GPS Essentials Manual

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Covers Version 5.0.0

The latest version of this document is available on https://www.gpsessentials.com

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Contents

1. Welcome
    1. Get Familiar With Android
    2. About This Manual
    3. Support
    4. Training Videos
    5. Installation
    6. Storage
2. Start Screen
    1. Navigation Drawer
    2. Activities
3. Domain Model
    1. Streams GPS Essentials Creates
    2. Categories
    3. Styles
    4. Stream Type
    5. Granularity
4. Dashboard
    1. Adding, Moving and Removing Widgets
    2. Using Widgets
    3. Altitudes
    4. Setting the QNH
    5. Edit Mode, Themes and Fonts
    6. Multiple Configurations
    7. Available Widgets
5. Camera
    1. Where Pictures Go
6. Compass
    1. Buttons
    2. Tracking Angle
    3. Audio Output
    4. Calibration
7. Portable Maps
    1. The Map
    2. Dial Menu
    3. Choosing a Map
    4. Using Maps Offline
    5. Turning and Following
    6. Dashboard Split View

8. Google Maps
    1. The Map
    2. Waypoints
9. Streams
    1. Selecting Streams
    2. Stream View
    3. Creating New Nodes
    4. Mark/Copy/Move
    5. Add Elements
    6. Cards
    7. Charts
    8. Categories
    9. Motion Modes
    10. Altitude
    11. Import
    12. Export
    13. Share
    14. Shared Streams
    15. Edit Waypoint
10. Routes
    1. The Route Card
    2. While You Navigate
    3. Auto Skip
    4. Straight Line Routes
    5. Directions
11. Tracks
    1. Track Control
    2. While Recording
    3. Stop Recording
    4. The Track Card
    5. The Chart
    6. How a Track Is Drawn
12. Waypoints
    1. Creating Waypoints
13. Satellites
    1. Getting a Fix
14. Pictures
    1. Viewing a Picture
    2. Transferring Pictures
    3. Saving Memory When Processing Pictures
    4. Pictures from Other Apps

15. Messages
    1. What You Find Here
    2. Read and Unread
    3. Working with Messages
16. Tags
    1. Adding and Removing Tags
    2. The Tags List
17. Settings
    1. GPS Readout
    2. Presentation
    3. Routes
    4. Saved Image Meta Data
    5. Maps
    6. Miscellaneous
    7. Privacy
    8. Debug
    9. Saving Battery
    10. Account
18. Support the App
19. Scripting
20. Appendix A: All Step-By-Steps
21. Appendix B: Error Reports
22. Appendix C: Versions
    1. Recent Versions

Welcome

Welcome to GPS Essentials, the Swiss Army knife of GPS navigation on your Android phone. This document gives you a brief overview of what you can (and cannot) do with GPS Essentials. You will rarely find step-by-step instructions here. Please also have a look into the help pages available within the app if you run into problems.

When we started with GPS Essentials, Android was the new kid on the block and we wanted to see how cool it really is. So we put together a satellite sky view, a map and a waypoint database and called it GPS Essentials. Both Android and GPS Essentials grew up since then, and we proudly present what we believe is the most universal GPS tool that you can get for your mobile device.

GPS Essentials is used by pedestrians, car drivers, motorcyclists, mountain bikers, geocachers, pilots, geologists, sailors, truckers, farmers, fishermen, just to mention a few. When we receive feedback from our users we notice that they all have their specific requirements and demands. Still, we believe if you want to get from A to B then GPS Essentials can do better than most specialized apps.

This effort to write a guide to GPS Essentials comes from many user requests asking for more information than is accessible in the in-app help. It is meant for users that are new to GPS Essentials and who are a bit overwhelmed by its complexity, and for everyone who wants to know what is behind a screen.

Get Familiar With Android

We are not teaching you how to use Android based phones and tablets but we will assume that you know how to handle your device. For example, when you export data to a file on your device, you have to know how to find that file again or send it to a different place, such as your desktop computer. If you are an Android beginner, please take some time to dive into Android before you start using GPS Essentials.

GPS Essentials is one of the complex apps. Most apps deal with one specific thing and they do it well. If you have an app to find your car where you parked it, you will probably learn how to use this app while you are using it for the first time. You can also find your car with GPS Essentials, but things will be less intuitive. On the other hand, you can save the parking lot and get back there the next time you drive downtown.

About This Manual

The intention of this manual is to give you detailed background information about the internals of GPS Essentials to unveil its full potential and at the same time let you quickly find a way to perform common tasks. Bear with us, this is not easy.

If you are interested in step-by-step instructions on a specific task, look for the 📱 symbol.

🚧 As all good manuals, this document is work in progress. In most situations it's better to have an incomplete manual than no manual at all, and so we released this one while some sections look like an early draft.

Support

If things are not working as you expect, you can ask for help. The app has its own help: open the navigation drawer and tap Help, and you get the page for the screen you are on. Visit www.gpsessentials.com for the latest information. There is a support forum on groups.google.com/g/gpsessentials where you can ask questions, request new features and comment.

If you need a personal word, send an email to michael@mictale.com. Please be as precise as you can: if you can reproduce the problem, tell us how; if you cannot, tell us how often it occurs. We'll try to respond as soon as we can, please understand that we cannot guarantee response times.

Training Videos

GPS Essentials has its own video channel on YouTube. Visit youtube.com/user/GpsEssentialsApp for a set of brief screencasts.

Installation

The quickest way to install GPS Essentials is to scan the following QR code with your device:

https://play.google.com/store/apps/details?id=com.mictale.gpsessentials

The link will open the Google Play app on your phone so that you can download and install GPS Essentials with a few taps.

Google Play installs updates as soon as they are available. The latest version of GPS Essentials usually contains important fixes, please ensure that you have the most recent version. To find out what's new after an update, look for the "Upgraded to …" message in Messages.

Storage

GPS Essentials stores information in a database on your device and in application preferences. The database holds all objects that are relevant for navigation such as waypoints, tracks, routes, pictures, tags and messages. Nothing is uploaded anywhere unless you export or share it yourself.

You choose where the database is kept in Settings under Storage Location. When GPS Essentials starts without a usable storage location, for example after an upgrade of Android, it asks you for one, and it can import your data from the previous location. Storage Setup in Settings shows how much space the data takes, sets a limit for cached map tiles and can repair the database.

To keep a backup of your data, export your streams to files (see Export in the Streams chapter). Android's own backup saves your settings, but not your waypoints, tracks, routes and pictures.

Start Screen

You see the start screen when you start the app. It has one button for each part of the app.

Some of the buttons are related to data that GPS Essentials stores in its database. GPS Essentials handles waypoints, routes, tracks, pictures, messages and tags. Each of these data types has a button so that you can see the elements, add new and delete existing ones. If you want to know more about these element types, refer to the appropriate chapter below.

The other buttons are related to concepts that deal with more than one element type at a time or that do not store data.

Button	**What it does**
Dashboard	Shows navigation values in widgets that you can configure.
Camera	Shows the camera picture with the map and your data in it. You can take pictures here.
Compass	Shows north and the direction to your target.
Portable Maps	Shows your location, waypoints, tracks and routes on a map.
Google Maps	Shows your location and waypoints on Google Maps.
Waypoints	Opens the Waypoints stream, where waypoints go when you create them without choosing a stream.
Routes	Lists all routes.
Tracks	Lists all tracks.
Streams	Lists all streams.
Shared	Opens Shared Streams, the streams your account shared on mapfinity.com.
Satellites	Shows the satellites in the sky above you and the state of your GPS fix.
Pictures	Shows the pictures taken with the camera in GPS Essentials.
Messages	Opens the inbox. A number on the button shows how many messages are unread.
Tags	Lists your tags and the elements that have them.
Settings	Changes units, formats and other settings.
PRO	Lets you buy GPS Essentials PRO on Google Play. It removes the ads.

We'll run through the features that are behind every button in the course of this document.

If GPS is disabled on your device, you will notice a banner warning. Tap it to get directly to the system settings page to enable GPS.

Navigation Drawer

To open the navigation drawer, tap the menu button at the top left, or swipe in from the left edge of the screen. It lets you switch between screens without going back to the start screen.

- Streams: All Streams, All Tracks, All Routes, All Maps and Starred Streams open the stream list with that filter; Shared Streams lists the streams your account shared on mapfinity.com, as a stream list.
- Dashboards: Standard, Portable Maps, Google Maps and Compass.
- Below them: Camera, Satellites, Messages, Tags and Settings. Help opens the help for the screen you are on.
- The record button in the side bar starts recording a track. When you are looking at a stream, it records into that stream, otherwise into a new track. While a track is recording, it turns into a stop button.
- The camera button in the side bar opens the camera.

At the bottom of the drawer you find the Privacy Policy and the Terms of Service.

Activities

GPS Essentials, as most other Android apps, separates its workflow into activities. Every activity has its own user interface screen. You start an activity by pressing a button or selecting a command from a menu. When you are done, the activity will finish and your previous activity will appear again. Use Android's back gesture or button to finish an activity at any time.

Think of the activities as a stack of cards: Every time you open a new activity, it will be pushed onto the top of the stack and you can work with it. When you are finished, the activity will be popped from the stack and you see the activity below it.

Going back ends the current activity and brings you back to the previous one. The arrow in the top-left corner of the screen opens the parent activity and navigates “up” in the hierarchy of activities. For example, if you are in some waypoint details, the parent will be the list that contains the waypoint. The parent activity is not always the activity where you came from.

Domain Model

GPS Essentials features a location based database that stores all your data into hierarchical streams.

Everything you store in GPS Essentials will end up in a so called stream. For example, when you are recording a track, GPS Essentials will append your current location to a specific stream every few seconds. When you are taking a picture, GPS Essentials will collect the image data, your location and the device orientation and append this data to a stream.

Streams are much like files in a text processing application. You can create, edit, export, duplicate and delete them, and the data that you create will reside in one and only one stream. A stream “owns” its nodes, so when you delete a stream you also delete all its nodes.

The things that you store into a stream are called “nodes”. A node can be anything from a simple latitude-longitude pair to a picture. Nodes have some common properties, such as their location, time, name and description. The app's help calls them elements.

Streams GPS Essentials Creates

Besides the streams that you create, there are some streams that GPS Essentials creates when required:

- Waypoints contains the waypoints that you create without choosing a stream.
- Pictures contains the pictures that you take without choosing a stream.
- Messages contains the messages that GPS Essentials writes, for example when a track recording or navigation starts or stops.
- Configurations contains your saved dashboard layouts.
- Lost & Found collects data that GPS Essentials recovers when it repairs the storage.

When you delete one of these streams, GPS Essentials will recreate it as necessary.

Categories

You can create *categories* within a stream to structure your data. The categories of a stream build a hierarchy so that every category has a parent and optional child categories. Every node is a member of one and only one category. Think of categories as the sections and chapters of a book. GPS Essentials also creates categories by itself, for example when you record a track or import data.

Nodes are ordered within a category. New nodes will append to the end of the category so that categories are initially ordered by time. You can drag nodes to a different position within a category to reorder the nodes. Notice that changing the sort criteria will not affect ordering, it will only present the nodes of a category in a different way. Order manifests in the database while sorting is a (volatile) presentation feature. In the app, the stored order is called “Natural”.

When you select nodes in a stream and delete them, they move to a category called Trash in the same stream. From there you can move them back, or clear the Trash to delete them for good.

Styles

Categories can style the nodes they contain. Styles are a set of attributes that tell GPS Essentials how to draw the nodes and set a line style to connect the nodes.

A style also defines the type of the category. The type of a category not only controls how the category will appear on a map, it will also tell GPS Essentials how to handle this category and its stream in various situations.

You can choose between the following category types:

Style	Description
None	No style defined for this category
Sequence	A generic sequence of nodes
Route	The nodes are routing targets, an optional child polyline contains the track line.
Track	The nodes are a sequence of recorded locations.
Polyline	The nodes are points of a polyline
Polygon	The nodes are points of a polygon
Slippy Map	The nodes are map tiles of a slippy map
Assets	The nodes contain internal data such as icons

The last two types are used internally by GPS Essentials.

Stream Type

The types of categories that are contained in a stream also define how the stream appears overall. GPS Essentials will apply the following rules in order to determine the stream type.

Containing Types	Stream Type
Tracks and routes	Mixed
Tracks but no routes	Track
Routes but no tracks	Route
Slippy maps, but no tracks and no routes	Map

A stream with none of these has no stream type. GPS Essentials works the type out again whenever the categories of a stream change. For example, when you add a track category to a route, the stream

becomes Mixed. The filters in the stream list use the stream type: a Mixed stream shows under both All Tracks and All Routes.

Granularity

GPS Essentials gives you a lot of freedom when it comes to how you structure your data. You can put all your data into a single giant stream or you can work with many small streams.

For example, you can create a new stream for every route you create, but you could also decide to add multiple routes into different categories of a single stream.

Here are some thoughts about the impact of the level of granularity you choose:

Sharing works best with streams: Export in the stream list sends whole streams in one go. You can export parts of a stream, such as selected nodes or a single waypoint, but that takes a few more steps. If you share huge streams, the files get large, and you probably don't want to give away all data in a specific scope. If you create many small streams, you will have to pick them one by one.

You can only star entire streams: Starring is a good way to make a stream visible on all maps. However, this will make the entire stream visible. If you have large streams, this will add many items to your map. If you create many small streams, you will have to star and unstar them one by one.

Dashboard

This is a fullscreen area to place widgets that show you navigation information, such as your current speed or the distance to the next waypoint. You can configure which navigation values to show. The Compass, Google Maps and Portable Maps screens show the same widgets below their compass or map: whatever you add, remove or move on one of these screens changes all of them.

Adding, Moving and Removing Widgets

When you open the dashboard for the very first time, it is empty. Select Add from the menu to add widgets. The widgets come in groups, such as Position, Motion and Routing, with a row of chips at the top to jump between them. Tap a widget to select it, tap it again to deselect it, and tap Close. Deselected widgets are removed. Press and hold a widget in this list to read what it shows.

To put a widget in a particular place, tap an empty spot and pick the widget.

Some of the widgets will show values immediately. Some others require you to start a route first or they need a valid GPS fix to work properly.

If there are more widgets than fit on the screen, drag to scroll them.

If you want to move a widget, tap and hold it, then drag it to its new position and let it snap in. To remove a widget, tap and hold it: a trash can pops up at the bottom of the screen. Drag the widget there until the trash can turns red, and release it.

Using Widgets

Some widgets do something when you tap them. For example, Altitude opens a dialog where you adjust the altitude shown, and Zero makes the current altitude read zero, which is handy to measure a climb. Pressure Altitude and Fused Altitude open the QNH dialog (see Setting the QNH). The stop watches and trip counters can be reset the same way.

Some widgets show a second value at the right end of their title line: Pressure Altitude its QNH, as QNH 29.92; Fused Altitude, Height Above Ground and Elevation how well their value is known, as ± 8 m.

The Playback widget belongs to the playback of a track (see the Track card in the Tracks chapter). It shows how far into the track the playback has run, and has buttons to rewind, start and stop it. When no playback is running, start plays the track you played last; if there is none, it opens the list of tracks so you can pick one.

Values shown in the warning color (yellow in the dark theme, olive in the light theme) do not come from GPS. They usually come from the network and are less accurate. Values in the normal color come from an up-to-date GPS fix.

Clear Target in the menu stops navigation.

Altitudes

All altitudes on the screen are above (or below) mean sea level: the dashboard's, the lowest and highest point of a track, the chart's Elevation, and a waypoint's elevation in its properties and in the editor. GPS measures heights above the WGS84 ellipsoid, a mathematical model of the Earth's shape. Sea level, the geoid, lies between about 106 m below and 85 m above the ellipsoid; in the San Francisco Bay Area it is about 32 m below it, so that heights above the ellipsoid read about 32 m lower there than heights above sea level. GPS Essentials stores heights as GPS measures them and converts them to sea level for display with the EGM2008 geoid, which is part of the app and works offline. The geoid loads in the background when the app starts; until it has loaded, altitudes show as unknown, not as heights above the ellipsoid. Differences, such as Climb, Altitude Made Good and Altitude To Go, do not depend on it.

The Altitude group has several altitudes, each from a different source:

- Altitude is the GPS altitude. Altitude Mode in Settings chooses where it comes from: Android's Location Manager (the default), converted to sea level with the geoid, or GPGGA, the sea-level altitude in the receiver's NMEA data. The adjustment set in its dialog is added to it. An adjustment set in a version before 5.0.1 to make up for the ellipsoid heights shown then is still added, now to the altitude above sea level.
- Fused Altitude combines GPS and the barometer: GPS keeps the barometer from drifting with the weather, the barometer smooths the GPS altitude. Every GPS fix counts, weighed by how well it fits; an outlying fix counts little, never nothing. A QNH set in the QNH dialog tells it the barometer's offset; the older the QNH, the less it counts. In a pressurized cabin, where the barometer and GPS climb at different rates, it follows GPS. Beside its title it shows its uncertainty, one standard deviation (σ), as ± 8 m. It is unknown only while nothing has told it the altitude: no GPS fix and no QNH. Without a barometer, it is the GPS altitude. The dashboard runs a fusion of its own; a recording keeps a fused altitude with each track point.
- Pressure Altitude comes from the barometer alone, through the standard atmosphere and the QNH it shows beside its title. It is as good as the QNH: the air pressure at sea level changes with the weather.
- Elevation, in the Position group, is not the device's altitude but the height of the ground under the current position, from the elevation tiles of the map (Copernicus GLO-30, the tiles Fill Elevation uses; tiles already loaded work offline). It is a surface's height: trees and roofs are in it. Beside its title it shows how well the tiles know it; over open ocean, where there are no tiles, it is sea level without a ±.
- Height Above Ground is Fused Altitude less Elevation, with both uncertainties together beside its title. Under a forest or among buildings it can be negative; it shows as it is.

