

# POCKET SIZE HANDBOOK ON HANDLING OF GPS FOR FIELD STUDIES



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(GTAD-2021)

*Aaranyak*

## **Acknowledgements**

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The pocket size handbook on handling of GPS in fieldwork has been prepared to impart knowledge on basic functions and steps for early career researchers, College and University students and government officials, particularly frontline forest department officials. Therefore, it is a great pleasure for me to acknowledge the preparation of the handbook.

My acknowledgement and high appreciation to Dr. Bibhab Kumar Talukdar, Secretary General and CEO of Aaranyak for the encouragement and financial support to the GTAD and all well colleagues of Aaranyak and well wishers.

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## **1. Global Positioning System (GPS).**

- GPS can be used during day and night.
- Simple to use for the beginners.
- Comfortable for handling and display as it is medium in size.

## **2. Limitation of GPS.**

- It can save 1000 waypoints (location).
- In some GPS external memory card can be used.
- It has in-built political boundary layer
- GPS Satellite signal inside building is very poor and signal gets lost under dense canopy.

### **3. Requirement for using GPS.**

- One pair Duracell AAA size batteries.
- USB cable is used to connect the GPS with computer for downloading waypoints and tracks or to export data from computer to GPS.
- User needs to check track setup (on/off) before doing any survey or work.

### **4. Software used to download data.**

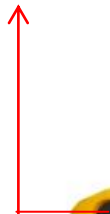
- DNR Garmin.
- Base camp.
- Google Earth.
- Easy GPS.

## 5. Overview of GPS (Garmin GPS 60).

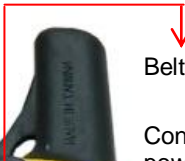




Connector for external GPS antenna



Belt clip mount



Connector for external power supply



Cover



Connector for USB cable



Battery compartment



## **IN (Zoom in):**

- “**IN**” button or key is use in the page (Map page) key.
- Map page contains surveyed tracks and waypoints saved by the user.
- To see the saved locations or to see the propose survey area in detail, “**IN**” button is used. (Example: If in GPS map page, there are 50 waypoints saved, to see one particular way point or group of waypoints one can use zoom “**IN**” button several times and at the same time needs to use “**Rocker**” button to get the correct position).

## **OUT (Zoom out):**

- “**OUT**” button or key is used in the page (Map page) key.

- Map page contains maps already in GPS or survey tracks and waypoints saved by the user.
- “**OUT**” button is used when there are saved waypoints in GPS. For example, for saved waypoints of Dibru-Saikhowa National Park, Pabitora Wildlife Sanctuary and Manas National Park, one can press “**OUT**” button to see all the waypoints at a time in a map page.

### **MARK Key:**

- “**MARK**” button is to save a new location or waypoint of the present location.

### **ENTR Key:**

- “**ENTR**” key is used as “OK”, to open a folder or to save a new waypoint. For example: To save a new waypoint, one has to press “**MARK**” button and press “**ENTR**” key.

### **FIND Key:**

- The function of “**FIND**” key is to search already saved waypoints. For example: If 50 waypoints is saved in GPS and one has to search waypoint serial number 35, with the help of “**FIND**” button the details of waypoint will be viewed.

### **QUIT Key:**

- “**QUIT**” means back page or previous page.

## **POWER Key:**

- Press and hold to turn GPS on/ off.
- Press and release to adjust backlighting and contrast.

## **ROCKER Key:**

- Move Left, Right, Up, or Down to move through lists, highlight fields, on-screen buttons, icons, enter data, or move the map panning arrow.

## **PAGE KEY:**

- One can create page as per requirement from menu.
- Pages like Satellite page, Trip Computer page, Map Page, Compass page etc.

- It is important to keep Satellite page as the first page.
- Create page as per preference. Go to satellite page and visualize on the screen, Press “**Menu**” twice, select “**Setup**” and press “**Enter**” to open setup, Use “**Rocker Key**” to go down and select “**Page Sequence**” and press “**Enter**” button to open. Select “**Add page**” and press “**Enter**” to add pages as required.

### **MENU Key:**

- Press and release to view option for a page.
- Press twice to view the main Menu page.

## 6. How to download Waypoints and tracks from GPS using DNR Garmin Software?

- Install DNR Garmin Software and install port setup by connecting GPS cable with GPS Garmin 60.

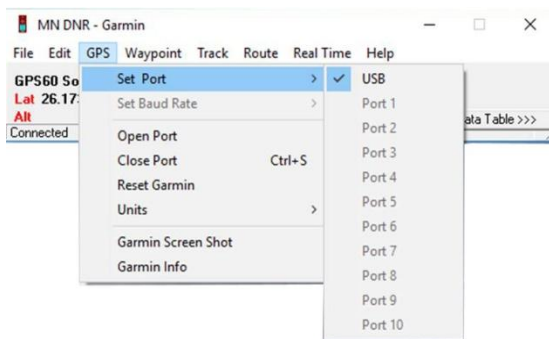
**Step1.** Switch “**ON**” GPS.

**Step2:** Connect cable with GPS and Computer.

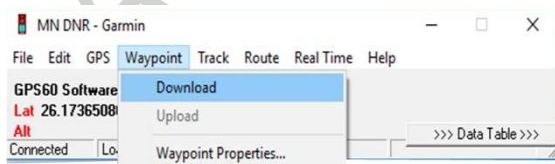
**Step3.** Open DNR Garmin Software.

**Step4.** In DNR Garmin Software, Click on GPS options, Click on Set port and select “**USB**”.

**Step5.** If connected with the software, it will show Lat and Long information in the software.



**Step6.** If one has to download the waypoints from Garmin GPS 60 with the help of DNR Garmin software, click on “**waypoint**” option in the software and click on “**download**” option.





