Gmap4
How To Use Gmap4 Offline
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For more documentation see the Gmap4 Help page
Also see the "What is new" page

Summary

With just a little work from you, Gmap4 lets your smartphone perform some of the same key tasks as GPSs costing $100s, including **displaying your location on high resolution topographic maps while your phone is offline**.

Even if the only thing you do before leaving home is start Gmap4 in your browser, then as long as your batteries last and you do not close that browser tab or turn your phone off, then you can see the coordinates for your position by touching Menu ==> "My location" and then touching the circle symbol that appears. If your GPS is off to conserve battery power then you will need to turn it on first.

1.   Introduction

Gmap4 is a browser app, not a native app. Typically in order for a browser app to do anything, the browser has to be online. If you follow these instructions then even though Gmap4 is offline you can still do the following things with your smartphone, tablet or other mobile device:

- **View a limited number of basemaps (topo, aerial, etc) and/or GIS overlays**.
- Periodically turn on Menu ==> "My location" and **see your position on the map** and display your position in the current coordinate format.
- Turn on Menu ==> "My location" and leave it on. Let the symbol follow you as you move just like a dedicated GPS.
- Continue viewing a data file showing your planned route.
- Touch a waypoint symbol and see a popup with a description.
- Change the coordinate format.

There is nothing to buy, nothing to download, nothing to install. The same Gmap4 browser app you use when you are online can also be used when you are offline. More GPS features will be added in a future update.

2.   Caution - Mobile browsers can crash

If you mobile browser stops working for any reason then you will not be able to restart Gmap4 until you are online. When going into the back country you should always carry a paper map and compass and know how to use them. You also need to bring along your common sense.

3.   Things to do before you go offline

a.   Start Gmap4

This is a crucial step. You can only start Gmap4 when your browser is online. Gmap4 is based on the Google map API (Application Program Interface) and the browser has to be online so the code for that API can be downloaded from Google's servers.

If you want a data file to be on the screen when you are offline, then use a Gmap4 link that will load the data file via the 'q' parameter. See also the tip further below about opening Gmap4 with the unique **map-in-a-link** feature.

You must leave Gmap4 running in this browser tab. If you close this browser tab or turn your phone completely off, then your Gmap4 session is over and you will only be able to start Gmap4 when your browser is online again.

b. Let Gmap4 find your location one time

Turn on your GPS and do Menu ==> My location. The map will center where you are.
Do Menu ==> My location again to turn this feature off.
Turn off your GPS to conserve batteries.

The purpose of this step is to make certain that your phone has a current copy of the GPS almanac. The almanac is data that tells your phone where each GPS satellite is located in the sky. **Your phone must have a current GPS almanac otherwise it cannot report your position.** Most phones can download a new copy of the almanac very quickly via the cell towers. The ability to do so is called Assisted GPS (**A-GPS**).

Note: If you are not in range of any cell towers and turn your GPS on and then ask Gmap4 (or any other software) to display your location and it does not work, the likely reason is that your phone does not have a current copy of the GPS almanac. Good news: If you leave your GPS on, your phone will download the almanac from the GPS satellites. Bad news: The transmission rate is slow and it will take **12-15 minutes** for your phone to download the almanac and then report your position.

The best plan is try to remember to grab a fresh GPS almanac before you go offline.

Many smartphones have a GPS chip that can accept data from both USA GPS satellites and Russian GPS satellites (GLONASS). This is an excellent feature that does two things. First, it enables your phone to get a lock on enough satellites (minimum is 3) in difficult situations in order to report your location. Difficult situations include heavy trees and/or high terrain masking a lot of the sky. Second, GLONASS data increases the accuracy of the position that the phone reports. However, your phone needs a current copy of the almanac for the GLONASS satellites in order to use that data.

I do not know if the Russian almanac data is downloaded to your phone via A-GPS or not. Nor do I know of any way to ask a phone if it has a current USA or Russian almanac. If your phone can only use data from the USA satellites (since your phone lacks a current almanac for the Russian satellites) then the best accuracy you can expect is **around 50 feet**. For many purposes that accuracy is good enough.

However, if (1) the GPS chip in your phone is capable of using the GLONASS data and (2) you want your phone to report the best possible position (**around 15 feet**), then I recommend turning on the GPS in your phone and leaving the phone someplace with a good view of the sky so you can be certain that your phone has a current Russian almanac. Technically this should only take 12.5 minutes but it might be wise to wait 15 minutes.

c. Load maps into the browser's cache

Yes, you can see topo maps, aerials and GIS overlays on your phone's screen while your browser is offline. However, there is an important limitation. The maps and overlays that you want to

view offline must first be stored in the browser's cache. It is not clear how much data can be stored in that manner.