Setting the QNH

The QNH is the air pressure reduced to sea level that an altimeter is set to, so that it reads the altitude above sea level. Airports and weather services give it in METAR and ATIS reports. Pressure Altitude uses it, and Fused Altitude takes it as a measurement of the barometer's offset.

Tap Pressure Altitude or Fused Altitude to open the QNH dialog, titled Altimeter Setting. It has two fields, coupled through the barometer: the QNH, and the Elevation, the barometer's altitude at that QNH. Editing one sets the other. On a phone without a barometer the dialog has the QNH alone.

- The QNH field takes the QNH in the unit chosen beside it, hPa, inHg or mmHg, with a comma or a point. A METAR or ATIS line pasted into the field gives its altimeter setting: Q1012 or A2990 in a METAR or SPECI, "QNH 1012", "ALTIMETER 2990" or "29.90" as an ATIS says it. The dialog switches to the report's unit.
- A METAR or ATIS report on the clipboard shows under the field with its station and time; tap it to take it.
- STD sets the standard atmosphere, 1013.25 hPa (29.92 inHg). Pressure Altitude then shows QNH STD, and Fused Altitude has no QNH. STD is a setting of its own: a QNH of 1013.25 typed in is a QNH.
- The drop-down beside the field chooses the unit. Until one is chosen, it is inHg in the United States, Canada and Japan and hPa elsewhere; the one chosen is kept, and Pressure Altitude shows its QNH in it.
- The Elevation field takes the elevation where the phone is, in the altitude unit of Settings, and fills in the QNH at which the barometer reads it.
- Ground, under the Elevation field, fills in the elevation of the ground under the GPS position, from the elevation tiles, as "Ground 21.8 ft". Indoors, add the floor's height above the ground by hand.
- While the air pressure changes, the field edited last holds and the other follows the barometer.
- Sea-level pressure here (GPS) shows the sea-level pressure that GPS and the barometer give, with its ± and the age of the latest GPS fix behind it, as "Sea-level pressure here (GPS): 1013.0 ± 1.1 hPa, 4 minutes ago". It is computed without the QNH set, so it never repeats it, and it is information only: nothing in the dialog takes it over. The ± has two significant digits, and the value is given to the same place.
- Done sets the QNH and counts it as set now, also when it is unchanged. Back leaves it as it was. Only a QNH that is not a number is refused, as Not a number, and one of 0 or below, which is no pressure, as Not a pressure; there is no range.

Fused Altitude takes a QNH as exact as reports round it, 1 hPa, 0.01 inHg or 1 mmHg in the dialog's unit, and trusts it less as it gets older. Done on an unchanged QNH makes it current again. No QNH is set from GPS: Fused Altitude already calibrates the barometer from GPS.

📱 Set the QNH from a METAR or ATIS

1. Copy the METAR or ATIS report, for example from a weather app or an aviation weather web site.
2. Tap Pressure Altitude or Fused Altitude on the dashboard.
3. Tap the report shown under the QNH field, or paste it into the field.
4. Tap Done.

📱 Set the QNH from a known elevation

1. At a place whose elevation is known, such as an airstrip, a summit or a survey marker, tap Pressure Altitude or Fused Altitude on the dashboard.
2. Type the elevation into the Elevation field, in the altitude unit of Settings. On the ground, tap Ground instead; indoors, add the floor's height.
3. Tap Done.

Edit Mode, Themes and Fonts

Tap and hold the dashboard to switch the toolbar to edit mode. It offers:

- Clear removes all widgets.
- Lock stops the dashboard from scrolling.
- Duplicate makes a copy of the current configuration.
- Configure opens the list of configurations (see below).
- Size, Theme and Font change the size, look and font of all widgets.

There are four themes: Classic, Plain, Modern and Glass, which shows each widget as a rounded glass panel. The font draws the values in any theme: System keeps the theme's own font, or pick one of the display fonts Bitcount Grid, Doto, B612 Mono, Audiowide, Orbitron and Michroma. Size, Theme and Font are the same as Widget Size, Widget Theme and Widget Font in Settings.

Multiple Configurations

You can keep several widget configurations. Use Duplicate in edit mode to make a copy of the current one. Configure opens the Configurations stream, where you can rename, delete and reorder configurations. The configuration in use is the topmost one. To use another one, tap and hold it, then drag it to the top of the list.

Available Widgets

Here is a list of all available widgets, in the groups the Add list shows. Scripts can define more widgets of their own (see the Scripting chapter); they appear in a group called Scripts.

Position

Widget	Description.
Number of Satellites	The number of satellites in view and the number of satellites considered for the latest fix.
Declination	The declination of the horizontal component of the magnetic field from true north, in degrees (i.e. positive means the magnetic field is rotated east that much from true north).
Accuracy	The precision of the current fix as reported by the GPS receiver. Lower values indicate better reception. The more satellites are in view, the better this value will be.
Latitude	The latitude of the current fix.
Longitude	The longitude of the current fix.
Position	The coordinates of the current fix, either latitude and longitude or UTM.
Elevation	The height of the ground above (or below) mean sea level under the current position, from the elevation tiles (as Fill Elevation uses them; tiles already loaded work offline). It is the terrain's height, not the device's altitude, and a surface's: trees and roofs are in it. Beside its title it shows how well the tiles know it, as ± 2 m; over open ocean, where the tiles have no land, it is sea level without a ±. Unknown where the tiles cannot be read. See Altitudes.
Location Provider	The provider of the current location: Cell, Wifi or GPS.

Motion

Widget	Description.
Speed	The horizontal velocity over ground.
Pace	The horizontal pace over ground, the reciprocal of velocity.
Tracking Speed	The velocity towards the tracking angle over ground.
Course	The direction from the current location to the target in degrees east of true or magnetic north, depending on your bearing settings.
Tracking Angle	A general purpose azimuth angle to track.

Altitude

Widget	Description.
Pressure Altitude	The altitude above (or below) mean sea level from the barometer and the QNH, which it shows beside its title, as QNH 29.92, or QNH STD for the standard atmosphere. Tap it to set the QNH; see Setting the QNH.
Height Above Ground	How high the device is above the ground under it: the Fused Altitude less the Elevation, the ground's height from the elevation tiles. Beside its title, how well it is known, both uncertainties together, as ± 8 m. The tiles include trees and roofs, so under a forest or among buildings it can be negative; it shows as it is. Over open ocean, a height without a ±. Unknown while either the altitude or the ground is.
Fused Altitude	The altitude above (or below) mean sea level, fused from GPS and the barometer: GPS keeps the barometer from drifting, the barometer smooths GPS. A derived value; Pressure Altitude stays the barometer's. It shows how well it is known beside its title, as ± 8 m, and is unknown only while nothing has told the altitude: no GPS fix and no QNH. Without a barometer, the GPS altitude. Tap it to set the QNH. See Altitudes.
Altitude	The GPS altitude above (or below) mean sea level, from the source chosen in Altitude Mode in Settings, plus the adjustment set in its dialog. Tap it to adjust it or to zero it.
Climb	The vertical velocity.

Routing

Widget	Description.
Route Control	Switches forward and back in a running route.
Target Pointer	Draws an arrow from the current location to the target in degrees east of true or magnetic north, depending on your bearing settings.
True Speed	The velocity towards the target over ground.
Bearing	The direction of travel in degrees east of true or magnetic north, depending on your bearing settings.
Reverse Bearing	The reverse direction of travel in degrees east of true or magnetic north, depending on your bearing settings.
Course From	The direction from the target to the current location in degrees east of true or magnetic north, depending on your bearing settings.
Turn	The angle between bearing and course. Turn left for negative values.
Altitude To Go	The vertical distance between the current location and the target location.
Target	The latitude and longitude of the target. You can pick a new target or select one from the waypoint list.
Target Altitude	The altitude of the target. You can pick a new target or select one from the waypoint list.
Target Slope	The gradient between the current location and the target in percent. Positive values indicate ascending slope, negative descending. You can pick a new target or select one from the waypoint list.
Target Name	The name of the current target. You can pick a new target or select one from the waypoint list.
Distance	The distance between the current position and the target.
Target Easting	The easting from the current location to the current target.
Target Northing	The northing from the current location to the current target.
∑Distance	The distance between the current position and the end of the running route.
XTD	Cross Track Distance: The smallest distance between the current location and the current leg on the running route. Requires a running route. Negative values are on the left side of the leg, positive values on the right.
Distance To	The distance between the current position and an arbitrary position. You can reset this value to select the current location.

Widget	Description.
TTG	The estimated time to go to the target.
∑TTG	The estimated time to go to the end of the route.
ETA	The estimated time of arrival at the target.
∑ETA	The estimated time of arrival at the end of the route.

Tracking

Widget	Description.
Stop Watch #1	A count up timer that can be paused, resumed and reset.
Stop Watch #2	A count up timer that can be paused, resumed and reset.
Playback	Plays the selected track, tap again to accelerate.
Average Speed	The average velocity over ground.
Max Speed	The maximum velocity over ground.
Min Speed	The minimum velocity over ground.
Max Altitude	The maximum altitude above (or below) mean sea level.
Min Altitude	The minimum altitude above (or below) mean sea level.
Altitude Made Good	The vertical distance between a starting point and the current position. You can reset this value to select the next received location as the new starting point.
Distance Covered	The distance traveled while GPS Essentials is in the foreground or tracking. You can reset this value.
Trip #1	A trip counter that measures distances and can be reset.
Trip #2	A trip counter that measures distances and can be reset.
Track Time	The time from the first point of the current track to its last point, while recording up to now.
Track Distance	The length of the current track.
Track Average Speed	The length of the current track over the time from its first point to its last point.
Track Top Speed	The highest speed recorded in the current track.
Track Ascent	The sum of the climbs in the current track.

The current track is the track being recorded, as a whole; else the track in playback, up to its position; else the track the map was opened on. Without any of these, the track widgets show a dash, as they do for what a track does not record.

Time

Widget	Description.
Time	The current time of day as reported by the GPS receiver. The time is in the local time zone.
Short Time	The current time of day as reported by the GPS receiver. The time is in the local time zone.
UTC Time	The current UTC time as reported by the GPS receiver. If there is no GPS fix, a different time source will be used if available.
GPS Time	The current GPS time as reported by the GPS receiver.
Date	The current date with year.
Short Date	The current date.

Sun & Moon

Widget	Description.
Sunrise	The local time of today's sunrise.
Until Sunrise	The timespan until today's sunrise.
Sunset	The local time of today's sunset.
Until Sunset	The timespan until today's sunset.
Moonrise	The local time of today's moonrise.
Until Moonrise	The timespan until today's moonrise.
Moonset	The local time of today's moonset.
Until Moonset	The timespan until today's moonset.
Moon Phase	The moon phase indicating the 'age' of the moon. A cycle of the moon lasts 29.530588 days, starting and ending with new moon. The moon is presented as it shows up on the northern hemisphere. Down Under, stay tuned.

Environment

Widget	Description.
Air Pressure	Shows the current air pressure.
Relative Humidity	Shows the relative ambient humidity.
Ambient Temperature	Shows the current ambient temperature.
Proximity	A value that indicates the presence of a nearby object to the display.
Illuminance	Shows the current ambient illuminance.
Magnetic Field	The strength of the magnetic field the compass measures, in µT, with the strength expected where you are below the unit. In the warning color when the two differ by more than a quarter: metal or electronics nearby disturb the compass.

Device

Widget	Description.
Battery Level	The percentage of remaining battery capacity.
Battery Temperature	The temperature of the battery.
Battery Voltage	The voltage of the battery.
Compass Accuracy	How far the compass heading may be off, from the magnetic field the compass measures against the field expected where you are, updated as the field changes. No value before the first location fix, or while the compass reports its accuracy as unreliable. In the warning color above 30°, in the error color above 60°. Moving away from metal and waving the phone in a figure 8 improve it. Tapping it opens its dialog: the value, the magnetometer's accuracy status and a plot of the values since the dialog opened; the screen does not turn while the dialog is open.

Camera

Shows your waypoints in the camera picture. You can also take pictures, and each picture stores the location and direction where you took it.

The camera shows the camera picture with the map, a head-up display and your data drawn into it. Its controls stand on glass along one short side of the screen and turn in place to stay upright however you hold the phone.

What Lies Over the Picture

Four buttons switch what is drawn over the picture, each on or off. A message such as “Map: on” confirms the change.

- Map: the map, seen through the camera, with buildings standing where they stand.
- HUD: a head-up display, with a heading tape along the top, the horizon and a pitch ladder, and a boresight in the middle with the elevation it looks at.
- Data: your waypoints, tracks and routes. Places hidden behind hills or buildings are drawn dimmed.
- Sky: where the sun and the moon stand.

The badge above them shows where the location comes from: none yet, the network, or GPS.

The Aim Mark

With Data on, corner brackets mark the middle of the view. Aim them at a waypoint and they close in and turn amber; a card below them shows its name, description, distance and bearing. While you navigate to a target and aim at nothing, the card shows the target. When the target lies outside the view, an arrow at the edge of the screen points towards it.

Height Above the Ground

The camera needs to know how high it is to put the map and your data in the right place. It takes the height by itself: the fused altitude from GPS and the barometer, less the terrain's, at any height and also below the ground where they say so, and standing height until they know. On an upper floor or a tower, drag up or down on the picture: a tape shows the height in your altitude unit while you drag, and the map follows your finger. Drag down to place the camera higher.

A height you set is kept until you change it, also the next time you open the camera. Below the ground on the tape is the stop “auto”: drag down past zero to it and let go, and the height comes from the fused

altitude again. While you hold a height of your own, a dashed mark on the tape shows where auto would put the camera, once the fused altitude and the terrain are known.

Calibrating the Heading

A phone's compass is often a few degrees off, more so near metal or inside a car. If the map and your data don't line up with the picture, tap Calibrate heading. The card that opens offers three ways, and shows the correction so far:

- Drag the picture sideways until the map lines up with what you see.
- Walk a few steps straight ahead with the camera pointing the way you walk; the camera compares your compass with the way GPS sees you move.
- Select the sun or the moon, whichever is up, and tap Start. Crosshairs appear in the middle and the shutter shows the sun or the moon. Put the real sun or moon in the crosshairs and press the shutter. While you aim at the sun, the picture is darkened and the screen brightened so that you can see it. Cancel goes back to the card.

A message tells by how much the heading was corrected. If the sun or the moon was also drawn too high or too low, it says so too: that is not a compass error but the tilt of the phone, which calibration does not change. Tap Done when you are finished. The correction is kept for this phone.

Taking Pictures

Tap the shutter button in the middle of the toolbar. With Save overlay on, the picture is saved with what lies over it drawn in, at the picture's full size. A message says while the overlay is drawn; however long that takes, the picture waits for it. If it cannot be drawn, as when the camera closes first or the phone's graphics cannot take a picture that large, the picture is saved without it and a message says why.

Flash, Exposure and Picture size open a dial beside the toolbar. Turn it by dragging along its rim, or tap a value; the setting's name and value show inside the rim. The dial slides away after a few seconds, when you touch the picture, or when you tap its button again.

Where Pictures Go

Pictures are added to the stream you opened the camera from, or to the Pictures stream. Each picture stores the location and direction where you took it. See the Pictures chapter for how to browse them.

The settings under Saved Image Meta Data in Settings control whether your device ID and location are written into the image files. Anyone you share a picture with can read them.

Compass

An orienteering compass that shows north, the direction to your current target, the tracking angle and a few widgets from your dashboard.

The widgets are below or on the right side of the compass, depending on the orientation of the device. They work exactly as on the main dashboard and show the same widgets. Please refer to the Dashboard chapter for a detailed description.

The compass features a rotating scale, an adjustable outer ring and a direction indicator. Having a rotating scale means that there is no compass needle, but the scale is rotating so that N always points north. You read out the current heading angle at the top end of the thin orange vertical line.

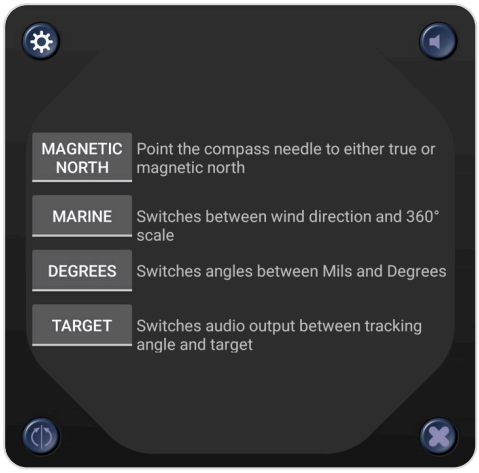
For best results, hold the phone flat, as if it were lying on a table, with the screen facing up. Keep away from magnets and electrical sources, and don't use covers that have a magnetic latch. In a vehicle, the phone is often mounted upright and the compass is unreliable. The Clamp Heading setting in Settings uses the direction you are moving in instead.