MN DNR - Garmin

File Edit GPS Waypoint Track Route RealTime Help

GPS60 Software Version 2.40 VERBMAP None  
 Lat 26.1736508 Lon 91.83002603  
 Alt EPE

<<< Data Table >>>

DNRGarmin X  
 Received 65 records.  
 OK

	type		long	y_proj	x_pr	
1	WAYPOINT	001	91.79085438	2894267.17426245	3	
2	WAYPOINT	002	91.79074701	2894287.72622816	3	
3	WAYPOINT	003	91.79075832	2894298.86605283	3	
4	WAYPOINT	004	91.79083762	2894316.62707783	3	
5	WAYPOINT	005	91.79098195	2894337.52973081	3	
6	WAYPOINT	006	26.16352829	91.79096460	2894355.97434418	3
7	WAYPOINT	007	26.16372929	91.79091926	2894378.27955237	3
8	WAYPOINT	008	26.16365737	91.79104797	2894370.19392177	3

**Step7.** Click on “file” in Garmin GPS software and set projection for setting projection information and Zone number as per requirement. For example: for the state of Assam, if one can select **UTM WGS 84** with **Zone no. 46N** under Datum’s/Projections.

MN DNR - Garmin

File Edit GPS Waypoint Track Route Real Time Help

Load From > BMAP None

Save To >

Set Projection

Get Projection

ArcMap 9.x Properties

Refresh Apps

Set App Refresh Rate

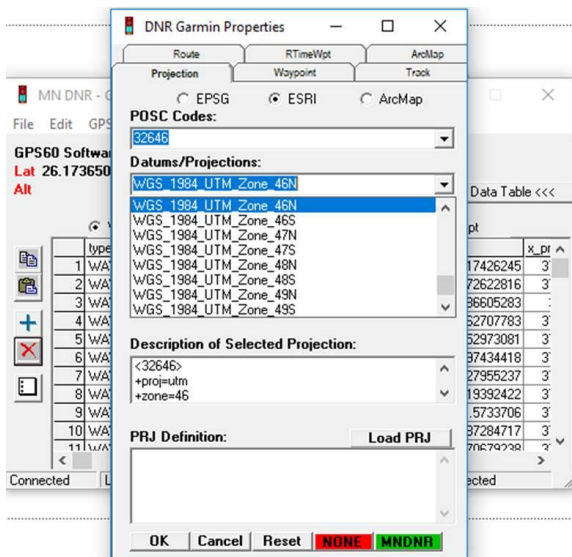
Exit

<<< Data Table >>>

Track
  Route
  RTimeWpt

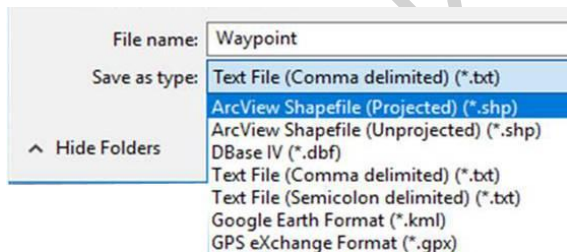
	long	y_proj	x_pr	
26.16272564	91.79085438	2894267.17426245	3'	
26.16291029	91.79074701	2894287.72622816	3'	
26.16301096	91.79075832	2894298.86605283	:	
26.16317198	91.79083762	2894316.62707783	3'	
26.16336191	91.79098195	2894337.52973081	3'	
26.16352829	91.79096460	2894355.97434418	3'	
7 WAYPOINT 007	26.16372929	91.79091926	2894378.27955237	3'
8 WAYPOINT 008	26.16365737	91.79104792	2894370.19392422	3'
9 WAYPOINT 009	26.16331019	91.79122687	2894331.5733706	3'
10 WAYPOINT 010	26.16332335	91.79139694	2894332.87284717	3'
11 WAYPOINT 011	26.16336694	91.79130876	2894326.70679738	3'

Connected 0 of 65 Selected



**Step8.** Click on “**File**” option in DNR Garmin Software and click on “**Save to**” and write the new file name, select the “**Save as type**” option as per requirement for example: For GIS file

format select **Arc View shapefile (Projected)** or for Google Earth format save as **Google Earth “KML”** and save in a folder.



**Step9.** To save a track from Garmin GPS 60, follow **step6** to **Step8**. Instead of Waypoint, one needs to select **“Tracks”** options in the software.

**7. How to download Waypoints and tracks from GPS using Google Earth Pro Software?**

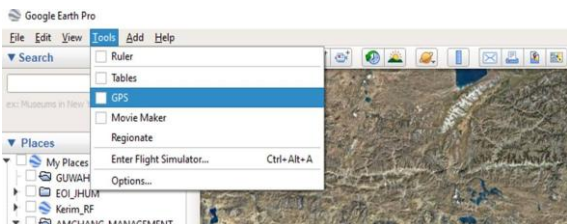
**Step1.** Switch “**ON**” GPS.

**Step2:** Connect cable with GPS and Computer.

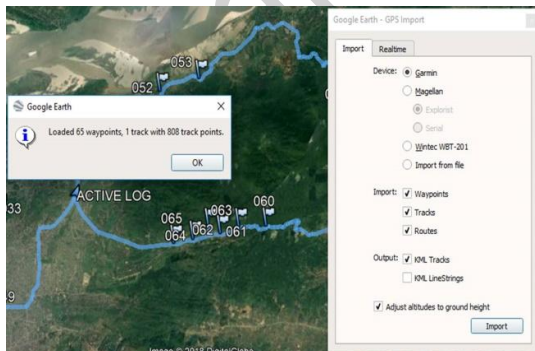
**Step3.** Open Google Earth Software.



