. GPS Setup for Collecting Data – All pictures of GPS menus in this document are from a Garmin GPS III Plus.

- A. Set up your GPS prior to going out on the fire line.

B. Set time to 8 hours behind UTC in Pacific standard time zone. During daylight savings time, use 7 hours.

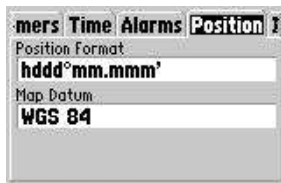


C. Use NAD27 CONUS Map Datum



1. This sets the datum used for coordinates as they are displayed on the GPS unit.

2. Aircraft GPS coordinates use **WGS84** datum (~300 foot horizontal deviation from NAD27 CONUS). Change to this datum when giving aircraft your coordinates. The GPS will change the displayed coordinates to this datum once changed.



3. Regardless of what you have your GPS Map Datum set to, it always downloads in WGS84 datum. This is the format used by most map software.

D. Set Position Format to **hddd °mm.mmm'** as shown above.

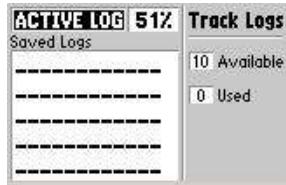
E. Set Interface Format to **Garmin** and Transfer Mode to **Host**.



III. Use the Following Process to Record Track Data:



1. Press the **Menu** button twice to open the main menu. Use the center rocker button to scroll down to **Track Logs** then press the **Enter** button.



2. The Active Log window will open.



3. Press the **Menu** button to open the Track Menu. Scroll down to **Clear Active Log**. Then press the **Enter** button to delete any track points currently stored on the GPS.



4. Next, select **Setup Logging** and press the **Enter** button to open the Setup Logging window. Set up your GPS to the settings displayed to the left. This will record a track point every 53 feet.



5. To set the **Record Mode**, scroll down until the item in this window is selected. Then press the **Enter** button. Select **Fill**, then press the **Enter** button.



6. Set the **Interval** to **Distance** using the same method as above.



7. Set the **Interval Value** to **0.01 miles**. This will be approximately 53 feet between track points. Using a GPS III plus, you can collect ~19 miles of track data at this setting.

8. Before getting to the location that you would like to start recording, set the **Record Mode** to **Off** (Step 5, but set to Off) and then **Clear Active Log** (Step 3). Doing this will prevent collecting unwanted track data.
9. When you are at your starting point and ready to start recording track data, set the **Record Mode** to **Fill** (Step 5). Leave the **Setup Logging** window open with the **Record Mode** menu open as the GPS is recording. If you need to stop recording, you can quickly set the **Record Mode** to **Off**. Take note of the time that you started recording and describe the data that you are collecting.

10. When you are at the location where you would like to stop recording, set the **Record Mode** to **Off**. Take note of the time that you stopped recording.
11. Go to the next location where you want to record data and repeat Steps 9 and 10.

IV. Use the Following Process to Create and Average a Waypoint



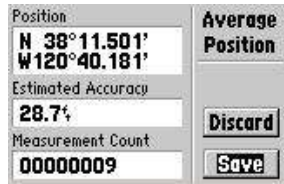
a)

3. If you don't want to average the waypoint, press the **Enter** button again to save the waypoint. Go to 4 if you want to average the waypoint.



1. **Not** all Garmin GPS models have this capability.
2. To record a Waypoint, press and hold down the **Mark** or **Enter** button until the **Mark Waypoint** window appears.

4. In **Mark Waypoint** window, press the **Menu** button to open the **Mark Waypoint Menu**. Then select **Average Position** and the **Enter** button.



5. The **Average Position** window will open and start collecting points to calculate the average position. Collect at least 20 points as noted in the **Measurement Count** window. Then press the **Enter** button to save it.

6. When the **Mark Waypoint** window appears, **Done** should be selected. Press the **Enter** button to record the waypoint.
7. Write the waypoint number and a description of the waypoint in the field notes.

V. Updating GPS Software

Garmin updates the GPS software for the various GPS models on a routine basis and it's good to regularly check their website for updates. The updates include: fixes to problems and software bugs; increase the capabilities and/or functionality of the GPS; update technology changes in satellite communications with unit; and many other feature changes. The updates and the installation instructions for the various GPS models can be downloaded from the Garmin website at <http://www.garmin.com/support/download.jsp>. Following the instructions, you can then upload the software update directly to the GPS unit.