Buttons

- The button at the top left turns the compass over to its options; tap it again to turn it back. You can point the compass to magnetic or true north, show a trekking or a marine compass, show

angles in degrees or mils, and choose whether audio guides you to the tracking angle or to the target. With the marine compass, the tracking angle is the wind direction and the tracking scale shows the relative wind direction.

- The button at the bottom left aligns the tracking angle with the direction you point the phone in (see below).
- The button at the top right turns audio output on or off (see below).
- The button at the bottom right opens your waypoints so you can pick a new target. When you have a target, the button shows its icon and an arrow on the compass points to it.



The menu offers Add to add widgets below the compass, Clear Target to stop navigation, and Calibrate, which shows how to calibrate the compass.

Tracking Angle

The tracking angle lets you mark any direction on the compass. It is shown by the outer ring. The ring turns with the compass, but you can change the angle between the two.

If the direction you want to mark is something in view, such as a landmark, point your device in its direction and hold the button at the bottom left. While you hold it, the tracking angle follows the direction you point in.

To change the tracking angle by hand, drag the outer ring. For example, if you know today's sunset will be at 278°, turn the ring until its zero mark is at that direction.

Audio Output

When you tap the audio button, a sound guides you in the direction of your tracking angle or your target. You choose which in the compass options.

If there is nothing to guide you to, a warning sound plays. This happens when audio is set to the target and you have no target or no location fix.

Otherwise, groups of two tones with different pitch sound. If the second tone is higher than the first one, turn right. If it is lower, turn left. As a rule of thumb, turn towards the higher pitch. As you turn

towards your target, the interval between the groups will decrease and the pitch will rise.

Audio stops when you leave the Compass screen.

Calibration

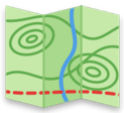
📱 Calibrate the compass

If the compass does not point the right way, calibrating it might help. Stay as far away from magnetic fields as you can, and keep the Compass screen open while you calibrate. Calibration does not work when the compass is not showing.

1. Hold the phone in front of you and move it slowly in a figure 8 a few times, turning it as you go.
2. If that does not help, put the phone on a flat surface with the display facing up and rotate it three full times around the axis pointing up.
3. Then rotate it three full times around the axis pointing away from you.
4. Then rotate it three full times around the axis pointing to the right.

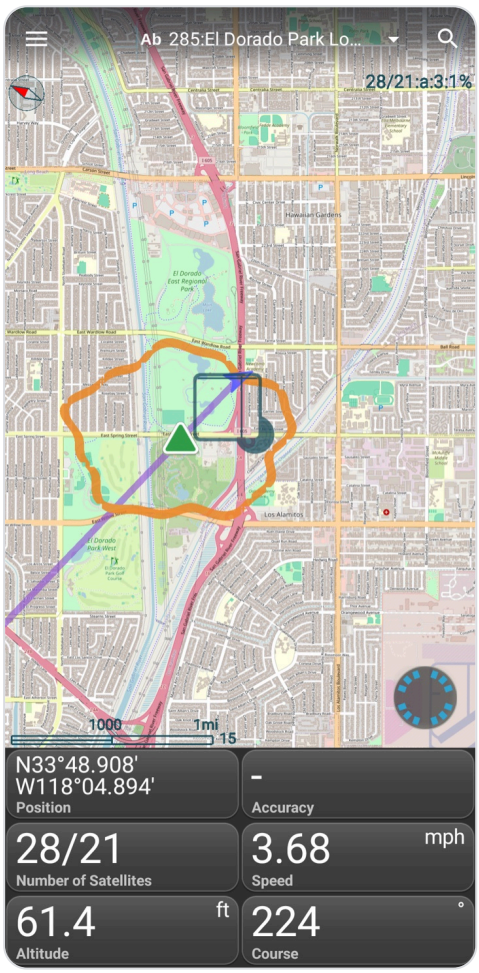
Move the phone slowly; 5 seconds per full rotation is OK. The direction of rotation doesn't matter.

Portable Maps



Shows your waypoints, routes and tracks on a map from various data sources.

This view shows your current position, waypoints, tracks and routes on top of a map. You choose the map background yourself. New map data loads from the internet while you zoom and pan the map, and all downloaded data is kept on your device for offline use. You can also download map areas ahead of time.



The Map

To pan the map, tap and hold the map and then swipe your finger to any direction. To zoom the map, pinch it with two fingers. Tap an element on the map to select it. Double-tap an element to open it.

Below the map are widgets, the same ones as on the dashboard (see Dashboard Split View below).

Cursors

You use cursors to select elements and mark locations on the map. To create a new cursor, tap and hold anywhere on the map. You can have up to three cursors; creating a fourth removes the oldest. There is one active cursor which is bolder than the others.

If you start dragging right after a new cursor was created, it moves with your finger. To move an existing cursor, tap and hold its bottom right corner.

If there is an element within the bounds of the cursor, the crosshair snaps to the element and the cursor has a selected element. If there is more than one element, the one closest to the center of the cursor is selected.

The Toolbar

On the left of the toolbar, the information pane shows one aspect of the selected element. An aspect is a piece of information about the element, such as its name, location, altitude or time. To change the aspect, tap the information pane and select a new one from the drop-down list. To the right of the information pane is Search, which finds an address or place.

Icon	Name	Description
Ab	Name	The name of the selected item, e.g. the name of the waypoint, route or track.
	Location	The location of the item or the plain cursor when there is no selected item.
	Altitude	The altitude of the item.
	Time	The time of the item, e.g. the track time for a track element.
	Target	The distance and bearing from the previous cursor location to the current cursor location.

Dial Menu

You use the dial menu to run map commands. The dial menu is located at the bottom right corner of the map. It has its name from the rotary dial, a long gone input device.

In its initial state, the dial menu is collapsed to a small disk. Tap on it to expand. The dial menu has two rings, the inner ring shows command groups and the outer ring shows commands. You can rotate both rings to show hidden icons. When you tap on an icon on the inner ring, the outer ring rotates to show the commands of this group. Commands that do not apply to the selected element are disabled.

Below is a list of all commands. Some of the commands are only available when you created a cursor over an existing element (long tap and drag the cursor until it locks onto an element). Tap and hold a command to see what it does.

	Edit	**Commands to change the nodes under the cursor or add new nodes**
	Edit	Opens the selected element for editing. This is the same as tapping on an element in list view
	Add	Adds a new node under the current cursor. The element will have the default icon, use edit to change its properties
	Contacts	Finds a contact and shows its address on the map
✓	Mark	Marks the element under the current cursor. This is the same as marking in the waypoint editor. You can then copy or move it to a different stream
	Remove	Removes the element under the current cursor
	Chart	Shows the chart of the selected element's category
	Export	Exports the selected element's stream
	Bulk Download	Loads all map tiles of the current map for the visible area, for use without a connection. Not every map allows this.

	View	**Commands to change the presentation of the map**
	My Location	Pans the map to show the current location and keeps it centered while moving
	Zoom In	Zooms the map in
	Zoom Out	Zooms the map out
	Zoom All	Zoom to show all contents of the current stream.
	Zoom Leg	Zoom to show the current location and the current target
	Map	Select a different map. The map will be saved for the current stream

	Navigate	**Controls route navigation**
	Start	Navigate to the selected target
	Previous	Navigate to the previous target
	Pause	Suspend navigation
	Next	Navigate to the next target

	Playback	**Controls track playback**
	Play	Starts playback at the selected element
	Pause	Suspend playback

•••	**More**	**Shows miscellaneous commands**
	Help	Shows the help page for Portable Maps
	Settings	Shows app settings

📱 Create a new waypoint

1. Tap and hold on the map to create a new cursor.
2. Now drag the cursor onto the location where you want the new waypoint.
3. Tap the dial menu to open it and select the Edit group.
4. Select the add tool to create the waypoint.

📱 Measure the distance between two waypoints

1. Place a cursor onto the first waypoint.
2. Place another cursor onto the second waypoint.
3. Tap on the info pane and select the target aspect.
4. While you are dragging the cursors, the info pane will keep its values updated so you can make successive measures quickly.

Choosing a Map

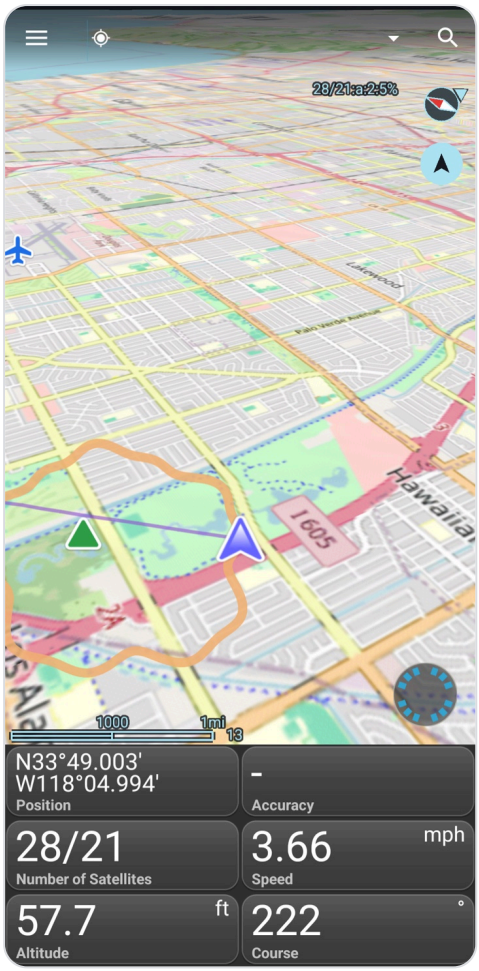
Open the dial menu and select the map command in the View group to choose the map backgrounds to show. The map is saved for the current stream.

Using Maps Offline

Move the map to the area you need, open the dial menu and select Bulk Download in the Edit group. GPS Essentials downloads the visible area of the current map ahead of time, so you can view it later without an internet connection. Not every map allows this. Storage Setup in Settings shows how much space the downloaded maps take and lets you clear them.

Turning and Following

The map draws only when something on it visibly changes, which is easier on the battery. Turn and tilt it with two fingers.



The button below the compass in the top right corner follows your location. Each tap takes it to the next state:

- Auto pan, north up: the map keeps your location in the middle, north up.
- Auto pan, course up: the map turns so that the way you move points up, and keeps your location in the lower third, where more of the way ahead shows. Standing still, it turns by the compass.
- Auto pan off: the map stays where you leave it.

Dragging the map with one finger turns auto pan off. Pinching zooms about your location and keeps auto pan on, and in course up the map keeps its turn.

The compass shows which way is north on a turned or tilted map. Tap it to turn the map north up and flat again.

Search

Search takes one line, “Text or location…”. It searches the area that the map's tiles for the view cover, which reaches a little past the edges of the screen. To find a place farther away, move the map there or zoom out first. Within that area it looks through:

- Coordinates: a typed position, in decimal degrees, degrees and minutes, or degrees, minutes and seconds, with signs or hemisphere letters, or as UTM, MGRS or a British grid reference. A coordinate is the only hit that can lie outside the view.

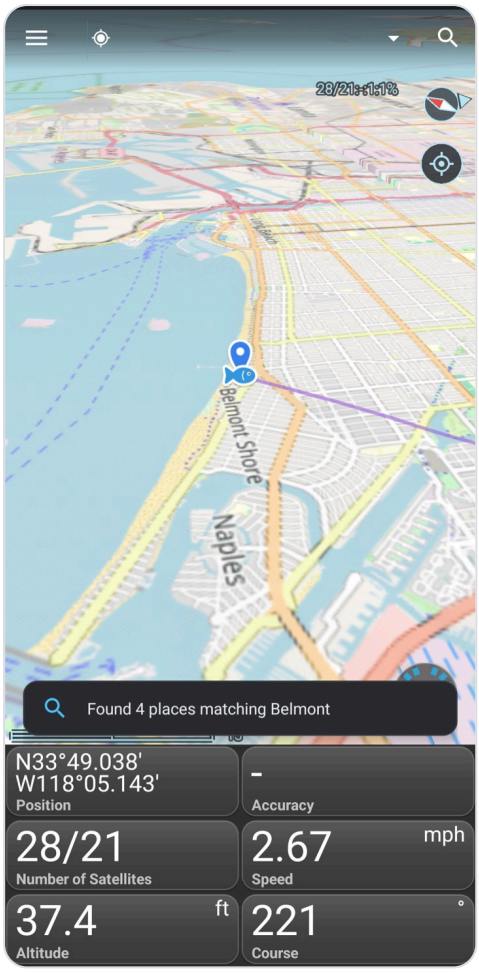
- Your waypoints, by name.
- Names on the map: points of interest, places, water, parks, peaks, airports, named areas and streets, read from the vector tiles of the view as they load. On a raster map the vector tiles of the same view are read.
- Addresses from the Geocoder in Settings.

The search starts with the first character typed. While you type, the hits are listed below the field, each with its name and its address or category; tap one to close the search and move the map onto it. The search key closes the field and keeps the hits on the map, and a message says how many places were found; if the best hit is a coordinate outside the view, the map moves there. Back closes the search and removes its hits. Below the field, a line names the sources still searching, for example “Geocoder still searching…”. The search runs until every source is done and keeps all hits. When you move the map, it searches the new area: the map's names in the tiles that load, and the waypoints and the Geocoder within the new area.

Hits are ranked by how they match: first names equal to the text, then names that start with it or have a word that does (several words each start one, in order), then similar names, where more letters agree than differ, so “cfae” finds “cafe”. Within each group the more similar name comes first, then the one nearer the center of the view. Hits of the same name stay separate unless they are known to be one place, such as the pieces of one street across tiles.

Each hit has a marker on the map. Where markers would overlap, they are drawn as one marker with the number of hits it holds. Tap it to zoom in until its hits separate; hits on the very same point stay together, and a tap selects the best one.

To find an address, type the house number and the street, as in “126 East Yale Loop” or “Hauptstraße 12”. A house number that the map data gives with its street is that street's address; one without a street counts when the street you typed is one of the two nearest to it. In villages where addresses name the place instead of a street, type the number and the place, as in “12 Kieferndorf”.



3D Buildings

Zoomed in far enough, buildings stand up from their footprints. Where OpenStreetMap gives a building's roof shape, the roof is built in that shape: flat, skillion, gabled, half-hipped, hipped, gambrel, mansard, saltbox, round, pyramidal, cone, dome or onion. A roof whose height is not mapped (by its height, its angle or its number of levels) stays flat, domes included, and so do skillion and saltbox roofs without a direction and shapes not in this list. Walls and roofs take the colours tagged in OpenStreetMap; untagged ones keep the map's building colour. At night, tagged colours darken as the rest of the map does.

Tracks, Pictures and Waypoints at Altitude

The Altitude setting of a category's style, described in Altitude in the Streams chapter, says whether the map draws the category's tracks, pictures and waypoints on the terrain or at their altitude:

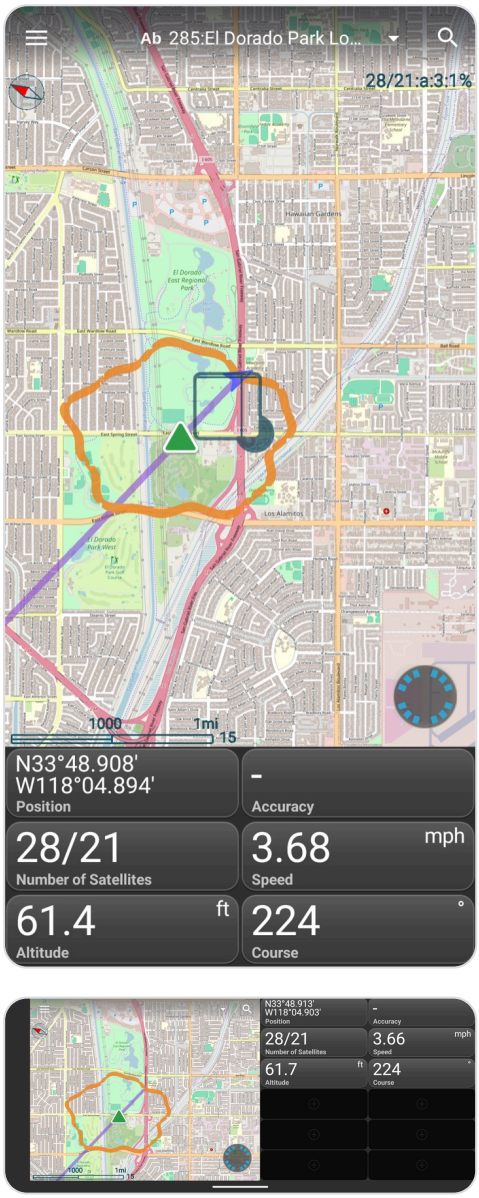
- On ground: on the terrain.
- At altitude: at their altitude above sea level, fused from GPS and the barometer where recorded. A track flies along its points; points without an altitude stay on the ground. A picture's direction wedge is drawn at the picture's altitude.
- Auto: follows the category's mode. Stationary, Walk, Bike and Drive are on the terrain, Flight is at altitude. In a category without a mode, as one that was never split by mode, pictures and waypoints are at their altitude and tracks on the terrain.