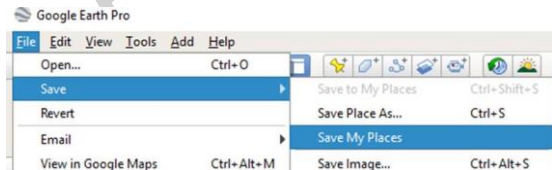
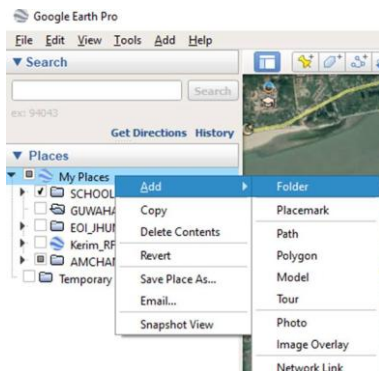
**Step4.** In Google Earth Software, Click on “**Tools**” options and click on “**GPS**” option.



**Step5.** Google Earth – GPS Import option will appear and click on **“Import”** at the bottom.



**Step6.** All the waypoints and tracks will appear in Google Earth Software and need to create a folder and save in My places by click on file-Save-My places.

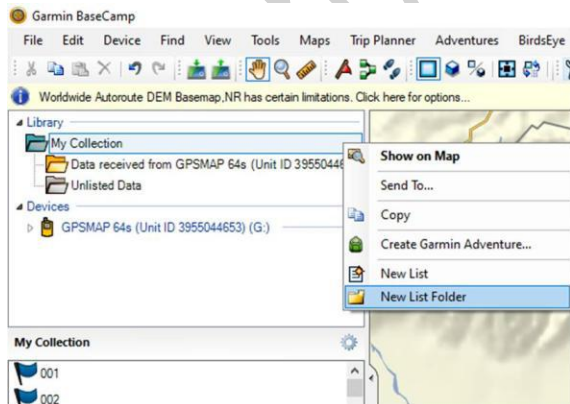


## 8. How to download Waypoints and tracks from GPS using Garmin Base Camp Software?

**Step1.** Switch “ON” GPS.

**Step2:** Connect cable with GPS and Computer.

**Step3.** Open Garmin Base Camp Software.





**Step4.** In Garmin Base Camp, Left panel show Library and Device. Double click on device option and Internal Storage folder will appear. All the saved waypoints and tracks will appear over the map.

**Step5.** Under library, Select My Collection and right click to create your own folder. For example. Survey\_01. Click on “Device” option written on top line near file, Edit, Device. Click on receive from device, select device viewer will appear and click OK.

**Step6.** All tracks and waypoints will appear as file. Drag the file and put inside Survey\_01 folder. Click on “file” option written on top line,

Export “survey\_01”. A warning message will appear and click OK. Save in a drive of a computer with new file name and select save as type as KML. Open Google Earth Pro software to open the saved KML file to view.

## **9. How to upload Grid, boundary and pre defined point layer in KML/KMZ format into GPS using Garmin Base Camp Software?**

**Step1.** Select “My Collection” under library in Garmin Base Camp software. Right Click and select “new list folder” and write the name of a folder-example-Survey\_02.

**Step2.** Select folder “Survey\_02”, Click on file

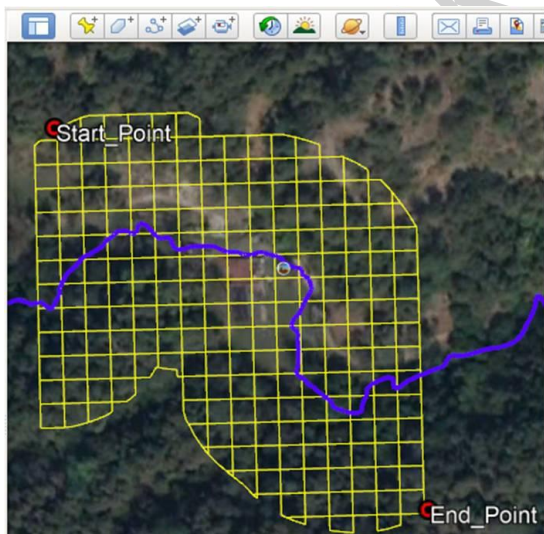
option on top line and click on” import into”. Select the required KML/KMZ file saved into the computer drive and click open. The boundary file will appear in Base Camp under “Survey\_02”folder.

**Step3.** Select “Survey\_02” folder, click on “Device” option on top line, Send to device option, and send “Survey\_02” to device.

**Step4.** Now boundary file is saved into the GPS for visualise and navigation purpose.

**Important note:** It is easier to find a single grid name and visualize the grid KML/KMZ layer in GPS, if the grid layer prepared with continuous

single stretch of one starting and one end node in line feature (add path) tool in Google Earth Pro or any other software.



## 10. Basic data sheet format for field work using GPS.

WP.	Date	Latitude	Longitude	Forest camp	Remark

WP	Date	Latitude			Longitude			F-Division	Remark
		DD	Min	Sec	DD	Min	Sec		
01		26	43	14.1	92	36	7.1		Pugmark

WP – Waypoint/ GPS serial no., DD – Degree, Min – Minute, Sec – Second.

## 11. How to see a satellite Page?

**Step1.** Power “ON” button on the top side of GPS 60.

**Step2.** After Power “ON” and press “PAGE” button showing “Acquiring satellite” and wait for 2 to 3 minutes and by default Satellite page appear.



**Step3.** In the satellite page one can see GPS battery status, Accuracy, no. of Satellite signal received, signal strength etc.



**Step4.** If the oval shape symbols with number shown in fill **black** colour, it means that particular GPS satellite signal is receiving. On the other hand, if the symbols without any fill colour, it means it has not received signal.

**Step5.** After receiving 3 or more satellite signals, Latitude and longitude values of the present position of the GPS appears in the satellite page.