Each basemap and GIS overlay is a series of jpg or png image files. Each image file is one "tile" and covers a screen area that is 256 pixels x 256 pixels. When you use Gmap4 to look at a basemap or overlay, the browser (1) fetches enough tiles from a server to fill your screen, (2) displays those tiles and (3) stores a copy of the tiles in the browser's cache.

<mark>Key concept:</mark> If your browser's cache already holds the map area (i.e. image files) that you want to see on the screen, then **your browser can display that map while it is offline** since it does not have to fetch the image files (tiles) from a server. To load image files into your browser's cache all you need to do is display that area on your phone's screen.

How much map area can the browser's cache hold? I do not know. And no doubt this depends on the browser. Can mobile safari hold a bigger area than mobile chrome? My testing indicates that the cache will readily hold the map area that anyone is likely to cover on foot during a day hike. Further empirical testing is need to get a feel for the maximum map area a given browser can hold in its cache.

> Want to do your own test? Great! **Do this first part online.**
> I suggest you pick a road between two towns. Display any basemap. Decide on the zoom level for your test. Now drag the map from one town to the next.
>
> Each zoom level has its own set of tiles. To see the zoom level touch Menu ==> Link to this map. The "z" parameter in the link shows you the zoom level.
>
> **Do this next part offline.**
> Turn off the phone's data connection.
> Turn off the phone's wi-fi.
> Drag the map back to the first town (or do Menu ==> Search).
> If the tiles for the first town re-appear on your screen, then all the tiles for the area between the two towns are stored in your browser's cache.
>
> Since your browser is now **offline**, the only way it can refresh the screen with different tiles is to get those tiles from the browser's cache. You can confirm that your browser is offline by dragging the map to one side. You should soon fall off the edge of the world into a white area. That white area represents map tiles (image files) that you did not load into the browser's cache as you were dragging the map.

Before a trip simply display the same map that you want to see offline and drag the map to cover the area of your trip. Doing this will cause your browser to cache those tiles (image files).

Remember:
- • The best quality topographic maps are called "t4 Topo High".
- • The zoom level you use while dragging the map is the same zoom level that you will be able to use offline.
- • After loading map tiles into the browser's cache you must leave Gmap4 running.

If you want to use maps offline at two different zoom levels, then you must load both sets of tiles into the browser's cache while your browser is online.

If you want to use both topos and aerials offline, then you must load both sets of tiles into the browser's cache while your browser is online.

At some point the browser's cache will be full and any new map tiles that are stored in the cache will start to overwrite the oldest map tiles in the cache.

Here is a tip that *might* double the map tiles that can be cached. This tip will work if each link you open with your browser has its own amount of cache space. Simply open Gmap4 in a second browser session. Perhaps you use the first browser session to cache "t4 Topo High" map tiles and the second browser session to cache google aerial tiles. However, this tip will *not* work if all open browser links share a common amount of cache space.

==Caution:== If all open browser tabs share a common amount of cache space and you have filled that cache with map tiles, then any subsequent browsing you do will likely start to overwrite map tiles. The solution here is to use one browser for caching map tiles and a **different browser** for checking the weather, etc.

4. <ins>**Things to do at the trailhead**</ins>

Turn on your GPS.
Do Menu ==> My location.
This is particularly useful if you have loaded any basemaps (such as a topo map) into the browser's memory. You can confirm that all this is working fine when you see the screen refresh and display the basemap you loaded into the browser's memory and the location symbol in the center of the screen at the trailhead.
Do Menu ==> My location to turn that feature off.
Turn off your GPS to conserve your battery. Sure, you can leave the GPS on and the location symbol will follow you over the basemap as you move. But your battery will drain faster.

In case your phone can use data from the Russian GLONASS satellites but you did not have time to download the Russian almanac from the satellites, you could do that at the trailhead while you are getting ready to start your trip. Just turn your GPS on and put your phone where it has a good view of the sky. This takes at least 12.5 minutes.

5. **Things to do during your trip**

If your browser has a basemap in its cache and you decided to leave your GPS on, then anytime you look at the screen it will show your location on the map.

If your GPS is off (to conserve batteries) then you will need to turn it on first.