A category without a setting of its own takes its parent's; where no category has one, Altitude of tracks in Settings applies. A point imported from KML with an altitude mode of its own keeps it. A point below the terrain is hidden behind it.

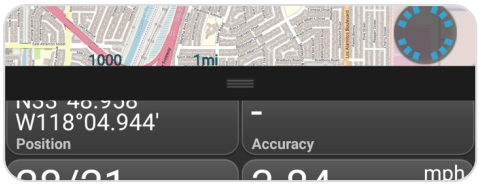
Dashboard Split View

Your screen is divided into a section that shows the map and a section that shows a portion of the dashboard.

Here is a split view that shows map and dashboard in both portrait and landscape oriented screens:



There is an invisible divider bar between the map and the dashboard. When you tap onto the border between the map and the dashboard, the divider will become visible and you can drag it to make more room to either the map or the dashboard.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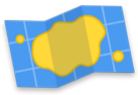
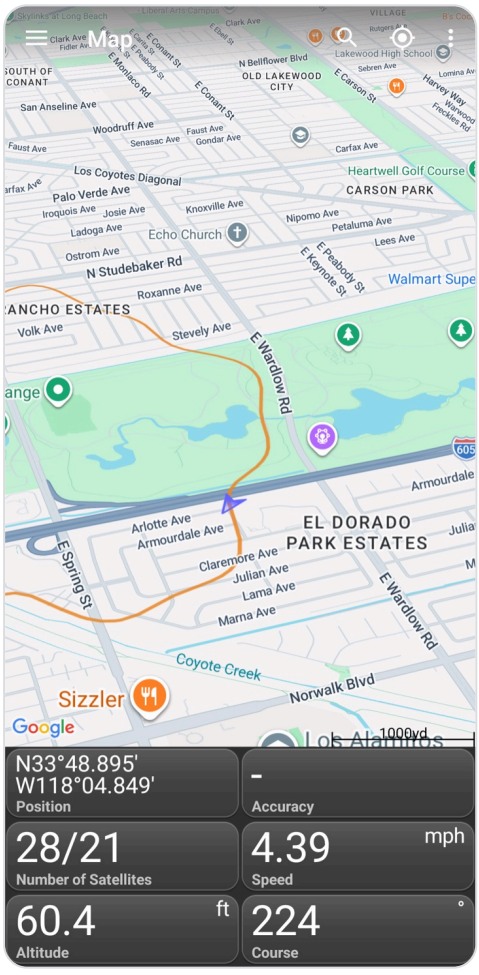
Google Maps



Shows your position, your target and your waypoints on a Google map.

The map shows the Waypoints stream, or the stream you opened the map from, your starred streams and the route you are navigating. It has a different layout in horizontal and vertical oriented screens and features a map and a dashboard. The dashboard works exactly as the main dashboard and it shows the same widgets. Please refer to the Dashboard chapter for a detailed description.

While this screen is open, GPS Essentials keeps your location up to date, so the arrow follows you even when no location widget is shown.



You can adjust how much space you want to use for the map and the dashboard by dragging the slider up and down (or left and right on horizontal screens). The slider appears when you tap on the screen near the separation between the map and the dashboard. You can drag the slider all the way down until the dashboard is completely hidden and you can also drag it all the way up to hide the map completely. Doing so can make it hard to find the slider again, remember that the map is always above the dashboard, even when it is hidden.

The Map

Drag the map to move it. Pinch to zoom in and out.

Command	Description
Search	Finds an address or place in the visible area. It uses the Geocoder in Settings.
Current Location	Moves the map to your position and keeps following you until you move the map yourself.
Map Type	Switches between Normal, Satellite, Hybrid and Terrain.
View	Turns Traffic, Indoor, Buildings and the Compass on the map on or off.
Add Waypoint	Adds a waypoint (see below).
Clear Target	Stops navigation.
Zoom Leg	Shows your position and your target together. Without a target, it centers the map on you.
Find Contact	Lets you pick a contact and shows their address on the map.
Add Widget	Adds widgets to the panel below the map.

Waypoints

The map shows the waypoint icons at their location. If you tap on the icon, a popup menu appears to run operations on this waypoint:

Operation	Description
Mark	Marks this waypoint, so that you can copy or move it to another stream.
Navigate	Makes this waypoint your target and starts navigation. Please refer to the Routes chapter for a detailed description of navigation.
Edit Details	Opens the waypoint editor. Please refer to the Streams chapter for a detailed description.
Move	Relocates the waypoint. Tap onto the map to move the waypoint, or select Add Waypoint to move it to your current location. If you know the coordinates of the waypoint, use the waypoint editor instead.
Delete	Removes the waypoint.

To add a new waypoint, select Add Waypoint. Then tap on the location on the map to create a waypoint there. If you want to create a waypoint at your current location, select Add Waypoint again.

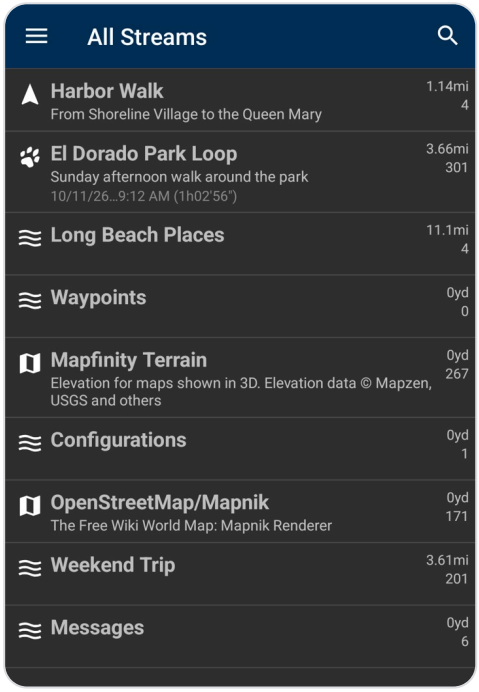
Google Maps needs a connection to load its maps. For maps that you can use offline, see Portable Maps.

Streams

Lists all your streams, lets you filter streams by type and edit streams.

Streams are a core concept of GPS Essentials. A stream is a series of locations (waypoints, pictures, messages) that are structured in categories. Feel free to read the Domain Model chapter to learn more about streams.

When you tap on Streams, you see a list of all streams. The Tracks and Routes buttons on the start screen open the same list with a filter.



The navigation drawer changes the filter. Every filter limits the streams in the list based on a specific criteria. The following filters are defined:

Filter	Description
All Streams	Shows an unfiltered list of all streams on the device
All Tracks	Shows all streams with stream type “Track” or “Mixed”. While a track is recording, it is shown on top under Recording Track.
All Routes	Shows all streams with stream type “Route” or “Mixed”. While you navigate a route, it is shown on top under Running Route.
All Maps	Shows all streams with stream type “Map”
Starred Streams	Shows all streams that are starred. The contents of starred streams are shown on all maps.

Below the filters, Shared Streams opens the list of the streams your account shared on mapfinity.com (see Shared Streams); the start screen has a tile for it too.

Review stream types in the Domain Model chapter for an explanation of stream types.

Notice that the filters are overlapping, some stream may appear under multiple filters.

The search button finds streams by name or description. The plus button creates a new stream: an empty one, a track, an import or a route (see Add Elements below).

The rows of tracks and routes show the length and the number of points of the whole stream, all its categories included.

Selecting Streams

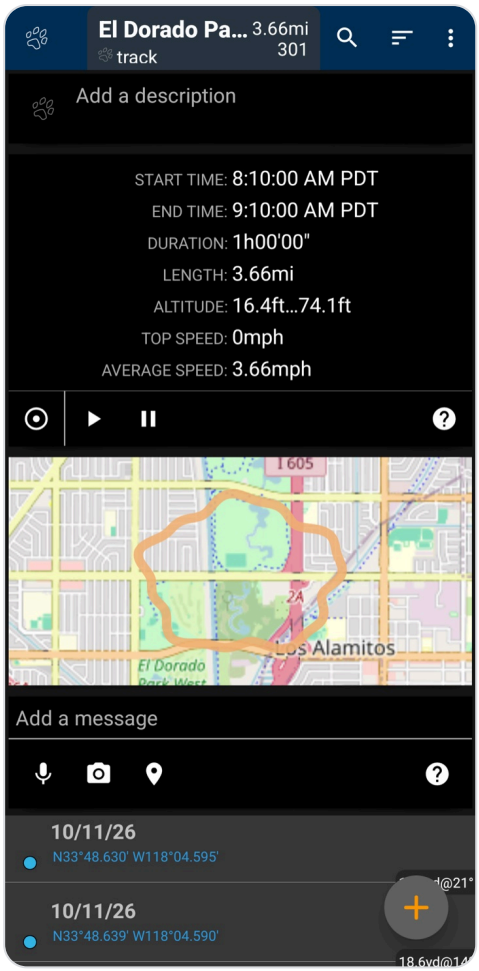
Tap and hold a stream to select it. While you are selecting, tap more streams to add them to the selection or remove them from it.

With one stream selected you can choose Properties to rename the stream or to star it (tap its icon in the dialog; a starred stream has a yellow icon), Resume to continue recording a track into it, Show on Map to see it on a map, Duplicate to make a copy of it, and Share to share it as a link, send its link, upload its changes or remove its share (see Share). A copy has a link of its own.

With one or more streams selected you can choose Delete to delete them from the device after you confirm (a shared stream's copy on mapfinity.com stays, see Share), Export to save them as a file or send them to another app, and Select to select all streams, the others, or those before, after or between the selected ones. A message in Messages records each deleted stream.

Stream View

Tap on a stream to view this stream. GPS Essentials will open the list view of the stream. The list view shows the nodes of a stream by category. The Waypoints, Messages and dashboard Configurations streams open in the same view.



Tap on the category name in the toolbar to change the category. The category tree opens under the name as a raised panel. For every category, you will also see the length and number of nodes of the category with all the categories under it; for the top category, that is the whole stream. A category with a motion mode shows its mode under its name, such as “Drive · 96%”, or “Drive · Set manually” where you set it (see Motion Modes).

Cards at the top of the list show information and controls for the current category (see Cards below). To remove a card, swipe it to one side.

Tap an element to open it. For example, a waypoint opens in the waypoint editor and a message opens on its own screen. The search button finds text in the elements of the current category.

Sort orders the elements by Natural, Name, Time, Marker or Distance. Descending reverses the order. Natural is the order in which the elements were added, unless you have rearranged them. To rearrange elements, sort by Natural. Then tap and hold an element and drag it to its new position.

Selecting Elements

Tap and hold an element to select it. While you are selecting, tap more elements to add them to the selection or remove them from it. The toolbar then offers:

Action	Description
Delete	Moves the selected elements to the Trash category of the stream.
Navigate	Starts navigating to the selected element. Only shown when one element is selected.
Select	Selects all elements, the others, or those before, after or between the selected ones.
Mark	Remembers the elements so that you can copy or move them elsewhere. For messages, Mark as Read and Mark as Unread change their read state.
Export	Saves the selected elements as a file.
Fill Elevation	Sets the elevation of the selected elements from the terrain data. It needs a connection where none is cached.

Menu

- Clear moves the current category with all its elements to the Trash. In the Trash, Clear deletes its contents for good. The top category of a stream cannot be cleared.
- Fill Elevation sets the elevation of all elements in the category from the terrain data.
- Split by Mode cuts the tracks of the category into categories by motion mode (see Motion Modes).
- View shows the category on a Map, its Pictures, a Chart, or its Style.
- Selection copies or moves the marked elements into the current category.
- Properties changes the name of the stream and whether it is starred.
- Export saves the whole stream as a file.
- Share opens the share sheet of the whole stream, whatever is selected (see Share).
- Repair checks the stream, restores categories of elements that lost theirs, and recalculates distances and elevation gain.

Creating New Nodes

There are a few ways you can create single new nodes in stream view. If you want to add a single waypoint with name, description, tags and icon from known coordinates, use the Waypoint tab of Add Elements.

📱 Add a new waypoint

1. Tap the plus button in the toolbar.
2. Open the **Waypoint** tab.
3. GPS will start. The position is your current location and improves while the GPS gets more accurate.
4. To enter coordinates yourself, tap the position. To go back to your current location, tap the location button.
5. Enter name, description and tags, and choose an icon.
6. Tap on **Create**.

If you frequently add new nodes such as text or pictures, add the Post card to your stream:

📱 Add the post card for text and pictures

1. Tap the plus button in the toolbar.
2. Open the **Cards** tab.
3. Tap on **Post**.

On the Post card, type into the “Add a message” field. As soon as there is text, a send button appears. Tap it to add the text as a message at your current location, or without a location if none is known. The microphone button lets you dictate the text instead; it does not store the recording. The camera button takes a picture and adds it to the stream, the gallery button adds pictures from the photo picker with their locations where they have them (see Pictures from Other Apps in the Pictures chapter), and the coordinates button adds a location with known coordinates. When elements are marked, a paste button copies or moves them here.

Mark/Copy/Move

You can mark one or more nodes in a category. Then you can reference these nodes later to create routes or you can copy or move them to another category in the same or in a different stream.

📱 Mark a set of nodes

1. Tap and hold on the first node until the toolbar changes.
2. The toolbar now shows the number of selected nodes and a set of contextual buttons.
3. Tap on more nodes to select or deselect them.
4. Tap on Select to select nodes based on their position in the list, such as all, the others, or those between the selected ones.
5. Tap on Mark to mark the set of currently selected nodes and close the contextual toolbar.

📱 Copy or move nodes

1. Mark the nodes you want to copy or move.
2. Open the target stream and select the category.
3. Select **Selection** from the menu, or tap the paste button on the Post card.
4. Use **Copy** or **Move**.

This is also how you restore elements from the Trash.

Add Elements

When you tap on the plus button in a stream, Add Elements opens. It adds nodes from many sources to the current stream.

💡 The dialog has two incarnations: Add Elements behind the plus button in stream view and Create Stream behind the plus button in the list of streams, which creates a new stream. Some tabs are only available in one of them.

The dialog is divided into tabs. Swipe or tap the tabs to switch between them. The dialog opens on the tab you used last.

Tab	Description
Waypoint	Adds a waypoint to the current category, at your current location or at coordinates you enter. Only in a stream.
Cards	Adds a card to the current category. Reset goes back to the default cards. Only in a stream.
Category	Adds a Sequence, Route, Track, Polyline or Polygon category below the current category. Only in a stream.
Empty	Creates an empty stream with the name you enter. Only in the stream list.
Track	Starts recording a track: into the current stream, or into a new track when you come from the stream list.
Import	Reads data from files or links and creates nodes and categories from it.
Straight Line	Creates a route with straight lines between two or more waypoints.
Directions	Creates a route along roads with turn instructions.

The route tabs are described in the Routes chapter.

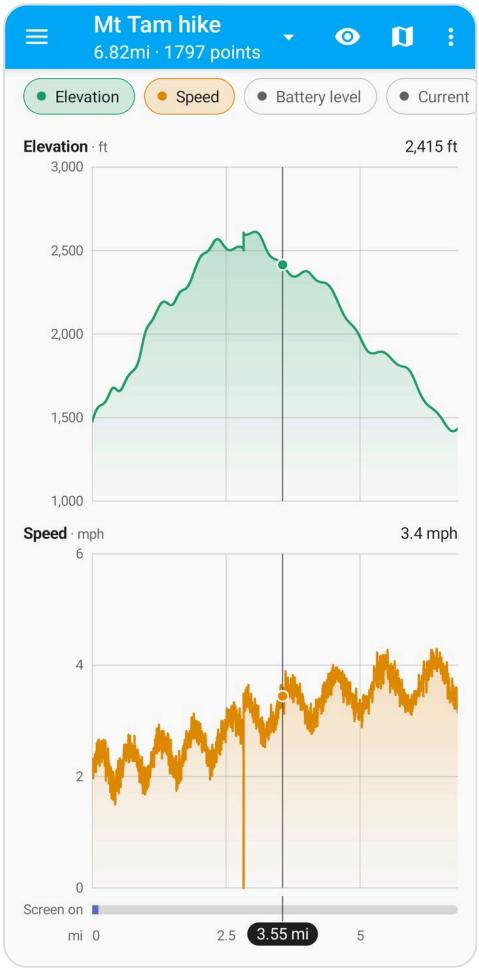
Cards

The cards tab lets you add cards to the current category. Cards are filled panels on top of the node list that show condensed information about the stream or category. Some cards let you interact with the stream in a special way. To remove a card, swipe it to one side.

Your current card configuration is stored in the stream style, so cards will show again when you open the category.

