



Standard Operating Procedure

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| SOP code | SOP_FIELD_001_ v01_EN |
| Title | Using a handheld GPS receiver model GARMIN eTrexH in field data collection (especially for geo-positioning schools in mapping activities) |
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1. OBJECTIVES

Provide the guidance in the use of a handheld global positioning system (GPS) receiver model GARMIN GPS Map in field data collection, especially for geo-positioning locations such as schools, health facilities, households, etc.

2. DEFINITIONS

NTDs: Neglected Tropical Diseases. Neglected tropical diseases are a group of infectious diseases that thrive in impoverished settings, especially in tropical climates. The main NTDs include soil-transmitted helminths, lymphatic filariasis, schistosomiasis, onchocerciasis and trachoma.

GPS: Global Positioning System. It is a global navigation satellite system (GNSS) developed by the United States Department of Defence and managed by the United States Air Force 50th Space Wing.

WAAS: Wide Area Augmentation System. WAAS is a type of differential correction in real time provided by some companies. Originally designed with air navigation in mind, WAAS signals are broadcast by geostationary satellites (satellites which constantly remain at the same point over the Earth), and require a clear view of the horizon at higher altitudes. Most GPS units today are WAAS enabled. WAAS can potentially improve horizontal accuracy from 5-30 m to 1-5 m.

DGPS: Differential GPS. DGPS is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.



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Geodetic systems or **geodetic data** are used in navigation, cartography and satellite navigation systems to translate positions indicated in their outputs to their real position on earth. The systems are needed because the earth is an imperfect ellipsoid.

Datum is a set of values used to define a specific geodetic system.

3. APPLICABLE TO

Field workers of NTDs control programmes involve in mapping activities.
National Control Programme Managers and Data managers

4. RESPONSIBILITIES

Field worker are responsible of collecting coordinates data of each school or household selected to be sampled. Moreover, they must ensure that coordinates have been gathered according to the procedures below explained in order to warrant a maximum level of accuracy.

5. RELATED SOPS AND PROTOCOLS

- SOP_FIELD_002_v01_EN → Using a handheld GPS receiver model GARMIN GPS MAP in field data collection.
- Manual “Using a handheld GPS receiver in field data collection” GAHI - CNTDs

6. PROCEDURES

Pre-Field Procedures

1. Ensure that the system battery is charged by charging over night.

Not only does this give your GPS better performance it will also help keep a better signal.



Note: To change the batteries, open the back plastic cover.
This GPS receiver uses two AA batteries.

- 2. Power up the system at the office location to ensure that it is working.
- 3. Inventory the components of the GPS configuration.

To access to **Setup** page:

- Press the **PAGE** key and switch to the **Menu** page.
- Press the **UP/DOWN** keys and highlight the "Setup" field. Press **ENTER**. The **Setup** page appears.
- From this screen you can access to the **Units** page to set *Position FRMT*, *Units* and *Datum* (if required) and the **System** page where you can make enable *WAAS* option.

To make sure that data collected in the field are consistent with GIS data used for mapping the survey data you must revise GPS configuration according to the following standards:

- *WAAS* should be "**Enabled**" as shown at right. This will allow for greater accuracy.
- Set *Position FRMT* to "**hddd.ddddd0**" (decimal degrees).
- Set *Units* to "**metrics**"
- Set *Map Datum* to "**WGS84**" (The default datum in the eTrex is WGS84 (World Geodetic Survey, 1984).)
- Set *North Reference* to "**True**".



Step 1. Press PAGE key to select Menu page and use UP/DOWN keys to highlight Setup menu.



Step 2. Select Units tab in Setup menu.



Step 3. Select **decimal degree** format in *Position FRMT* field.



Step 4. Select **metric** format in *Units* field.



Step 1. Press PAGE key to select Menu page and use UP/DOWN keys to highlight Setup menu.

Step 2. Select System tab in Setup menu.