**Step6.** If the number of GPS satellite signals received is more than the accuracy will be high.

**Note:** In advance GPS set, press “**Page**” button continuously to see the “**Satellite**” option.

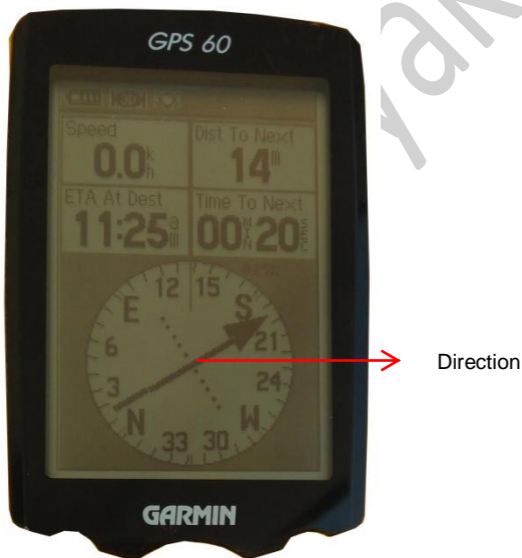


Satellite page will automatically appear on the screen.

## 12. How to see compass in GPS?

- The compass page uses traditional navigation to display your current direction of travel and keep headed towards your destination. When you are navigating to a destination, the compass Page provides navigation data and directions, such as bearing, current speed, estimated time of arrival, and, more.
- To open compass page press “**Page**” button repeatedly.

- If you want to stop navigating, press “Menu” from the compass page, use the “Rocker” key highlight ‘stop Navigation’ and press “Enter”.



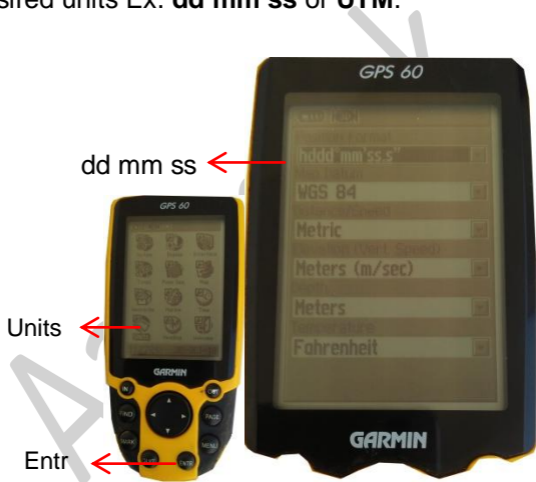
### 13. How to change Latitude/Longitude Units?

**Step1.** Press “MENU” button twice.

**Step2.** Select “Setup” folder with the help of rocker key.



**Step3.** Press “**ENTR**” button to open the “Setup” folder and select on “**UNIT**” folder and again press “**ENTR**” button to change the desired units Ex. **dd mm ss** or **UTM**.



**Step4.** Press ENTER button to open the unit folder.

**Step5.** Select posit format and change the format by press ENTER as hdd mm ss.s and again press enter and press QUIT button to reach in Satellite page.

**Note:** In advance GPS set, Select “**Position Format**” instead of “**Unit**”.

**14. How to setup the track on or off and clear?**

**Step1.** Press “**Menu**” button two times to see the “**Track**” folder in the GPS display.

**Step2.** Select “**Track**” folder by “**Rocker**” key & press “**Entr**” button to open the “**Track**” folder.

**Step3.** Select “**ON**” button for showing tracks on “Map page” and “**OFF**” button does not show tracks in GPS



At the initial stage before fieldwork, if needed select Track “**On**” button.



**Note:** In advance GPS set, Press “**Menu**” button twice, Select “**Setup**” and press “**Enter**” to open “**Setup**” folder, Select “**Track**” and press “**Enter**”, select “**Track log**” and press “**Enter**” to select as per requirement.

To delete track in advance GPS set, press **“Menu”** twice, select **“Track manager”** and press **“Enter”**. All date wise track list will appear. To delete individual track, select a particular track date from the list and press **“Enter”** Go downward using **“Rocker key”** and select **“Delete”** and press **“Enter”**, select **“Yes”** and press **“Enter”**.

To delete all track, select and track from the date list, Press **“Menu”**, and **“Delete all saved”** will appear. Press **“Enter”** and select **“Yes”** and press **“Enter”**.

## **15. How to save track with date?**

**Step1.** To save surveyed track press **“Menu”** twice, Select **“Track”** and press **“Enter”** to open track folder and select **“Save”** and it will show

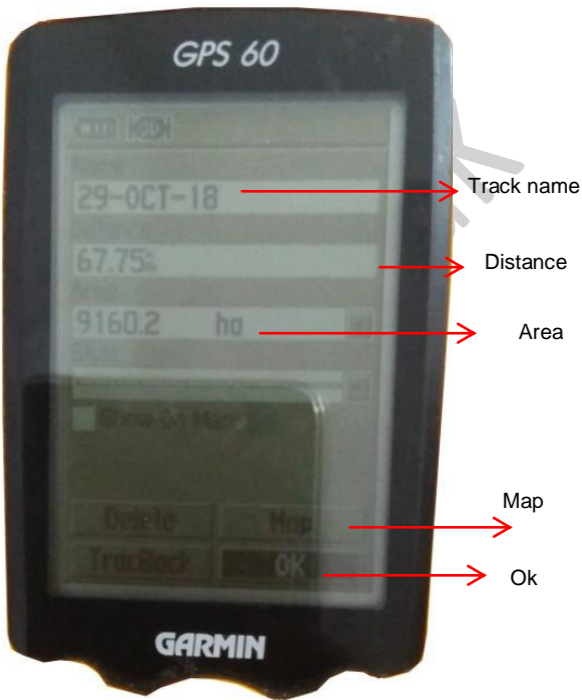


as **“Do you want to save the entire track”** and select **“Yes”** option with **“Rocker”** key and press **“Enter”** button.