Card	Description
Post	Quickly creates new nodes.
Info	On the top category, shows and changes the description and the tags of the stream. On any other category, shows the category's name and the time span of its points; on a track category, also its motion mode, which a tap sets (see Motion Modes).
Route	Lets you start and stop navigation and switch between waypoints.
Track	Lets you resume and pause recording and shows condensed information about the track: the category in view with all the categories under it. You can also start playback of the track. During playback, GPS Essentials uses the current track to read locations instead of the GPS unit. On the top category, playback plays all track categories of the stream in time order.
Area	Lets you calculate areas.
Map	Shows the current stream on a map.
Chart	Shows the elevation and speed charts of a track.
Trash	Clears the trash.

Charts



The Chart card shows the elevation and the speed of a track, and follows it while it records. Tap on the chart to open it full screen. You can also select View > Chart in a stream. If the stream has several categories, choose one from the drop-down list in the toolbar; under its name it shows the length and the number of points.

The charts sit one above the other on the same time or distance, each with its own scale on the left, in your units. The buttons under the toolbar switch them on and off: Elevation and Speed; Ground, the height of the ground under each point from the elevation tiles, drawn as an area in the Elevation panel and on until you switch it off, with a gap where the tiles cannot be read and sea level over the open ocean; under the crosshair the Elevation panel reads the ground too; for a track recorded with a barometer Fused elevation, the altitude fused from GPS and the barometer, with a band one σ either side and its ± under the crosshair; and for a track recorded with battery data Battery level, Current, Temperature, Voltage and Charge used, and at the end of the row, a little apart, the bars Charging, Screen on and Thermal, each for a track with that data and off until switched on. Current and Charge used are shown in the units Android documents for them where the recording's own readings bear them out; where the readings contradict them or do not tell whether the current flows in or out, both are left out. Tracks recorded with GPS Essentials 5.0.0 and older show the values they were recorded with. The choice is kept for the next track and for the card, which shows charts only. With all of them off, the chart shows no channel, and the card shows elevation and speed; with only bars on, the bars show above the time or distance. When they don't all fit, they scroll up and down.

Switched on, thin bars under the charts show when the phone was charging (amber while plugged in but not charging, as when it is too warm), when the screen was on, and the phone's thermal status. At the line through the charts, each bar reads its state: Charging, Full, Not charging or Unplugged; Screen on or Screen off; and the thermal status from None to Shutdown.

A tap puts a line through all charts: each shows its value at that point, each bar its state, and the bottom the time or distance; a tap on the line takes it away. Touch and hold, then drag, moves the line, and it stays when the finger lifts; Show Point on Map then shows that point of the track. A pinch zooms the time or distance; zoomed in, a sideways drag moves along it, and a drag up or down scrolls the charts when they don't all fit. Each chart's scale fits the values in view, of the whole track or of the time or distance zoomed in on; the values stay as recorded. A double tap shows the whole track again. The button at the right of a chart's name maximizes that chart: it grows from its place to the whole chart, pushing the others out, while the buttons under the toolbar fold away; the bars and the time or distance stay under it. There a drag moves along both the time or distance and the values, a pinch zooms by the direction of the fingers (side by side the time or distance, one above the other the values, at a slant both), and a double tap shows all of it again. The same button and Back shrink it back to all charts, at the same time or distance and with the line in place. TalkBack reads the button with the chart's name, such as “Maximize Elevation” or “Minimize Elevation”, and a double tap on it does the same as a tap. No line is drawn where the track has no points for more than 5 minutes, or for more than twice its usual spacing between points if that is longer.

The View command in the menu switches the horizontal axis between Time, the time of day, with the date where a new day starts; Elapsed, the time since the start of the track; and Distance along it. The choice is kept for the next chart and for the card. Show on Map shows the stream on the map chosen under Default Map Type in Settings, and Export writes the stream to a file.

Categories

You can add new categories to an existing category of a stream.

Every category includes the categories under it: its length and number of points, its list of elements, its pictures, the search, its messages and its chart take them all in. The top category is the whole stream. The Trash is not part of any of them.

Only the top category has a description and tags, those of the stream, which the Info card shows and changes. On any other category, the Info card shows the category's name and the time span of its points.

📱 Add a category

1. Open the stream and select a category
2. Tap on plus and open the Category tab
3. Tap on the type of the new category
4. The dialog will close and you are back in the category where you started

📱 Delete a category

1. Open the stream and select a category
2. Select **Clear** from the menu
3. The category, its descending categories and all their nodes move to the Trash of the stream
4. To delete them for good, open the Trash and select **Clear** again

Sometimes it is useful to change the type of a category. For example, when you imported data from KML, there is no information whether the elements of a folder are just a set of locations or a route. You can change the category type to route so that the stream shows up under All Routes.

📱 Change a category type

1. Open the stream and select a category
2. Select **View** > **Style** from the menu
3. Tap on the type and select a new one
4. Go back to save your changes

The style editor also changes the name, the description, the line width and color, the fill color of polygons, and how the map draws the category's altitude (see Altitude).

Motion Modes

GPS Essentials tells the parts of a track apart by how you moved. The modes are Stationary, Walk, Bike, Drive and Flight, and Unknown where none of them fits. Drive means any road vehicle; the classifier has learned it from car trips only, so a bus, truck or motorcycle may not be recognised as Drive yet. Flight

means anything airborne; it has learned it from airliners, light aircraft, helicopters, gliders and paragliders.

Each part is a track category of its own, named by its mode and its time, such as “Walk 10:39–11:02”. It carries a tag of its mode, such as mode:walk, which the Tags list shows with the category's name; a tap there opens the stream at that category.

Split by Mode in the menu of the stream view and of the style editor makes these categories, from a recording or an imported track; a recording is not split when it stops. A day of many starts and stops becomes one sequence of categories:

- On the top category, it takes the track categories directly under it, and the stream's own points where the stream is a track. On a track category, it takes that category with the track categories beside it.
- It merges their points in time order, cuts them by mode, and puts each part into a new track category in the same place, which replaces the old ones. A description that all the tracks of a new category agree on goes with it.
- Categories that are not tracks, such as waypoints and pictures, stay as they are.
- It also cuts the categories whose mode you set yourself; their mode is not kept.
- Run again on the same points, it gives the same categories.

When it is done, it says which modes it found, such as “Found 2 modes: Drive, Flight”, or “Found 0 modes”. While the stream records, it says “Recording in progress” and changes nothing.

📱 Split a track by mode

1. Open the stream and select the top category or one of its track categories
2. Select **Split by Mode** from the menu
3. The message lists the modes found; the category tree shows the new categories

On a track category, the Info card shows a chip for each mode, the category's mode checked, and under them where the mode came from: “Classified, 96%”, the classifier's mode and how sure it is; “Set manually”; or “Not classified”. A tap on a chip sets the mode. A mode you set stays until Split by Mode runs from the menu. The category tree shows the mode under the category's name, such as “Drive · 96%” or “Drive · Set manually”.

📱 Set the mode of a category

1. Open the stream and select the track category
2. If the Info card is hidden, tap plus, open the Cards tab and tap **Info**
3. Tap the chip of the mode

Altitude

The style editor's Altitude setting says how the map draws a category: On ground, on the terrain, or At altitude, at the altitude above sea level, fused from GPS and the barometer where recorded, else as GPS

gave it. Auto follows the motion mode of the category, or of the nearest category above it that has one:

Mode	Lines	Pictures and waypoints
Stationary, Walk, Bike, Drive	On the terrain	On the terrain
Flight	At altitude	At altitude
Unknown, or not classified, the top category included	On the terrain	At altitude

A category without a setting of its own takes its parent's, shown as Inherited, such as “Inherited: Auto”; set on the top category, it applies to the whole stream. Where no category has one, Altitude of tracks in Settings applies, Auto unless you change it. A track that was a flight but is not classified as Flight stays on the terrain under Auto until you set it to At altitude.

Pictures and waypoints without an altitude lie on the terrain, and those below the terrain are hidden behind it. A point's own altitude mode from a KML file wins over its category's. A KML export writes each track's altitude mode as it comes out of these rules, so a track classified as Flight is written at altitude; a KML import keeps the file's altitude mode, which the style editor shows as Relative to ground where the file says so.

Import

Use the Import tab to read tracks, routes and waypoints from files and links. GPS Essentials reads GPX, KML, KMZ, LOC and MFT (Mapfinity) files.

- In a stream, tap plus and open the Import tab. The data is added to that stream.
- In the stream list, tap plus and open the Import tab. The data goes into a new stream.
- In another app, such as Files, Google Drive or your email app, open the file with GPS Essentials. The data goes into a new stream.

On the Import tab, the browse button picks a file on your device or in a cloud storage app, and the import starts right away. The Pictures button adds pictures from the photo picker, with their location, to the stream and category the Import tab was opened for. A picture picked with the browse button is added as a picture, see Pictures from Other Apps in the Pictures chapter; a file that is neither a picture nor a format GPS Essentials reads gets the message “Unknown format”. The link button shows a field for a link that starts with http:// or https://, filled with what is on the clipboard; tap send to import it.

The screen shows the progress. Tap Stop to cancel; a cancelled import leaves nothing behind. When the import is done, tap Open to see what was imported. Points without a usable position, such as coordinates that are not numbers, are not imported; the summary says how many were skipped. If the import fails, the screen explains why, and nothing is imported.

Export

Export writes data from GPS Essentials to a file that you can save or send to another app. You can export a whole stream, a selection of elements, a single waypoint, or all elements with a tag. Export is in

the menu of a stream, a waypoint, a chart and the style editor, among the actions for selected elements or streams, in the tag list, and in the dial menu of Portable Maps.

Select the format at the top of the screen:

- KML (Google Earth): KML optimized for Google Earth.
- KML (Google Maps): KML optimized for Google Maps.
- GPX 1.0 and GPX 1.1: understood by most GPS devices and apps.
- KMZ: compressed KML.
- LOC 1.0: the LOC waypoint format.
- MFT 1.0: the Mapfinity File Format.

Altitudes in GPX, KML, KMZ and LOC files are above sea level, as other apps read them. MFT keeps them as recorded, above the WGS84 ellipsoid. An import converts back. GPX and LOC files from GPS Essentials 5.0.0 and older hold the altitudes as recorded and are read as they are. KML and KMZ files from those versions are read as above sea level, like any other, and their altitudes come out about 30 m off in places.

Save As opens Android's “Save as” dialog: you choose the folder and the file name, on your device or in a cloud storage app. The file is then written in the background, and the screen and a notification show how many elements are written, for example “Writing 1,234 of 56,789”. You can leave the screen or turn the device meanwhile; tap the notification to return to it. To cancel, tap the close button next to the progress message, or Cancel in the notification; the unfinished file is removed. The export runs until it is done, also when you leave GPS Essentials, and without the permission to show notifications too; the screen then shows how far it is. If Android stops it anyway, it starts again from the beginning, into the same file, and the result says why. Only one export runs at a time: while it runs, Save As and Share do nothing. Share sends the file to another app, such as Gmail, Google Drive or Dropbox. It prepares the file first, because these apps need to know its size; the screen says “Preparing export” until then, and the close button cancels.

To send streams as a file, select them in the stream list, choose Export and then Share on the export screen.

Share

Share puts a stream on mapfinity.com and gives you a link to it. Whoever opens the link sees the stream, its positions and pictures in a web browser, without an account. Share is in the menu of a stream and of the style editor, and among the actions for one selected stream in the stream list, for every stream. It opens a sheet that shows what there is and changes in place from one state to the next: on top the link, with a line under it that says where the stream stands and the note that anyone with the link can read it; below, the stream's size in elements and how much the account's shared files take of what they may take (“… of … used”, a dash until the device knows it); then the buttons, and Remove share at the bottom. A line below the progress bar says what is going on or what went wrong.

Not signed in, the line says “Not signed in” and the sheet offers Sign in with a Google account; after the sign-in it shows the stream's share, or Share. This happens once: GPS Essentials keeps the account and

a session with the server, and later Shares use only the session, without any sign-in on the screen. It keeps no password. GPS Essentials asks for a sign-in again only after Sign out or Delete Account on the Account screen, when the account is removed from the device, or when the server no longer takes the session. The session is not part of a backup: restored onto another device, the app signs in again at the first Share. The same account is meant for backups and subscriptions later.

Signed in and not shared, the line says “Not shared”. Share writes the stream's elements and uploads what the shared copy lacks of them; the sheet shows how many elements are written, then how much is uploaded, then “Checking upload” while the server reads what was uploaded, and Cancel stops it. Without a network connection, Share says “No network connection” and does nothing.

The shared streams of an account may take only so much space on mapfinity.com together; how much depends on the account's profile, and every account starts on the profile free. A stream shared again counts with its new size instead of its old one. A Share that would go over it leaves the shared copy as it was and says “Share not uploaded” with what the account uses and how much it may use, as “… of … used”. Remove share frees the space of a stream. The Account screen and mapfinity.com/account show the same two numbers.

The link shows as soon as the upload is done. Behind it, Share uploads the link's preview: the stream's name, a line with the date, the distance, the time and the ascent of its tracks as the Track Card adds them up, in the units set in GPS Essentials, and a picture of the stream on the Mapfinity map, drawn by GPS Essentials in the map's day colors. Messengers and social media show these when the link is pasted; mail apps do not, so Send link attaches the picture when a mail app is chosen right after the upload. A link pasted within the first seconds can still show a general preview. The picture holds only what is in the shared stream, no location and no other stream. If the preview cannot be made or uploaded, the link still works and shows a general preview; Share again makes a new one. Messengers keep a preview they have once fetched, so a link already sent can show the earlier one.

When the upload is done, the sheet shows the link in place. The copy icon at the end of the link puts it on the clipboard; Send link hands it to another app, such as a messenger or mail. Only the link goes; to send the file itself, use Export. The line under the link says when the shared copy was uploaded and its size, “Uploaded … · …”. A stream keeps its link: when the stream changed on the device since its upload (it was renamed or restyled, or elements were added or deleted; an element edited in place does not count), the sheet offers Upload changes, which uploads what changed under the same link, so that whoever has it sees the new version; otherwise the button says “Up to date”. When the shared copy was uploaded later from another device, the sheet says “The shared copy is newer than this one”; Upload changes then joins the two where both only added elements, and brings the result onto this device; where the two changed the same elements, it says “Not merged” with what differs, and both stay as they are. Signed in, GPS Essentials also brings its shared streams up to date with mapfinity.com in the background whenever it comes to the front: what changed on this device is uploaded, and what changed on the shared copy is brought here. A link that was sent shows the stream as it was at the last upload.

A shared stream has a cloud icon under its icon in the stream list. Remove share, at the bottom of its share sheet, deletes the link and the shared file on mapfinity.com, and the link no longer opens; the cloud goes away and the sheet says “Share removed” and “Not shared”. There is no confirmation. A

Share after it makes a new link. Without a network connection, Remove share says “No network connection”; if the server cannot remove the share, it says “Share not removed” with the reason, and the stream stays shared. A share that is already gone on the server, for example deleted on mapfinity.com/account, counts as removed.

Which streams are shared is what the server says for your account: GPS Essentials keeps a copy of the account's list on the device and brings it up to date in the background, each time the app comes to the front, when a share sheet opens, after signing in, and after Share and Remove share; the account's use comes with it. So a stream counts as shared however it came onto the device, also when it was exported, shared, deleted and imported again from its file, or shared on another device: a stream keeps its link in its file. Without a network connection, or signed out, the device keeps the list it has; no message is shown. The list is not part of a backup; on another device it comes with the first update after signing in.

Deleting a shared stream deletes only its copy on the device: its shared copy on mapfinity.com and its link stay, and the confirmation says so. Shared Streams then lists it among the streams not on this device, and it can be loaded again from there. To stop the link, use Remove share before deleting the stream, or remove the share later in Shared Streams or on mapfinity.com/account.

The shared file is the MFT file that Export writes. It includes the ID of the device that recorded the track. To stop one link from opening, use Remove share on its stream; to stop all links, use Delete Account on the Account screen (Settings, Account), which also takes the cloud icon off every stream.

Shared Streams

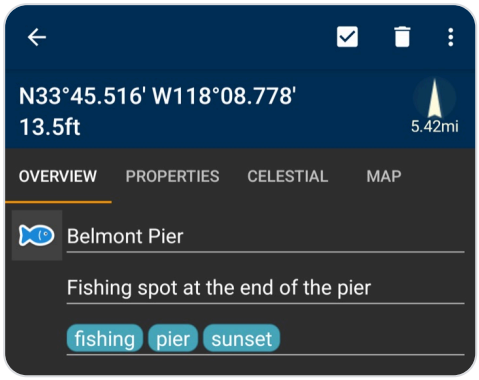
Shared Streams, the tile Shared on the start screen and under Streams in the navigation drawer, lists the streams your account shared on mapfinity.com: from this device and from any other. It is a stream list like the others and shows at once, from the account's list as the device has it (see Share above); when an update from the server arrives, the list changes with it.

First come the shared streams on this device, as in the stream list: each with the icon of its stream type and the cloud, a tap opens it, and tap and hold selects it, with the same actions as in the stream list: Share opens the share sheet, with Remove share. Below them, under “Not on this device”, come the shares whose stream is not on this device, the most recently uploaded first, each with the icon of its stream type, the cloud, the name and line of its link preview and the date of its last upload; a share whose preview was not made shows its link instead of a name, and a share made before the server knew stream types shows the general stream icon. Tap one to load it: GPS Essentials fetches the shared copy from mapfinity.com, then opens it. It is then a shared stream on this device, with its link. Tap and hold one for Copy link and Remove share, which deletes the link and the shared copy on mapfinity.com without a confirmation.