Step 3. Enable WAAS function in *Mode* field

4. Check the GPS memory to ensure that there is enough space to store the data you need to collect. Optimally, the memory should be empty before going out to the field – you should ideally download GPS data after every field survey.

Field Data Collection Procedures

5. Once you have arrived at the location where you need to collect data, power up your GPS handheld device.
6. Check the following items on the **Satellite Information** page of the GPS unit:
 - Check that you are receiving signals from enough satellites to obtain your position. Generally you will need **four**, in limited circumstances three will be enough.
 - Check that the estimated accuracy displayed on the GPS is sufficient to meet your requirements. Typically, accuracy values between 20 to 40 m are considered acceptable.
7. Approach the geographic feature (school, health facility, household, etc.) which you wish to map. This do avoiding obstacles in order to receive clear transmission signals from four or more satellites. If the "view" to the horizon or overhead is obstructed, you may need to get to higher, open ground. In the meantime, turn off your GPS to conserve battery power.
8. Place the antenna of the GPS over or near the point feature.
In the case of a point taken to represent something like a school, place the antenna near enough to the feature that it will be represented near to the correct place on a map.
9. Mark a waypoint by pressing and holding down the **Enter** key on the GPS device, this will bring up the **Mark Waypoint** page with the coordinates of you current location displayed.



Step 1. Holding down ENTER key to mark a new waypoint



Step 2. Change settings of new marked point (name)



Step 3. Use UP/DOWN keys to select waypoint settings

10. Name the waypoint or location using the code assigned to this feature; school code, household permID, etc.

- On the **Mark Waypoint** page, press the **UP/DOWN** key to highlight the *Waypoint Name* which appears by default (i.e. '001').
- Press **ENTER** key. The **Edit Waypoint Name** page appears.
- Press **ENTER** key. Using the **UP/DOWN** keys, scroll through the letter selection.
- Select each letter or number until complete the new name assigned to this point pressing **ENTER** after selecting each letter/number.
- Press the **UP/DOWN** key to highlight the **[OK]** field and press **ENTER** key. The **Mark Waypoint** page appears.
- Press the **UP/DOWN** key to highlight the **[OK]** field and press **ENTER** key. Your new location is now marked and stored in memory.

11. At the same time, you should consider writing down latitude and longitude values in the field survey form, in order to cross-validate against data directly downloaded from the GPS device.

12. Finally, save the waypoint by highlighting the **[OK]** button and pressing the **Enter** key.

13. Check that you have saved every new location marked. Thus, you should access to the **Waypoint** page and check out if the new waypoint has been saved with the appropriate name (i.e. school ID).

To access to the **Waypoint** page:

- Press the **PAGE** key and switch to the **Menu** page.
- Press the **UP/DOWN** keys and highlight the "Waypoints" field. Press **ENTER**. The **Waypoints** page appears.

- On the **Waypoints** page, you can view in alphabetical order all waypoints saved.
- Use the **UP/DOWN** key to highlight the alphabetical tab containing the points. Search the last point saved and check that the name has been written correctly.



Step 4. Use UP/DOWN keys to edit the waypoint name



Step 5. Press ENTER key once you have edit each digit



Step 6. Once the waypoint name has been setting, press OK field



Step 7. Press again ENTER key to save in memory the new waypoint



Step 8. Press PAGE key to view the new location in the Map screen

Post-Field Procedures

14. Upon returning to the office, download the data collected with the GPS receiver to a computer.
15. Cross-check latitude and longitude data recorded in the field survey form with the data directly downloaded from the GPS receivers to the computer.
16. Ensure that the system battery will be charged and ready to be used in subsequent surveys.
If your GPS device uses disposable batteries you should consider removing it when battery indicator (go to **Setup** Menu) show less than half charge. When using rechargeable batteries, charging over night before the forthcoming field survey.

7. REFERENCES

- Manual "Using a handheld GPS receiver in field data collection" GAHI - CNTDs
- Quick Start Guide GARMIN GPS Map