**Step2.** By default track file name will appear or can be changed manually with respect to date for ex. 29-OCT-18 and select **“Ok”** button with **“Rocker”** key and press **“Entr”** to save track.

**Note:** In advance GPS set, press **“Menu”** twice, and select **“Track Manager”**. Open **“Track Manager”** by press **“Enter”**.

Select **“Current Track”** and press **“Enter”**. Select **“Save track”** option from the list, Enter name and select **“Done”**. Press **“Enter”** and select **“No”**.



## 16. How to save a new location/ waypoint?

**Step1.** Press the “**Mark**” key from any page. The MARK waypoint page appears.



**Note:** It is important to note that before saving a new location or waypoint, make sure that latitude and longitude information will appear on the satellite page or in the map page.

**Step2.** It will show by default waypoint serial number, for example 066 with its latitude, longitude, elevation, date, time etc.

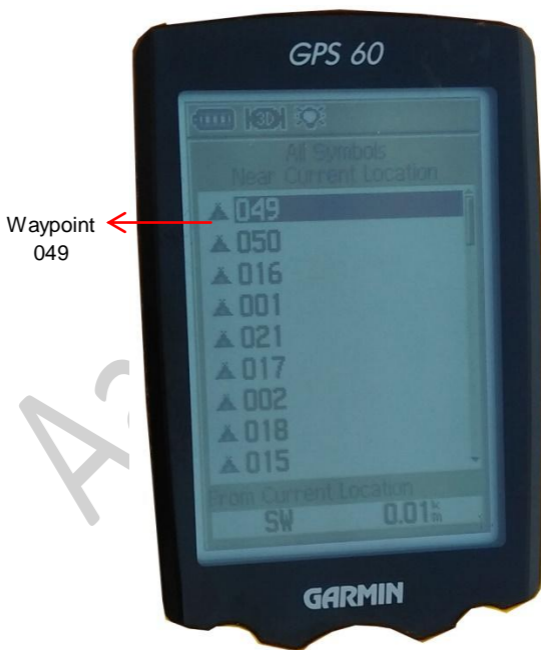
The waypoint serial number can be changed by selecting waypoint serial number. Finally, select “**OK**” button with “**Rocker**” key and press “**Entr**” button to save a new waypoint. If the user does not want to save the waypoint, press the “**QUIT**” button to exit.

**17. How to search already saved waypoints and its information?**

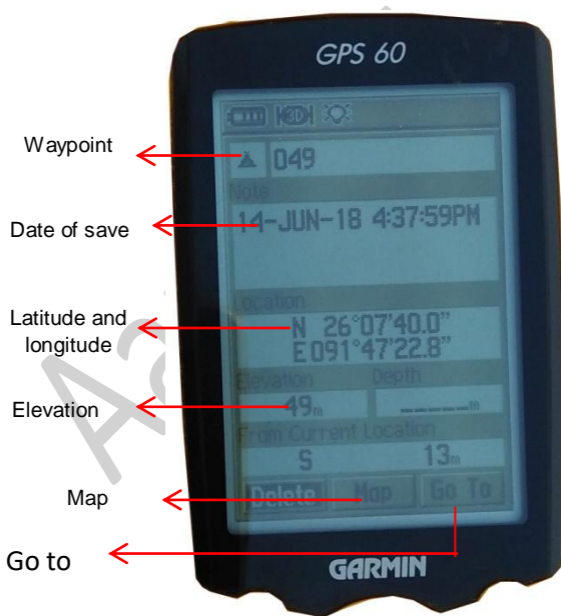
**Step1.** Press **“Find”** button and **“Waypoint”** folder under selection will appear or select the **“Waypoint”** folder with **“Rocker”** key and press **“Entr”** button.



**Step2.** Press “**Entr**” button to open “**Waypoint**” folder and waypoint numbers list will appear.



**Step3.** Select any waypoint number with the help of “**Rocker**” key and press “**Entr**” to see the details.



**Step4.** Select “**Map**” or “**Go To**” with the help of “**Rocker**” key and press “**Entr**” and it will show the particular waypoint in “**map page**”.

**Note:** In advance GPS set, to see the details of any saved waypoints, press “**Menu**” twice, select “**Waypoint Manager**” and press “**Enter**” to open. List of saved waypoints with serial no. will appear. Select the desired waypoint serial no. and press “**Enter**”. All the details of particular waypoint will appear such as latitude and longitude, elevation etc.

## **18. How to delete a waypoint?**

**Step1.** Press “**Find**” button and “**Waypoint**” folder under selection will appear or select the “**Waypoint**” folder with “**Rocker**” key and press “**Entr**” button.



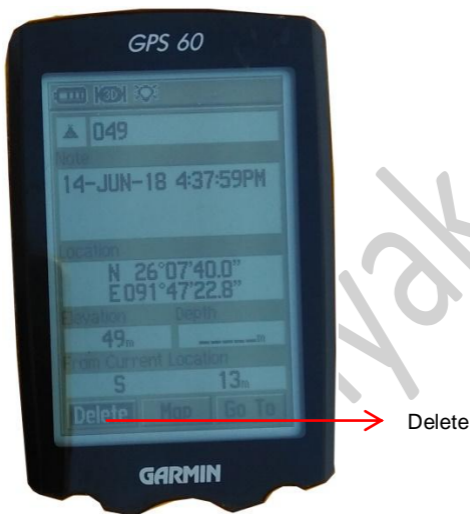
**Step2.** Press “**Entr**” button to open “**Waypoint**” folder and waypoint numbers list will appear.