Not signed in, the list says “Not signed in” below the streams and offers Sign in, which signs in with Google as the first Share does; it never signs in by itself. Without a network connection, loading a stream and Remove share say “No network connection”. The same list, with Remove share, is on mapfinity.com/account, where you sign in with Google. Account in the menu opens the Account screen,

with the profile, how much the account's shared files take and may take, and Sign out (see the Settings chapter).

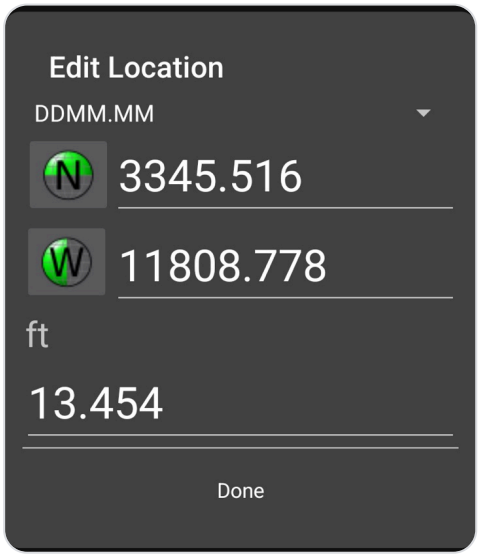
Edit Waypoint



Tap on a waypoint or a picture in the stream list to edit it. The editor has a fixed part at the top that shows the location, the elevation, and the direction and distance to it from your current location. Below the fixed part are the tabs Overview, Properties, Celestial and Map.

- Overview: tap the icon to show all icons, then tap the one you want. Tap and edit the name and the description. Their length is not limited, but only two lines are shown in the list of the stream. Type words into the tags field to add tags (see the Tags chapter).
- Properties lists all stored values, such as the position, altitude, accuracy, speed, time, category and tags, and, where they were recorded, the direction the device pointed in and how it was tilted. For a picture, it also lists the file type and size. The values cannot be changed here.
- Celestial shows today's sunrise, sunset, moonrise and moonset at the location.
- Map shows the location on a small map. Tap it to open the full map there.

The menu offers Mark, Delete, which deletes the element right away, Show on Map, Export, Set as Target, which starts navigating to it, Geocode, which looks up an address and sets the name and description from it, and Get Elevation, which sets the elevation from the terrain data.



To edit the location of the waypoint, tap on the location on the top of the screen. The location editor consists of a selector for the location format and some edit fields and buttons. When you change the location format, the location will be presented in the new format. Press **Done** to submit your changes.

When you have entered some numbers into the location editor and then select another format, GPS Essentials attempts to convert the location into the new format.

The following formats are supported:

Name	Format	Remarks
Degrees/Minutes/ Fractions	DDMM.MM, e.g. 17301.04 means 173°1.04′	Notice decimal point is after the full minutes part
Degrees/Minutes/ Seconds	DDMM.SS, e.g. 5703.12 means 57°3′12″	Notice the decimal point is after the minutes part
Decimal	D.D, e.g. 57.9234 means 57.9234°	
UTM	Zone/Northing/Easting	
MGRS	Grid Reference e.g. 4QFJ12345678	In the Position Datum. Clarke and Bessel datums use the AL row letters of the standard
OSGB36	Six Figure Notation, e.g. HU396753	Always on OSGB36, whatever the Position Datum

For example, to enter a location that Google Earth shows as 47°53'38.54"N 11°43'47.10"E, select DDMM.SS, press the hemisphere buttons until they match and enter 4753.3854 and 1143.4710. The location shown at the top of the editor depends on the Position Format in Settings.

If you want to transfer many waypoints at once, consider exporting them from the other app as a KML or GPX file and importing that file into GPS Essentials.

Routes

You use routes to plan a trip. Navigation guides you to a specific node with the ability to advance to a successive node when you reach a target.

When you start navigating, GPS Essentials will guide you to a target node. The target node is required to have a valid location. Apart from this, the target node can be any node, such as a waypoint, a picture or a track point.

📱 Start routing

1. Tap and hold a node in stream view.
2. Select the navigate button from the toolbar.

The nodes in the same category as the target node are the current route. You can switch manually between those nodes or configure auto skip to advance to the next node automatically.

You can add the route card to the route to enable route controls.

📱 Add the route card

1. Open the stream and select the route category
2. Tap on the plus button and open the Cards tab
3. Tap on Route

The Route Card

The route card shows the waypoint you are navigating to on this route, or none, and controls navigation:

- Reverse reverses the order of all waypoints in this route.
- Recreate recreates this route on the Directions tab of Add Elements.
- Start starts navigation on this route. If you are already somewhere along the route, GPS Essentials looks for the nearest leg and makes the waypoint ahead of you the target.
- While you navigate, Back and Next make the previous or the next waypoint the target. They also show while you navigate another route, and then change that route's target.
- Stop stops navigation. It replaces Start while you navigate this route.

Start first asks for permission to use your location if GPS Essentials does not have it: navigation cannot start without it. It then asks for location all the time. Navigation starts either way, but without that permission it cannot continue once Android has closed GPS Essentials in the background; Start is shown in red while it is missing.

There are other options to control navigation: You can add the Route Control widget to the dashboard to advance the target node from the dashboard. The Navigate group in the dial menu of Portable Maps, the Routing notification and scripts can control navigation, too.

While You Navigate

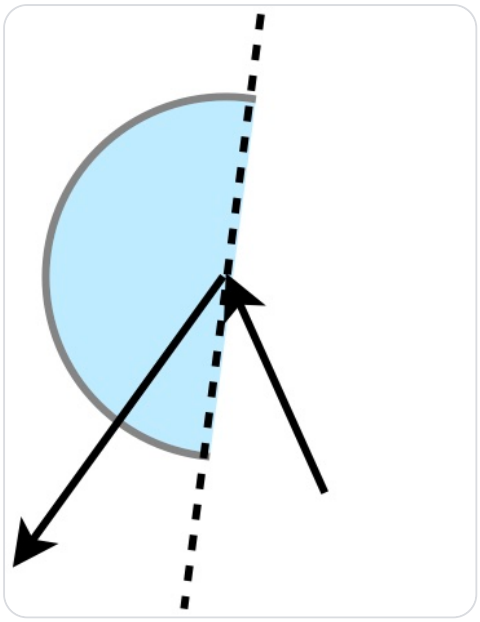
When you start navigating, a service runs in the background to track route parameters, such as your current distance, and to control voice output.

- A Routing notification shows the current target. Tap it to open the route. Its Stop, Back and Next buttons work like the buttons on the card.
- When the target changes, GPS Essentials shows the distance to the new target and its name, for example “In 300 m: Harbor”.
- When you come closer to the target than the Announcement Proximity in Settings, the target is announced again. At the last waypoint of the route, its name is announced. Speak Route Info in Settings speaks the announcements aloud, and Proximity Alert plays a sound and shows an alert with the target; tap Silence to close it.

💡 Navigation continues in the background when you switch off the screen or start another app. This will also cause the GPS receiver to stay on and drain your battery. Stop navigation when you no longer need it.

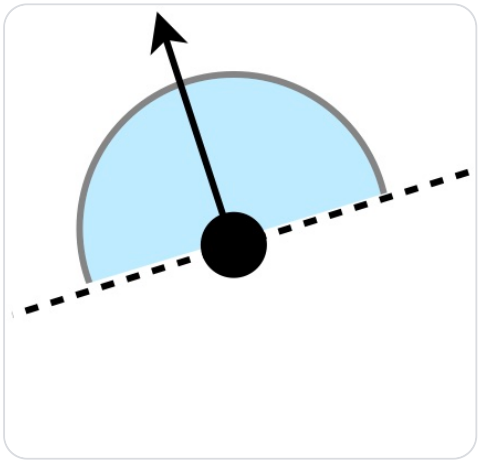
Starting and stopping navigation is noted in the Messages inbox as Navigation started and Navigation stopped, with a link to the route. Navigation can also stop without you asking: when the battery is low, when Android does not allow GPS Essentials to keep running in the background, when the permission to use your location is missing, or when the target no longer exists. You then get a Navigation stopped notification that gives the reason and, when navigation can continue, a Resume button, an unread message in the Messages inbox, and a short notice on the screen if GPS Essentials is open.

Auto Skip



GPS Essentials can advance to the next node in your current route automatically. This ability is called *auto skip*. It is on unless you turn off Auto Skip Target under Routes in Settings.

Auto skip will only happen when you are closer than the *auto skip distance* away from the target point. You can set this distance in Settings under Auto Skip Distance. Additionally, you have to cross the bisecting line between your current leg and the subsequent leg of the route. The drawing above illustrates the algorithm: Auto skip will occur as soon as you are within the blue area.



When the first route point is active, auto skip will occur when you have passed a line perpendicular to the first leg, as the drawing above shows.

Auto skip does not happen when you navigate along a track.

Straight Line Routes

Creates a route between two or more waypoints. The legs between the waypoints will be straight lines. You find it on the Straight Line tab of Add Elements, both in a stream and in the stream list.

📱 Enter waypoints to a create route dialog

The waypoint list starts with your current location.

1. Select waypoints by tapping and holding in a stream list, then tap the plus button. The waypoint list will be populated with the waypoints that you selected.
2. Or mark waypoints in any stream (see Mark/Copy/Move in the Streams chapter), then open the Straight Line tab and tap the button that adds the marked elements.
3. Or open the Straight Line tab and tap the button that adds a point. Then pick a stream and a waypoint from it.

The cross icon next to each waypoint removes it from the list.

To change the order of the waypoints, tap and hold a waypoint and drag it to the new position.

📱 Create a route

1. Tap on **Create** to create and open the route.
2. Or tap on **Start** to create the route and immediately start navigating.

Directions

The Directions tab lets you create routes along roads with turn instructions. You need a network connection to use it, but once GPS Essentials has created the route, you can navigate without one.

The waypoints list can be populated in the same way as described under Straight Line Routes above. Choose the Route Type (Driving, Walking, Bicycling or Transit) and what to avoid.

Tracks

Tracks are records of your trips. When you start recording, GPS Essentials continuously saves locations to a stream. You can review the track later, see it on a map, analyze it as a chart, or export it.

GPS Essentials keeps recording while you use other apps or the screen is off. How often a location is stored depends on Tracking Update Interval in Settings. You can export these tracks to a KML or GPX file and import them into other apps.

GPS Essentials has some built-in features to analyze tracks. For example, you can see the elevation, the speed and the battery over time and distance using the chart, and the Track card shows times, length, altitudes and speeds.

Track Control

There are many ways to start, pause and resume recording.

Each of them asks for permission to show notifications and to use your location, and then to use it all the time (Allow all the time). Recording starts only with location access all the time: without it, recording cannot continue after Android has closed GPS Essentials in the background. Notifications are not required, but without them you are not told when recording stops.

📱 Start tracking to a new stream

1. Tap on Tracks to see a list of all existing tracks.
2. Swipe from the left screen edge to the right to open the navigation drawer.
3. Tap on the record button in the side bar to create a new track and immediately start recording into it.

You can also tap the plus button in the stream list, open the Track tab and tap Start.

📱 Start tracking to an existing track

1. Tap on the track in All Tracks or All Streams
2. Tap on the record button on the track card
3. If the track card is hidden, add it by tapping on the plus button and opening the Cards tab

📱 Resume tracking

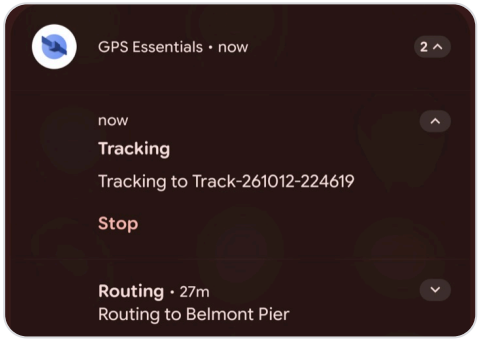
1. Tap and hold the track in All Tracks or All Streams
2. Choose Resume

You can also open the track, select the tracking category to resume in the category selection, and tap the record button on the track card.

While Recording

A paw icon in the status bar shows that GPS Essentials is recording, and a Tracking notification shows which track you are recording to. Tap it to open the track, or tap Stop to end recording. In the navigation drawer, the record button turns into a stop button, and the Tracks list shows the track on top under Recording Track.

The notification shade contains an element like the following that represents your recording.



Only GPS locations are recorded, unless you turn off Track only GPS locations in Settings. With Drop stationary locations on, nothing is stored while you are not moving. If nothing is recorded, see the Satellites chapter for how to get a GPS fix.

You can only record to one track at a time. When you are already recording to a track and start or resume recording, the current recording will stop.

Altitude and air pressure

With each location, GPS Essentials stores the altitude as GPS gives it, the vertical accuracy GPS reports for it (from Android 8), the air pressure where the phone has a barometer, and an altitude fused from GPS and the barometer. Without a barometer, the fused altitude is the GPS altitude. When the recording stops, the fused altitude is computed again over the whole recording. The chart shows it as Fused elevation, and GPX 1.1 and MFT exports keep all of these values.

Battery data

With each location, GPS Essentials also stores the state of the battery: the charge level, the temperature, the voltage, the current flowing in or out, the remaining charge, and whether the phone is

charging and from what. Some phones do not report the current or the remaining charge; these values are then left out.

It also notes whether the screen is on, the brightness, Battery Saver, how warm the phone is and the network in use. All of this is stored only with a location: while nothing is stored, for example when Drop stationary locations leaves out a stop, there is no battery data either. A change of the charger or the screen shows at the next location.

The current and the remaining charge are stored as the phone reports them. Phones differ in what these numbers mean; the chart reads them from each recording's own readings (see The Chart).

Battery data is kept in GPX 1.1 and MFT exports and read back when you import them. No extra permission is needed, and nothing about other apps is recorded.

💡 Keep an eye on your remaining battery while recording. Depending on the tracking interval, recording drains your battery within a few hours, because it keeps the GPS on.

Stop Recording

Tap the stop button in the navigation drawer or on the Track card, or tap Stop in the notification.

GPS Essentials notes each start and stop in the Messages inbox: Track Recording Started, Track Recording Resumed and Track Recording Stopped. Each message links to the track. The stop message also gives the length, the duration and the altitude gain.

Recording stops without you asking when the battery is low, when Android does not allow GPS Essentials to keep running in the background, when the permission to use your location is missing, or when you delete the track being recorded. A Track Recording Stopped notification then gives the reason and stays until you dismiss it. When recording can continue, it has a Resume button, which continues the same recording in the same category of the track. You also get an unread message in Messages and, if GPS Essentials is open, a short notice on the screen. If the location permission is missing, there is no Resume: allow location access, then start again from the Track card.

If GPS Essentials itself ends while recording, for example after a crash, recording continues in the same category of the track, when Android restarts GPS Essentials or when you open it again. A notice then says “Recording interrupted from to ”. No points are recorded for the gap. Recording does not continue by itself after a stop you asked for or after one of the stops above.

To split a recording into categories by motion mode, use Split by Mode in the stream menu; see Motion Modes in the Streams chapter.

The Track Card

The Track card shows information about a track and controls recording and playback. Its values are those of the category in view with all the categories under it; on the top category, of the whole stream.

- Start Time and End Time: the first and the last recorded location.

- Duration and Length: how long and how far.
- Altitude: the lowest and the highest altitude.
- Top Speed and Average Speed.

The record button continues recording into this track; while this track is being recorded, it changes to stop. If it is shown in a warning color, GPS Essentials may not use your location all the time, which recording needs. The play button plays the track back: GPS Essentials uses the recorded locations instead of the GPS, so maps and the dashboard follow the track. Tap it again to increase the playback speed. The stop button stops playback. On the top category, playback plays all track categories of the stream in time order, one after the other, such as a day split by motion mode; on a track category, that category. Maps and the dashboard go on from one category to the next.

The Chart

View > Chart in a stream, or a tap on the Chart card, shows the charts of a track; Charts in the Streams chapter describes them. For a track:

- The Elevation panel shows the ground under the track as an area under the track's line, from the elevation tiles, with a gap where the tiles cannot be read.
- Fused elevation shows the altitude fused from GPS and the barometer, with a band one σ either side.
- Current and Charge used are shown as the recording's own readings say they mean. Where they contradict each other or do not tell whether the current flows in or out, both are left out.
- The button at the right of a chart's name maximizes that chart to the whole chart and back; TalkBack reads it as “Maximize” or “Minimize” with the chart's name.

How a Track Is Drawn

On the map, a track whose style, and the styles above it, have no Altitude setting is drawn as Altitude of tracks in Settings says: Auto, On ground or At altitude. Auto follows the track's motion mode; see Altitude in the Streams chapter.

Waypoints

The Waypoints stream is a default place to store your waypoints.

Waypoints is a stream that keeps all new waypoints that you create without choosing a stream, for example on a map opened from the start screen.