You can touch the location symbol to see your coordinates. This display uses the current coordinate format. You can change the coordinate format via the Menu button.

6. **Practical tips**

    a. **Find your position on a paper topo map**

Assume you are carrying a paper USGS topographic map with a UTM grid printed on it. Those grid lines are on a 1km spacing. You could use the Menu button to change the coordinate system to UTM. Then adjust the zoom so your screen is showing a 1km grid. Turn on your GPS and do Menu ==> My location. You can look at your location within the 1km box on your screen and quickly find the same spot on the paper topo.

This tip will work fine even if you have not stored any basemaps in the browser's cache.

    b. **See your position on the US National Grid**

Use the Menu button to change the coordinate format to USNG. Even if the screen is not displaying any basemap, the USNG lines and labels will appear. If you do Menu ==> "My location" you will see your location within the grid. Touch the location symbol to see your USNG coordinates.

    c. **Use your phone's GPS with a map-in-a-link**

Short version: Use Gmap4's map-in-a-link feature to plan your trip. You can then load those map tiles **along with your planned route** into the browser's cache. Use your phone's GPS to stay on route.

Longer version: Map-in-a-link means a Gmap4 link that includes parameters that will (1) add waypoints to the map and/or draw lines on the map. These parameters use the same syntax that is used by the delimited text files that Gmap4 can read. Here are the steps to make your own custom map-in-a-link:

1. Menu ==> Draw and save

2. Select "Waypoint and linepoint". Continue.

3.   Click the map to mark you route.
       Each point you make is draggable. Rightclick any symbol for a context menu that lets
       you delete/insert/edit your points.

4.   To change the default name for any waypoint and/or add a description, rightclick the
       symbol and select "Edit this point".

5.   When done marking your route, right click any point and select either "Gmap4 link - No
       description" or "Gmap4 link - With description". Copy the link you see.

This is the link that you will use to open Gmap4 and load map tiles into your browser's memory. When you are doing the trip and your browser is offline, the waypoints and line marking your route will be on your phone's screen. You can turn on Menu == "My location" to see how close your position is to your planned route.

Below is a sample map-in-a-link I made for a cross country ski tour at Mt. Rainier. This link also uses the coord parameter to turn on a UTM grid and does ==not== have either a z (zoom) or ll (map center) parameter. The lack of a z and ll parameter means that when the map opens on your phone it will automatically be centered and zoomed so that all of your planned route is on the screen.

If the long link causes you any trouble then just use a free link shortening service such as
https://bitly.com/

https://mappingsupport.com/p/gmap4.php?t=t4&coord=utm&label=on&markers=line=on%20width=2%20color=ff0000%20linesymbol=off%20dash=off||46.786368,-121.735876^1^^default||46.786368,-121.735876^2^^default||46.791980,-121.738043^3^^default||46.797562,-121.735682^4^^default||46.803790,-121.729546^5^^default||46.803820,-121.726198^6^^default||46.800588,-121.723838^7^^default||46.796093,-121.718988^8^^default||46.793038,-121.716886^9^^default||46.787602,-121.721005^10^^default||46.783194,-121.722894^11^^default||46.777023,-121.729760^12^^default||46.769439,-121.733150^13^^default||46.769616,-121.743193^14^^default||46.774613,-121.743278^15^^default||46.777081,-121.740446^16^^default||46.778904,-121.732635^17^^default||46.784781,-121.726112^18^^default||46.789424,-121.725426^19^^default||46.791187,-121.729374^20^^default||46.785604,-121.734095^21^^default||line=off

       d.   <u>Use your phone's GPS with a property line map</u>

I own PropertyLineMaps.com and produce online property line maps for clients. One deliverable is a Gmap4 map-in-a-link. The coordinates in that link represent approximate corner coordinates for the client's land. Clients of that service can use Gmap4 on their smartphone either online or offline to locate their approximate property corners and property lines.

7.   "Who knew" any of this was even possible

To the best of my knowledge, this is the first time that the ability of a browser-based map app to work offline and do a bunch of really useful things has been written up such that anyone willing to read the instructions can make use of this kind of capability. I only started to think about this possibility and do proof-of-concept testing a couple of months ago.

No doubt there is more to learn and share about this capability. For example, are some browsers better than others for using Gmap4 offline. For those adventurous souls among you who play with this and make your own discoveries about what works and what does not, I would enjoy hearing from you. You can email me through my contact page:
https://mappingsupport.com/p/gmap4_contact.html