**Step3.** Select any waypoint number with the help of “**Rocker**” key and press “**Entr**” to see the details.

**Step4.** Select “**Delete**” option with the help of “**Rocker**” key and press “**Entr**”.

**Step5.** A message will appear *as Do you really want to delete waypoint 23?*

**Step6.** Select “**Yes**” with “**Rocker**” key and press “**Entr**” to delete a waypoint and when you are finished, press “**QUIT**” to exit.



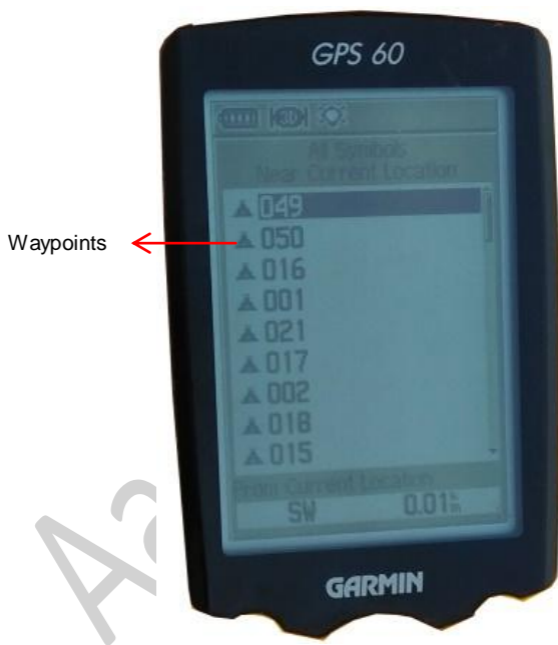
**Note:** In advance GPS set, to delete a waypoint, press “**Menu**” twice, select “**waypoint Manager**” and press “**Enter**”. Select the desired waypoint from the list and waypoint details will appear. Press “**Menu**” button once, select

**“Delete”** option from the list and press **“Enter”**. A message will appear as **“Do you really want to delete waypoint?”** Select **“Yes”** and press **“Enter”**. The particular waypoint will delete.

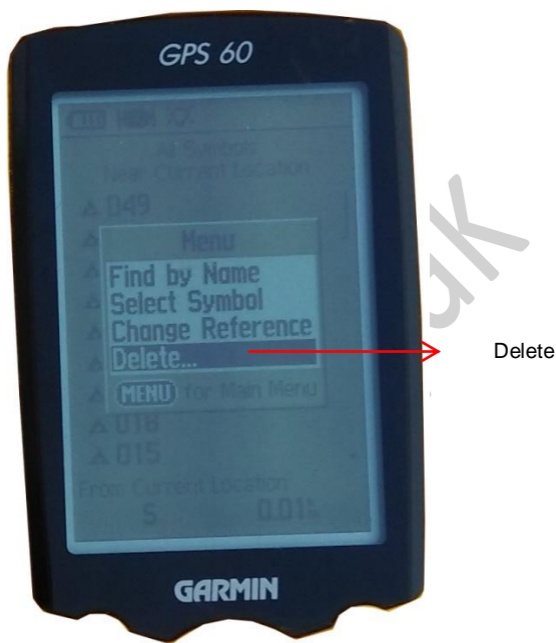
## **19. How to delete all waypoints?**

**Step1.** Press **“Find”** button and **“Waypoint”** folder under selection will appear or select the **“Waypoint”** folder with **“Rocker”** key and press **“Entr”** button.

**Step2.** Press **“Entr”** button to open **“Waypoint”** folder and waypoint numbers list will appear.



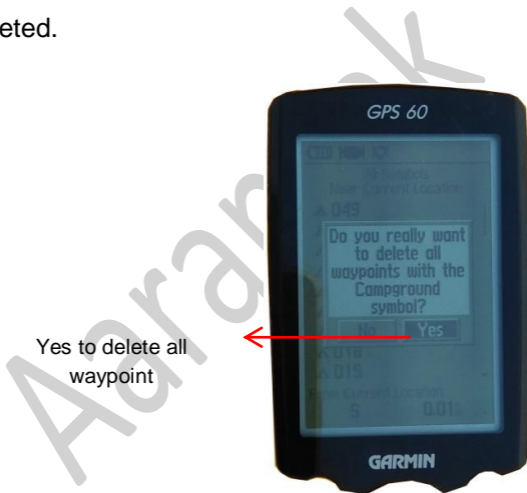
**Step3.** Press “**Menu**” button once and delete option will appear.



**Step4.** Select **“Delete”** option with the help of **“Rocker”** key and **Press “Entr”** button.

**Step5.** A message will appear as ***Do you really want to delete all waypoint?***

**Step6.** Select **“Yes”** and all waypoints will be deleted.



**Note:** In advance GPS set, to delete all waypoint, press **“Menu”** twice, select **“waypoint**

**Manager**” and press **“Enter”**. Select any waypoint from the list and press **“Menu”** button once, select **“Delete All”** option from the list and press **“Enter”**. A message will appear as **“Do you really want to delete all waypoint?”** Select **“Yes”** and press **“Enter”**. All waypoints will delete.

## **20. How to manually enter Latitude and longitude values (distant location) and save in GPS?**

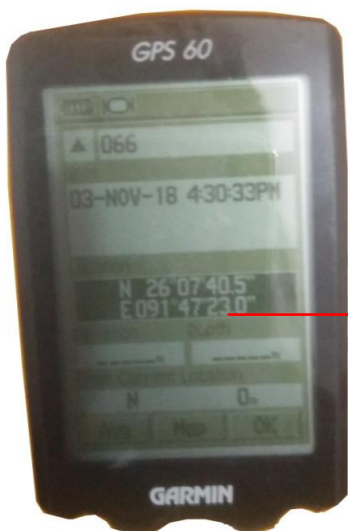
**Step1.** If Latitude and longitude information is showing in the satellite page, means GPS is ready to use. Press **“Mark”** button from any page. The **“Mark”** waypoint page appears.