The Waypoints stream will spring to life when you delete it and create the next waypoint. Apart from this, the Waypoints stream is a stream just like any other. For example, you can star or unstar the stream to show it while viewing other streams.

Creating Waypoints

There are several ways to create a new waypoint. You can then select the waypoint as a target and navigate to it.

- In a stream, tap the plus button and open the Waypoint tab (see the Streams chapter). Or type into “Add a message” on the Post card and tap send, which creates a message at your current location.
- In Portable Maps, tap and hold the map to create a cursor, open the dial menu and select Edit and then Add. Edit also has a button that creates a waypoint from a contact.
- In Google Maps, select Add Waypoint from the menu and tap on the map, or select it twice to create a waypoint at your current location. Find Contact and Search also find locations that you can turn into waypoints.
- Tap a geo link, for example on a web page, and choose Show on Map (GPS Essentials). Portable Maps marks the location; select the mark, open the dial menu and select Edit and then Add to keep it.
- Import waypoints from a GPX, KML, KMZ, LOC or MFT file.

The Camera creates pictures with your location, not waypoints.

When you create a new waypoint closer than the Waypoint Overwrite Distance in Settings to an existing one, the existing one is overwritten.

To find waypoints again, give them tags (see the Tags chapter) or search the stream.

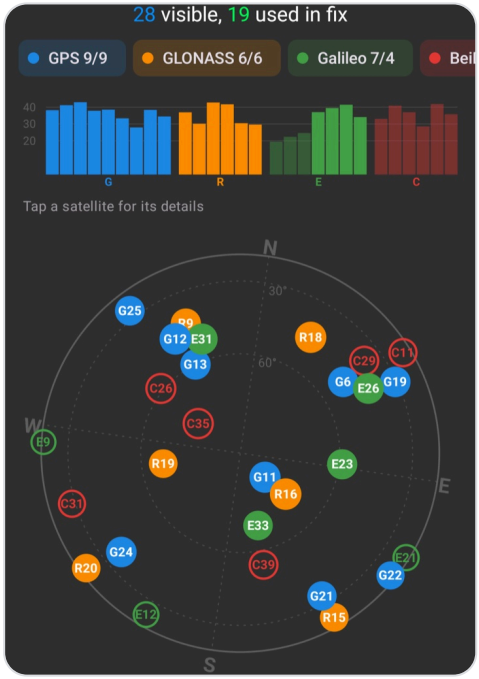
Satellites

This is a sky view of all navigation satellites that your device receives. This view is good in cases when you don’t have a GPS location and you don’t know why.

GPS receivers interpret signals coming from satellites that revolve the earth: besides the American GPS, today's devices also receive GLONASS, Galileo, BeiDou, QZSS and others. Before a receiver emits a location (also called a GPS fix), it must receive signals from at least 4 satellites. There are many things that can prevent the receiver from seeing the satellites. The lower the satellite is above the horizon, the longer its signals travel through the atmosphere, so satellites high above the horizon usually have better signals. Thick clouds, especially thunderstorms, can weaken the signal and so do windows, trees, vehicles and buildings.

The GPS antenna built into your Android device also plays an important role. Some devices work better than others.

The satellite view helps you understand the quality of the signal you are currently receiving and gives you an idea if and how you can take measures to improve it.



The view is a top view of the sky above you. It turns with your device, so it matches the directions around you. Satellites on the outer circle are on the horizon; the dotted circles are 30° and 60° above it.

Each satellite is a disc at its position, colored by its system and named the way receivers do, with the system's letter and the satellite's number, such as G12 or E24. A filled disc is used in the current fix, a

hollow one is received but not used, and a grey one sends no signal. The stronger the signal, the larger the disc.

Satellites can be in view but not used for the GPS fix. This can happen if the signal quality is not good enough, usually because the signal of the specific satellite is too weak.

The chips above the sky name each system with how many of its satellites are received and how many are in the fix; tap one to hide or show its satellites. The bars show every satellite's signal strength in dB-Hz, grouped by system. Tap a satellite or its bar for its details: its signals and bands, where it stands and whether it is in the fix.

The information lines at the top show your current position and the accuracy of the fix, if there is one, and how many satellites are received and how many of them are used in the current fix.

Android shares satellite data only with apps that have access to your precise location. If you allowed only approximate location, no satellites are shown, and a hint lets you switch precise location on.

Getting a Fix

📱 Get a GPS fix

1. Check that location is switched on for your device, and that GPS Essentials may use your location, with Precise location switched on.
2. Go outdoors, clear of buildings and trees, with a clear view of the sky.
3. Open the Satellites screen. There should be at least 6 filled discs with strong signals.
4. Wait. Under bad conditions, especially when you switch on the device at a new location or when there is no cell network to estimate your location, the first fix can take up to 20 minutes.

Pictures

Shows, locates and shares the pictures that you took within GPS Essentials.

In Pictures, you can swipe through all pictures of the Pictures stream, which holds the pictures you take with the camera in GPS Essentials. To see the pictures of any other stream, open the stream and select View > Pictures from its menu.

Pictures that you took with other apps, such as the camera app of your device, do not appear here by themselves. To add them, see Pictures from Other Apps below.

Swipe to browse. Tap a picture to view it. The picture gallery supports a full screen mode that hides navigation decorations so that you can focus on the content.

📱 Switch the picture gallery to immersive mode

1. Double tap in the picture list to switch to full screen
2. Double tap again to switch back
3. Swipe from the edge of the screen to show the navigation buttons

The menu of the gallery offers Add, which opens the camera to take a new picture for this stream, Mark to copy or move the current picture to another stream, Delete, Show on Map, which opens the map at the location where you took the picture, and Share, which sends all pictures shown here to another app. Selection > Copy here or Move here copies or moves the elements you have marked into this stream.

Viewing a Picture

A single picture shows its name in the toolbar. You can pinch to zoom in and out and swipe to pan.

- Edit opens the picture's details, such as its name, description, tags and location, in the waypoint editor.
- Rotate turns the picture by 90°.
- Adjust Horizon straightens a picture that you took with the phone tilted. It uses the tilt the camera recorded, turns the image so the horizon is level, and crops the edges. This changes the stored picture.
- Mark, Delete and Show on Map work as in the gallery. Which map opens depends on Default Map Type in Settings.
- Share sends the picture to another app.

Transferring Pictures

To share a single picture, select Share from the menu. You will get a list of apps that you can use to share the picture. The list grows when you add more apps capable of sharing data.

To send many pictures at once, use Share in the gallery. Each picture stores the location and direction where you took it; the settings under Saved Image Meta Data in Settings control whether your device ID and location are also written into the image files.

Saving Memory When Processing Pictures

When you capture a picture, GPS Essentials post-processes it in the background to store additional information. This can run out of memory, especially when you have many apps running and you are processing large pictures. GPS Essentials then leaves an Out of Memory message in Messages. Reduce the picture size in the Camera screen, or close apps you are not using.

Pictures from Other Apps

Pictures from the gallery, from an email or from any other app come into a stream in these ways:

- Import (the plus button in a stream, then Import) has a Pictures button. It opens Android's photo picker, and the pictures you pick go into the stream and category Import was opened for. Opened from the stream list, a list of streams asks where they go.
- On the Post card of a stream, the gallery button opens the photo picker too. The pictures go into the stream and category shown, as the camera button's do.
- In another app, such as Gmail, Google Photos or Files, share one picture or several to GPS Essentials. A list of streams asks where they go; it starts at the stream pictures went into last, or at Pictures the first time.
- In Import, the browse button can pick a picture as it picks a file. Opened from a stream, the picture goes into that stream; otherwise the list of streams asks.

GPS Essentials stores each picture as it comes and reads from it, where the picture holds them, where it was taken (latitude, longitude and altitude), when, which way up it is, and its name. A picture without a location gets none: GPS Essentials does not put your current location there. A picture without a time gets none either. A time without a time zone is read in the time zone of the device, unless the picture's GPS time says the instant.

Android withholds the location of pictures from apps unless it is given on purpose:

- The photo picker asks whether to include the location (“Include location info?”), on Android versions whose picker can ask; include it, and the pictures keep their location. The picker does not give the file names, so these pictures have none.
- Pictures that Android's media store serves, such as those picked under Images with the browse button, or shared by apps that hand out the media store's pictures, come without their location.

The message after adding them says “Location not available on this way in. The Pictures button in Import keeps it.” GPS Essentials does not ask for a permission for this.

- Attachments from email and files from Files or cloud storage come as they are, with their location.

A file that is neither a picture nor a format GPS Essentials reads gets the message “Unknown format”, and nothing is imported.

Messages

Messages is the inbox of GPS Essentials. The app writes a message whenever something happens that you should know about, even while the app is in the background. Open it with the Messages button on the start screen or in the navigation drawer.

Messages are always listed by time with the latest message on top of the list and older messages further down. Unread messages have a blue dot below their icon so that you can distinguish them from messages you have already read. The Messages button on the start screen shows the number of unread messages.

What You Find Here

- Upgraded to ... tells you what's new after an update.
- Track Recording Started, Track Recording Resumed and Track Recording Stopped. The last one says why the recording stopped and gives the distance, duration and elevation gain.
- Navigation started and Navigation stopped.
- Track Deleted, Route Deleted and Stream Deleted when you delete a stream.
- Out of Memory when a picture could not be processed.
- Notes about the app itself, such as Usage Statistics.

Messages can contain links and you can tap on them to follow. For example, when you started recording to a track, you can tap on this track right from the message.

Read and Unread

Only important messages will be marked unread. A message is filed as read when you caused it yourself, for example when you stopped a recording; we don't want to steal your attention. When recording or navigation stops without you asking, for example because the battery is low or Android did not allow it to continue in the background, the message stays unread. In that case a notification also tells you why it stopped.

Messages about recording, navigation, deleted streams and memory are removed automatically once they are more than two weeks old, so that your message list is not getting too long.

Working with Messages

Tap a message to open it. This marks it as read. There you can also choose Mark as Unread, Share to send the title and text to another app, and Delete to delete the message for good. It does not go to the

Trash.

In the list, tap and hold messages to select them. Then choose Mark > Mark as Read or Mark as Unread, or Delete to move them to the Trash. The Messages list is a stream, so everything in stream view works here, too.

Tags

You use tags to structure your waypoints, pictures and streams. Tags are words that you can attach to any one of these elements. The Tags list then groups the elements by your tags.

By means of tags, you can structure your data. Because tags can be assigned to different kinds of elements, tags make it easy to bind together different element types, such as a stream with a route and the waypoints and pictures along it.

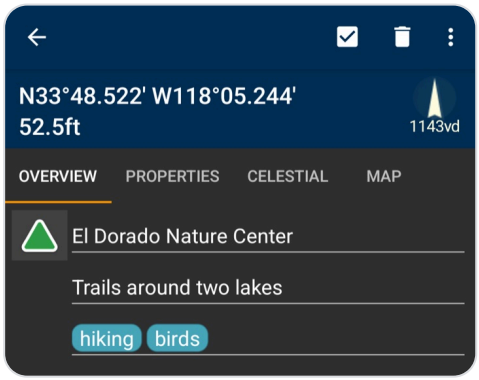
Tags should be very short terms that uniquely describe an aspect of the elements that you want to attach to them. Think of a tag as a label that you can attach to everything, but as opposed to a label, you can attach the same tag to many elements. E.g. if you are hiking, you will have many waypoints that denote camps. You can now add the tag Water to those waypoints that have water supply. When you open the Water tag later, you'll see a list of all camps that have water supply.

Adding and Removing Tags

You cannot add tags in the Tags list. To add tags, type one or more words, separated by spaces, into the Add tags field of the element. Each word becomes a tag.

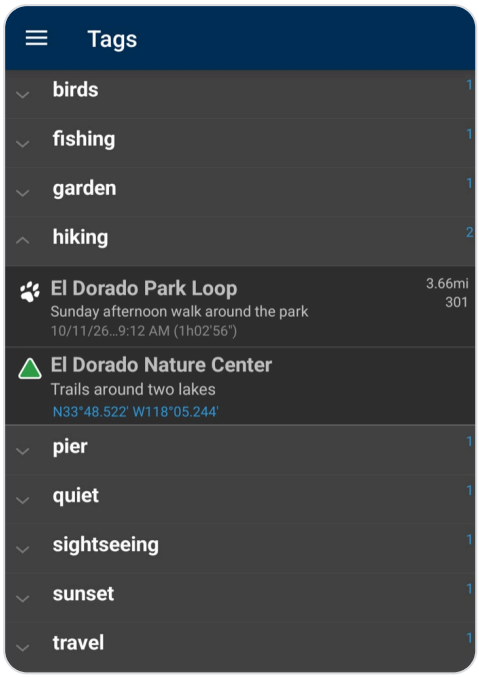
- For a waypoint or a picture, use the tags field on the Overview tab of Edit Waypoint, which also edits pictures.
- When you create a waypoint, use the tags field on the Waypoint tab of Add Elements.
- For a stream, tap the description or the tags on its Info card in the stream view.

To remove a tag, delete the word from the field.



The Tags List

Open it with Tags on the start screen or in the navigation drawer. It shows an alphabetically ordered list of all your tags. Tap a tag to see the elements that have this tag. Tap an element to open it.



Tap and hold a tag and choose Export to save all elements with this tag as a file. Tap and hold an element and choose Export to save just that element, or Show on Map to see it on the map.

Settings

Configures all global settings in a single place.

The configuration is organized into sections. Tap on the setting to change it. Most of the settings have a list so that you can choose the desired value. If the setting is a simple yes/no choice, you can toggle a switch.

GPS Readout

- GPS Update Interval: how often GPS Essentials asks for a new location. Faster updates increase readability but consume more battery. If you use the dashboard, it is recommended to use “Fastest”.
- Tracking Update Interval: how often a location is added to a track while you record it. Use bigger intervals to preserve space.
- Drop stationary locations: leaves out locations from a track while you are not moving, to save storage.
- Track only GPS locations: records only GPS locations in tracks. When it is off, Wi-Fi and cell tower locations fill in while GPS has had no fix for half a minute or longer, indoors or in a tunnel, for example. When it is on, GPS Essentials asks only the GPS for locations while it records, which saves battery.
- Altitude Mode: where the dashboard's Altitude comes from: Location Manager (Default), Android's altitude above the WGS84 ellipsoid, converted to sea level with the EGM2008 geoid, or GPGGA, the sea-level altitude in the receiver's NMEA data. Fused Altitude and recorded tracks always take Android's altitude. See Altitudes.

Presentation

- Theme: Dark, Light or the system default.
- Widget Size, Widget Theme and Widget Font: the size, look and font of the widgets on the dashboard and below the maps and the compass. The themes are Classic, Plain, Modern and Glass. The font is System, which keeps the theme's own, or one of the display fonts Bitcount Grid, Doto, B612 Mono, Audiowide, Orbitron and Michroma.
- Track Color, Route Color and Running Route Color: the colors of track lines, route lines and the route you are navigating.
- Location Icon and Location Icon Color: the icon and color that mark your location in Portable Maps.
- Utility Color: the color of utilities such as the scale or cursors.

- Units: the unit system for values, such as kilometers and meters, or miles and feet. Altitudes, and the elevation in the QNH dialog, are in its unit of height. The QNH has its own unit, hPa, inHg or mmHg, chosen in the QNH dialog (see Setting the QNH).
- Position Datum: the datum of UTM and MGRS positions. OSGB36 positions are always on OSGB36; one of the Ordnance GB 1936 datums selects which parameters are used to reach it. Degrees are always WGS 84.
- Position Format: how coordinates are shown. You can choose between Degrees, Minutes, Seconds; Degrees, Minutes, Fractions of minutes; Decimal; UTM; MGRS; and OSGB36.
- Angular Unit: degrees or mils.
- Bearing: whether bearings refer to true north or magnetic north.
- Clamp Heading: uses your direction of travel as the heading instead of the compass, always, when moving, or never. This helps in vehicles.
- Temperature: Celsius or Fahrenheit.

Routes

- Auto Skip Target: moves on to the next target automatically when you pass one.
- Auto Skip Distance: how close to a target automatic skipping starts. Only used while Auto Skip Target is on.
- Speak Route Info: speaks information about your route.
- Proximity Alert: the sound to play when you approach a target.
- Announcement Proximity: how close you must be to a target before it is announced.
- Waypoint Overwrite Distance: when you create a new waypoint closer than this to an existing one, the existing one is overwritten.

Saved Image Meta Data

Two switches control what GPS Essentials writes into the pictures you take with its camera: Device ID writes an ID of your device, and Location writes the location where you took the picture. Anyone you share the picture with can read this information.

Maps

- Map Scale: the scale of the map background in Portable Maps. Larger values make map text smaller.
- Default Map Type: Portable Maps or Google Maps, the map that opens for example when you select Show on Map.
- Altitude of tracks: how the map draws the tracks, pictures and waypoints of a category whose style, and its parents' styles, have no Altitude setting: Auto (the default), On ground, on the terrain, or At altitude, at their altitude above sea level. Auto follows the category's motion mode: Flight at its altitude; Stationary, Walk, Bike and Drive on the terrain; where no mode is known, tracks on the terrain and pictures and waypoints at their altitude. The KML (Google Earth) export writes the mode that results. A setting in the style editor wins over this one.