**Step2.** It will show by default waypoint number. For example, 049 with its latitude, longitude, elevation, date, time etc., and press “**Entr**”.



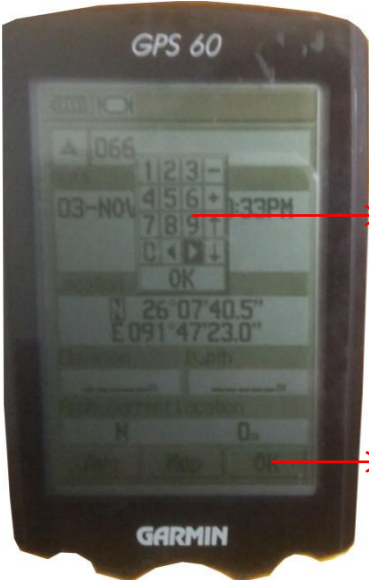
**Step3.** Select “**Location**” latitude and longitude values with the help of “**Rocker**” key.





**Location:**  
Latitude and  
longitude

**Step4.** Press “**Entr**” button and edit the latitude and longitude values by user and select “**OK**” with the help of “**Rocker**” key and press “**Entr**”.



**Edit** Latitude and longitude

**Ok**

## 21. How to setup trip computer in GPS?

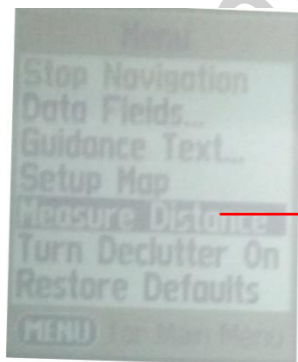
**Note.** Trip computer give the measurement of total distance covered. For example, if a surveyor set the trip computer as “0” just before starting the survey. While survey or walk, it will show the distance travelled and at the end of survey, the surveyors know the total distance covered during the survey.

**Step1.** Press “**Page**” button continuously and “**Trip Computer**” page will appear with trip details in meter, Kms etc. press “**Menu**” once and select “**Reset**” option and select “**Reset Trip Data**” and press “**Enter**”. A message will appear as “Are you sure you wish to reset all trip data (**timers, averages, distances etc**)?” Select “**Yes**” and press “**Enter**”.

## 22. How to measure distance from one location to another location?

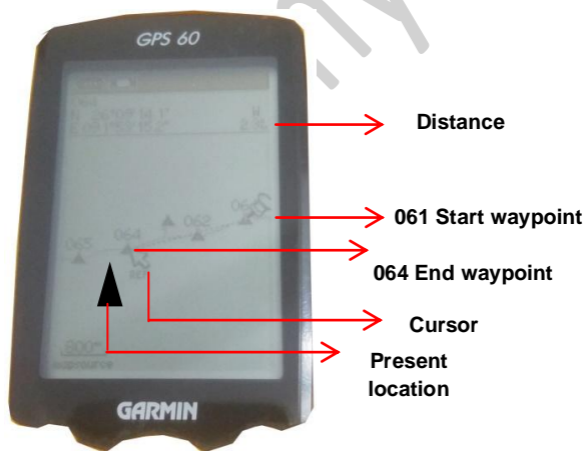
**Step1.** Press **“Page”** button to see the Map page.

**Step2.** Press the **“Menu”** key to display the Map page options. Use the **“Rocker”** KEY to highlight **“Measure Distance”** and press **“Entr”**.



**Measure  
distance**

**Step3.** Map page will open. Using “**Rocker**” key move cursor and select any waypoint by pressing “**Entr**”. For example **061**, from this point the user wants to measure and select waypoint **064** as end measuring point. The distance will appear on the top corner of the display.



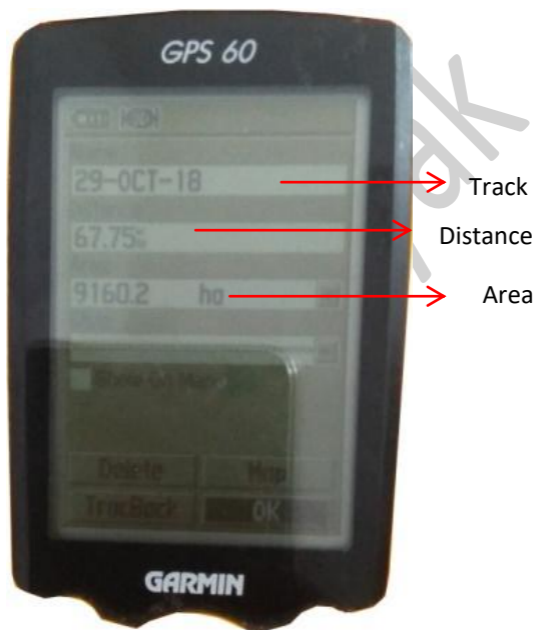
**Note:** In advance GPS set, to measure distance from current location, press “**Page**” button to open “**Map page**”. The present location cursor, waypoints and tracks appear on the screen, press “**Menu**” once, and select “**Measure Distance**” option from the list and press “**Enter**”. Using “**Rocker Key**” move your cursor arrow from the current location (Shown in Black triangle). While moving the cursor, a line with distance in Km will appear.

### **23. How to calculate an area?**

**Step1.** Press “**Menu**” button two times.

**Step2.** Select the save track file name with the help of “**Rocker**” key.

**Step3.** Press “**Entr**” to see the area and distance details in measuring units.



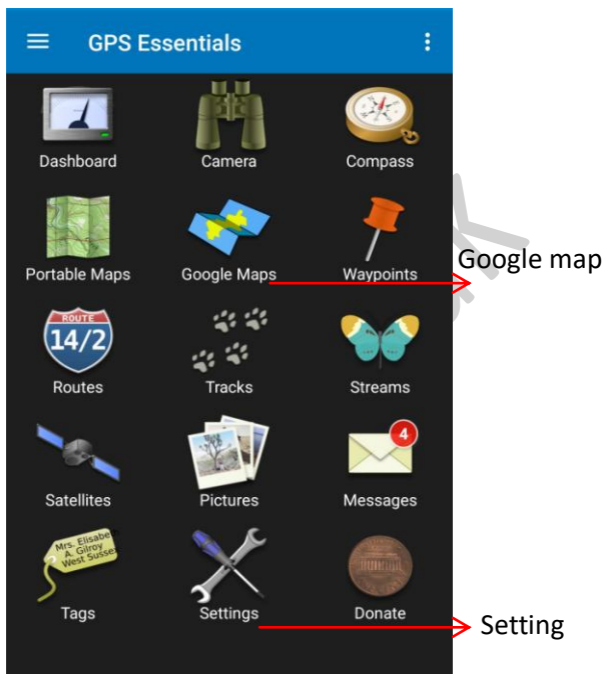
**Note:** In advance GPS set, to measure area calculation, Press “Menu” button twice and scroll down with “Rocker Key”, select “Area Calculation” and press “Enter”. Press “Start” and walk around the area to be measure. When reach on end location, press “Calculate” option with “Enter” key. Area in units will appear on the screen. Units can be change under “Change Units” option and select “Save track”.

## **24. How to change latitude and longitude position format in a mobile app “GPS Essentials”?**

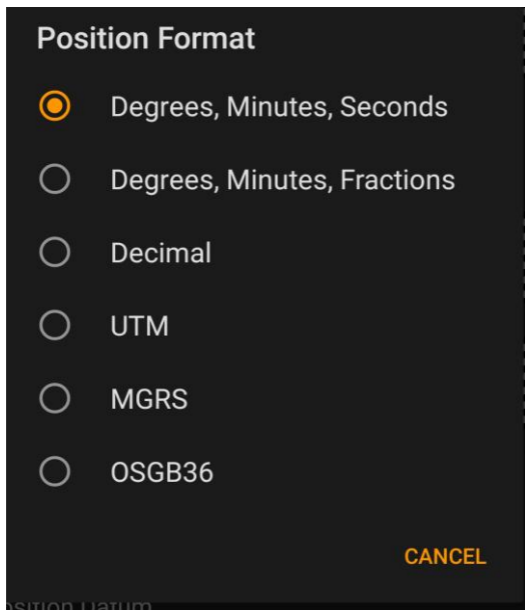
**Step1.** Enable location of mobile and open app.

**Step2.** Open Setting.





**Step3.** Open position format and select the desired format.



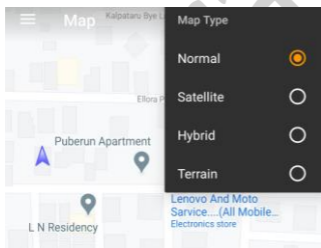
**25. How to see the current location with hybrid satellite image on the background?**

**Step1.** Open Google map on the dashboard of GPS Essential.

**Step2.** Arrow shaped cursor shows the current position. Zoom into the area.

**Step3.** On the top right corner, Select the three dots and select Map type.

**Step4.** Select “Hybrid”.



**Step5.** Now the background shows the hybrid image to see the area in detail.

## **26. How to save a new waypoint (location)?**

**Step1.** Zoom over the arrow cursor.

**Step2.** Select the 3 dots on the top right corner.

**Step3. Select** “Add waypoint” option.

**Step4.** One point will appear on the arrow (This is the new waypoint).

**Step5.** Select the point and select “Edit details”.

**Step6.** In the “Overview” edit the details or give waypoint serial number or name as per requirement.

**Step7.** Now the waypoint has been saved and click on arrow button on top left corner to go back to the map page.

**Step8.** To send the waypoint file through email, go to dashboard of GPS Essential and select “Waypoint”

**Step9.** List of way points will appear and go to top right corner on the three dots and export. Now download the file and open in Google Earth or other GIS software’s.

## **27. How to use track tool in GPS Essential?**

**Step1.** On the map page select the three lines on top left corner.

**Step2.** From the list, select “**All tracks**” option.

**Step3.** Select Plus symbol on bottom right corner.

**Step4.** Select “**Track**” within create stream.

**Step5.** Select start to begin tracking.

**Step6.** Now tracking path will start appearing on the map and select stop symbol (In rectangular shape above the map on left side).

**Step7.** Go back to all tracks and select the desired track name.

**Step8.** Select top right corner on three dots and select export.

**Step9.** Select Gmail or other options and send the track file as attachment.

**Step10.** Download and open in Google Earth Pro or other GIS software's.

## Present team of GTAD



*Arup Kumar Das is associated in Geo-spatial Technology and Application Division (GTAD) Aaranyak since 2008. Currently, Manager of*

*GTAD and studied geography. He studied B.Ed, M.Phil & PhD (Currently Pursuing) from the dept. of Geography, Gauhati University. He carried out field work in most of the Protected and non protected areas of Assam, Nagaland, Meghalaya, Arunachal Pradesh, West Bengal and parts Mussori and Jammu. His area of interests includes Remote Sensing, GIS, GPS and applications in wildlife research and conservation.*



*Ms. Madhumita Borthakur, Spatial Database Officer, GTAD, Aaranyak has graduated in Geography and Masters in Sociology. She has*

*experience in the field of Remote Sensing & GIS with demonstrated history of working from last ten years, skilled in Quantum GIS, ArcGIS, and Erdas.*



*Avishek Sarkar, GIS Assistant, GTAD, Aaranyak studied M.Sc in Ecological Restoration from Dibrugarh University, Assam and pursuing PhD*

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