Miscellaneous

- Storage Setup: shows how much space the data takes, sets the limit for purgeable data such as cached map tiles, clears it, and repairs the database. Elements that no longer belong to any stream are moved to the Lost & Found stream.
- Storage Location: where data is stored on the device.
- Edit Scripts: edits script files and reloads them; see the Scripting chapter.
- Keep Screen On: keeps the screen on while the app is open: Always, When plugged (the default) or Never.
- Geocoder: the service that looks up addresses, used to search on the maps and to name new waypoints and pictures after their address. Built-in (Google) uses the service built into Android. None turns address lookups off.

Privacy

- Usage Statistics: lets GPS Essentials collect usage statistics to improve the app. Switch it off to stop this. See the privacy policy.
- Ads Privacy: changes what you agreed to for ads and usage statistics. Shown only where that consent is asked for (the EEA, the UK and Switzerland).
- Delete Usage Data: deletes the usage statistics and error reports not sent yet and starts a new Analytics ID. Statistics already sent are no longer linked to this device and are deleted automatically within 2 months. Tracks, waypoints, pictures and settings stay.
- Account: the Google account that GPS Essentials uses for Share, “Signed in as” and the account or “Not signed in”. It opens the Account screen (see Account).
- Error Reporting: what happens with a report after the app crashes; see Appendix B.

Debug

- Map Debugging: shows debug information on the map.
- Profile Database: writes database profiling data to a log file.
- Write Log File: writes app events to a log file.

Saving Battery

The GPS, the processor and the display use the most power. GPS Essentials switches off the GPS whenever it can. A few settings help, too:

- Keep Keep Screen On at When plugged, or choose Never. The display quickly drains your battery.
- Choose a longer GPS Update Interval. Faster updates use more battery.

Close the Compass and Camera screens when you don't need them, and stop recording and navigation when you no longer need them. When Android reports that the battery is low, GPS Essentials stops

recording and navigation; a notification tells you so and offers to resume, for example after you have plugged in a charger.

Account

The Account screen, opened with Account under Privacy in Settings or from the menu of Shared Streams, holds what concerns the Google account that GPS Essentials uses for Share:

- Account: the account the app is signed in with: its picture, its name where the sign-in gave one, and its e-mail address; or “Not signed in”.
- Sign in, when not signed in: signs in with Google as the first Share does.
- Sign out, when signed in: ends the session on the server and forgets the account on this device, without a confirmation. The shared streams stay on mapfinity.com and the streams on the device keep their cloud icon; the next sign-in with the same account finds them.
- Profile and Shared files, when signed in: the account's profile, which sets how much its shared files may take together on mapfinity.com, and how much they take, as “… of … used”. Without a network connection the screen says “No network connection”.
- Shared Streams: opens the list of the account's shared streams (see the Streams chapter).
- Delete Account: deletes the account and everything stored with it on the server, today the shared streams, so that their links no longer open. It asks you to confirm, then ends the session, withdraws GPS Essentials' Google sign-in permission for the account and signs out on this device, also when the server held nothing for the account. Signing in again later is like the first time: Google asks for your consent, and the account starts empty. It is offered only while an account is signed in, and greyed out otherwise; to delete an account this device does not hold, for example after reinstalling the app, sign in first, or use mapfinity.com/account. The data on the device stays. Afterwards no stream counts as shared on this device. The next Share asks for a sign-in again and makes new links. You can also delete the account on mapfinity.com/account, where you sign in with Google to do it; the page also lists the account's shared streams, each with Remove share.
- Privacy Policy: opens the privacy policy.

Support the App

Developing and maintaining GPS Essentials is a lot of work. When you buy GPS Essentials PRO, you support this effort and new features. You will not find any additional features in PRO; the free version is complete.

Our way to say thank you is that PRO switches off the ads. Tap PRO on the start screen to buy it on Google Play. Google handles the payment, and GPS Essentials does not see your payment details.

If you bought the donations plugin earlier, it still switches off the ads.

Scripting

GPS Essentials provides an automation interface called “Scripting”. With scripting, you can write scripts that automate your workflows and run at a later point in time. You can also use scripting to define custom ellipsoids and datums.

GPS Essentials scripts are written in JavaScript. If you are not familiar with JavaScript it is recommended that you at least learn the basics before writing your own scripts. You can still try out the tutorial and make simple modifications to the scripts in the tutorials with little or no knowledge of JavaScript.

All scripts are JavaScript files (.js) in the scripts folder of the storage location you chose in Settings. GPS Essentials provides a simple script editor: open it with Edit Scripts in Settings. You may also use third party script editors or edit scripts on your desktop computer and copy them into the scripts folder to use them.

Every time GPS Essentials starts or you choose Reload in the script editor, all scripts will reload. If there is an error in your scripts, the script editor will show it below the script. You will also see a hint on the start screen, the dashboard and Portable Maps when a script fails; its Edit button opens the script editor.

In the script editor, Add creates a new script, the drop-down list in the toolbar selects a script to edit, and Delete in the menu deletes the selected one right away. Your changes are saved when you switch scripts or leave the screen.

📱 Write your first script

This step-by-step tutorial lets you write your first script that does nothing but shows a message.

1. Open GPS Essentials
2. On the start screen, tap on *Settings*
3. Tap on “Edit Scripts”
4. Tap on “Add” (the plus sign)
5. Enter *test* as the script name
6. Tap on the right arrow to create the script. This creates an empty script for you
7. Tap into the script window to activate the cursor on the last (empty) line
8. Enter

   ```
   toast("Hello World!");
   ```

9. Choose *Reload* from the menu to reload scripts. You should see a toast message.

10. If you have an error in your script, a red error message appears on the bottom of the screen.

📱 Creating custom dashboard buttons

You can define a custom widget and write scripts that run when the user taps on the widget.

1. Create a new script that contains the following code:

```
var w = new Widget("addWaypoint");
w.title = "Add Waypoint";
w.description = "Adds a new waypoint at the current location";
w.addButton("tb_add").setTapListener(function() {
});

register(w);
```

What happens in this script? In the first line, we create a new widget for the dashboard. You need to specify a unique string so that the widget can store data. We will come back to this parameter in a later tutorial.

In the next 2 lines, we assign a title and a description to the widget. These values will show up in the add dialog. The next line defines a button in this widget. The first parameter to the function is the name of the icon.

The following icon names can be used: tb_add, tb_arrow_left, tb_arrow_right, tb_bulk, tb_camera, tb_chart, tb_check, tb_contact, tb_edit, tb_export, tb_help, tb_map, tb_more, tb_move, tb_mylocation, tb_navigate, tb_pause, tb_play, tb_remove, tb_search, tb_settings, tb_view, tb_zoom_all, tb_zoom_in, tb_zoom_leg, tb_zoom_out.

The second parameter is a function that will be called when the user taps the button. We'll add an empty function here to do nothing.

Finally, we have to register the widget with GPS Essentials.

After reloading scripts, open the dashboard and tap on a free space to add a widget. The list should contain our new widget.

📱 Add a waypoint

Let's add some code to create a waypoint to the previous script.

1. Open the script file from the previous tutorial.

2. Insert the following code into the function definition:

```
var n = new Node();
n.name = "Waypoint";
```

```
n.description = "This waypoint was created on user request";
n.iconId = "circle";
n.location = location;
waypoints.insert(n);
n.save();
```

3. Choose *Reload* from the menu of the script editor.
4. Tap on the new widget on your dashboard.
5. Check your Waypoints stream for a new waypoint.

📱 Control routing

You can add more buttons to a widget. Notice that there is no overflow, and you have to try and error to find out the maximum number of buttons that work for you.

The following script creates a widget that allows you to pause and control the current route:

```
var w = new Widget("routing");
w.title = "Routing Control";
w.description = "Starts and stops routing";
w.addButton("tb_arrow_left").setTapListener(function() {
    Stream.navigatePrevious();
});

w.addButton("tb_pause").setTapListener(function() {
    Stream.stopNavigate();
});

w.addButton("tb_arrow_right").setTapListener(function() {
    Stream.navigateNext();
});

register(w);
```

📱 Control tracking

The API supports creation of streams and track control. Here is a widget to start tracking into a new stream and you can also stop tracking:

```
var w = new Widget("tracking");
w.title = "Tracking Control";
w.description = "Starts and stops tracking";
w.addButton("tb_play").setTapListener(function() {
```

```
    var t = new Stream();
    t.description = "Stream created from the dashboard";
    t.save();
    t.track();
});

w.addButton("tb_pause").setTapListener(function() {
    var tr = Stream.trackingStream();
    if (tr == undefined) {
        toast("Not tracking");
    }
    else {
        Stream.stopTrack();
        toast("Tracking stopped");
    }
});

register(w);
```

📱 Custom expressions

Expressions build the fundamental state model in GPS Essentials. For example, the value that GPS Essentials show in the speed widget is the result of evaluating an expressions. Expressions can consume other expressions. GPS Essentials maintains the dependencies of expressions.

You can provide JavaScript that calculates custom expressions like this:

```
var tts = new Expression("timeToSunset");
tts.setCalculateListener(function(time, sunset) {
   return sunset.getTime() - time.getTime();
});
register(tts);
```

When this script runs, the expression timeToSunset will be available in GPS Essentials.

The following expressions are defined:

Name	Description
gps	Provides the current GPS info
trackingAngle	Provides the current tracking angle
battery	Provides the current battery state
gpsStatus	Provides the current GPS status
time	Provides the current time
current	Provides the current location
route	Provides the current route
target	Provides the current navigation target
remainingDistance	The distance to the end of the current route
targetDistance	The distance to the next target
targetEasting	The easting value of the current target
targetNorthing	The northing of the current target
totalDistance	remainingDistance + targetDistance
trackTime	The time of the current track, see the dashboard's Track widgets
trackDistance	The length of the current track
trackAverageSpeed	The average speed of the current track
trackTopSpeed	The top speed of the current track
trackAscent	The sum of the climbs in the current track
xtd	Cross track distance
atg	Altitude to go
trackingSpeed	The speed towards the tracking angle
trueSpeed	The speed towards the target
course	The direction towards the target
courseFrom	The direction from the target to the current location (course + 180°)
turn	The change of direction
speed	The current speed
altitude	The current altitude
declination	The local declination
targetSlope	The slope to the current target
ttg	The time to go to the current target

Name	Description
totalTtg	The time to go to the end of the route
eta	The estimated time of arrival at the current target
totalEtg	The estimated time of arrival at the end of the route
climb	The vertical velocity
sunset	Today's sunset time
sunrise	Today's sunrise time
moonset	Today's moonset time
moonrise	Today's moonrise time

The following tutorial shows how to create a widget that shows this expression.

📱 Expression widgets

Beside widgets that show buttons you can also define widgets that show formatted expressions. The following script shows a widget that consumes the timeToSunset expression from the previous tutorial:

```
var w = new Widget("timeToSunset");
w.title = "Time to Sunset";
w.description = "Shows the time until sunset";
w.setDrawListener(function(fmt, value) {
   fmt.timeSpan(value);
});

register(w);
```

📱 Accessing a specific node

You can read specific nodes in a script. For example, the following script shows the distance to a specific node.

The script requires you to know the id of the referring node. To get the node identifier, open the stream that contains the node, tap on the node and open the Properties tab. Scroll to “Key” and note the number after the hash sign.

```
var node = new Node(115854);

var home = new Expression("distanceToHome");
home.setCalculateListener(function(current) {
   return node.location.distanceTo(current);
});
```

```
var w = new Widget("distanceToHome");
w.title = "Distance To Home";
w.description = "The current distance to home";
w.setDrawListener(function(fmt, value) {
   fmt.distance(value);
});

register(home, w);
```

📱 Calling scripts from Tasker

GPS Essentials provides a service that you can use to call a JavaScript function you defined in GPS Essentials from Tasker. The procedure may work in many other automation apps as well.

1. Open Tasker and tap on tasks to create a new task
2. Tap on “+” and enter a name for the new task
3. Tap “+” to add an action
4. Select “System” and then “Send Intent”
5. Enter `android.intent.action.RUN` as the action
6. Enter `application/javascript` as the mime type
7. Enter `javascript:toast('hello')` as the data
8. Enter `com.mictale.gpsessentials` as the package
9. Enter `com.gpsessentials.RunScriptService` as the class
10. Select “Service” as the target
11. Tap back twice to save the changes
12. Add a profile or scene to trigger the task.
13. When you see the toast message, change `toast()` to your custom function.
14. Add your custom function to a script file, place it into the scripts folder and don’t forget to reload scripts in the script editor.

Appendix A: All Step-By-Steps

- 📱 Set the QNH from a METAR or ATIS
- 📱 Set the QNH from a known elevation
- 📱 Calibrate the compass
- 📱 Create a new waypoint
- 📱 Measure the distance between two waypoints
- 📱 Add a new waypoint
- 📱 Add the post card for text and pictures
- 📱 Mark a set of nodes
- 📱 Copy or move nodes
- 📱 Add a category
- 📱 Delete a category
- 📱 Change a category type
- 📱 Split a track by mode
- 📱 Set the mode of a category
- 📱 Start routing
- 📱 Add the route card
- 📱 Enter waypoints to a create route dialog
- 📱 Create a route
- 📱 Start tracking to a new stream
- 📱 Start tracking to an existing track
- 📱 Resume tracking
- 📱 Get a GPS fix
- 📱 Switch the picture gallery to immersive mode
- 📱 Write your first script
- 📱 Creating custom dashboard buttons
- 📱 Add a waypoint
- 📱 Control routing
- 📱 Control tracking
- 📱 Custom expressions
- 📱 Expression widgets
- 📱 Accessing a specific node
- 📱 Calling scripts from Tasker

Appendix B: Error Reports

When GPS Essentials runs into a problem it did not expect, it can send an error report to Google Firebase Crashlytics. Reports help us find and fix the problem. Nothing is sent unless you allow it, and there is no email report anymore.

You decide in Settings > Privacy > Error Reporting:

- Ask before sending (the default): the report is kept on your device. Whenever a screen of GPS Essentials comes to the front while reports wait to be sent, the app asks: Send, Don't send, or Always send, which also changes the setting. Dismissing the question keeps the reports for next time.
- Always send: reports are sent without asking.
- Never send: nothing is sent, and kept reports are deleted.

A report describes the error and where in the app it happened. It also contains the app version, the device model and build, the Android version, the language and region, display and input settings, the mobile network country and operator codes, and a device identifier that is specific to GPS Essentials. If the problem happened during an import, it also says which app and which storage provider the file came from, but not the file name. Reports contain no locations and none of your data.

If you want to tell us more about a problem, write to michael@mictale.com. The Version and Device ID at the top of the app's help home page help us find your report.

Appendix C: Versions

GPS Essentials receives regular feature additions. Since we deployed GPS Essentials to Android Market, today Google Play, for the very first time, we pushed many updates.

Every release has a unique version number that consists of three parts: A major version, a minor version and a build number, for example 4.5.38. The major version number changes when something dramatically changes in GPS Essentials and we went from 1 to 2 when we added tracking because this was a big step ahead. The minor version we increment whenever a new piece of functionality was added that we think is worth mentioning. While we add new features, we are also maintaining the app to remove bugs, make it more stable and support specific devices. Every time a new release comes out, we increment the build number so that we can distinguish the releases.

New features reach the beta channel first, then all users.

The version you have is shown at the top of the app's help home page. After an update, the “Upgraded to …” message in Messages tells you what's new.

Recent Versions

5.0.1

- New map and camera.
- Altitudes are shown above sea level (EGM2008), and GPX, KML and LOC files hold altitudes above sea level. GPX and LOC files written by GPS Essentials up to 5.0.0 keep their heights above the ellipsoid on import. See Dashboard and Streams.
- Track points carry an altitude fused from GPS and the barometer, with its uncertainty; the dashboard shows it as Fused Altitude.
- The QNH is typed in hPa, inHg or mmHg, pasted from a METAR or ATIS, or set from a known elevation. Pressure Altitude shows its QNH; STD is a setting of its own.
- New dashboard values: Elevation (the ground under the position) and Height Above Ground.
- Charts: the Elevation panel shows the ground under the track, battery current and charge are drawn as each recording says they mean, and a panel grows to the whole chart and back. See Tracks.
- Refreshed stream cards.
- Split by Mode in the stream menu cuts tracks into categories by motion mode, and a category's mode is set with one tap on its card; playback plays a recording across its categories. See Streams.
- 3D buildings with roof shapes and colours in vector maps; search on the map's visible area from the first character with house numbers by street, and tracks, pictures and waypoints at their altitude per category. See Portable Maps.
- Exports keep running in the background until done; a recording continues in the same category after Android ends the app.

5.0.0

- Vector maps that rotate and tilt, over 3D terrain, with search and a night look (Labs).
- Camera with the map over the picture, and heading calibration by the sun or the moon (Labs).
- Track charts with a panel per quantity, zoom and a crosshair; battery, screen and thermal state recorded in tracks.
- The Glass dashboard theme and six new widget fonts.
- Settings > Privacy, with Delete Usage Data.
- This manual, on gpsessentials.com/manual.