

Help File for gScouts 1.0.5 Oct 24, 2016

Purpose

gScouts is a GPS data collection and manager application that enables the users to survey a set of points using the precise satellite-based coordinates on an Apple map. A user can record the positions, notes, and photos of the points to a set of files, which can be transferred to a desktop computer using iCloud or iTunes. Points are color-coded to indicate if they have been surveyed. Data from each session are save and re-loaded as default values for next session. In addition to the points, gScouts can be set to show the locations of other users in the vicinity of the user.

Requirements:

Hardware

- Apple iPhone 6 or higher or iPad 2 or higher with heading sensors and camera
- An SBAS-tracking or differential positioning capable GPS/GNSS receiver that is capable of supplying bluetooth data to the Apple device

Firmware

Apple iOS 9.1 or higher.

Permissions Required

- Use of location service
- Access to iCloud(optional if iTunes is available on device and main computer)
- Use of camera

Non-essential Requirement

WiFi access to Internet

Input

Positioning Data

GPS/GNSS positioning data are needed and they can be supplied in several ways:

- Feeding GPS positioning data to Apple location service using receiver OEM supplied software, e.g. Trimble's GNSS Status. User will have to connect the receiver to device first(see instructions below). Horizontal accuracy, if available, is shown as a value, preceded by \pm sign, at lower-right corner of map.
- Feeding GPS/GNSS data directly to application directly. Connect Trimble PG200(R1 GNSS) or DUAL XGPS150 receiver to device using device settings(see instructions below). Horizontal accuracy is shown on map followed by HDOP and number of satellites tracked.
- Feeding NMEA GGA data from a receiver with serial output. Connect a Serial I/O TruConnect bluetooth dongle to receiver output port. Accuracy is unknown.

File

The user can supply an optional preplot file containing the approximate coordinates of the points to be surveyed. A preplot file can be a KML file, or a standard file. The standard file should have a TXT or RTF extension if it is to be downloaded via iCloud. The file name must contain the text "Preplot", case-insensitive.

If it is standard preplot file, the data must be stored in the format indicated here:

Format of a standard preplot file

- Header consists of two lines.
 - First line contains the text "Preplot".
 - Second line contains "Line Point Latitude(dms) Longitude(dms)". The text in the brackets are

the units for the respective coordinates. The string "(dms)" means degrees, minutes, & seconds. You may use "(deg)" if your latitudes and longitudes are in degrees. You may add other text, such as "Height(m)" after the end of the line shown provided it is preceded with a tab.

- One line per point, the remaining lines contains the line & point numbers of the points followed by their horizontal coordinates, at least. The line and point numbers may contain any alphanumeric characters plus valid characters shown below. The values for the latitudes and longitudes are listed according to the unit specified, i.e. dd mm ss.sssss or dd.ddddddd. The number of decimal places is up to you, and the values are separated by a tab.

Example of a preplot in a simple TXT or RTF file

Preplot Coordinates

<i>Line</i>	<i>Point</i>	<i>Latitude(dms)</i>	<i>Longitude(dms)</i>
00001	0000129 38	4.82329	-95 34 39.00072
00001	0000229 38	5.14704	-95 34 39.00072
0000X	#000329 38	5.47080	-95 34 39.00072

Valid non-numeric characters for line and point

numbers: !@\$%^&=\";<>?'+\\"/>

Format of KML(Google Earth) file

- Each point must be added to Google Earth map as a point placemark.
- The point number is the a concatenation of a numeric line id and a 4-digit numeric point id, e.g. line id=1, point id=12, then point number=10012 or 010012.
- It can be stored as the name of the placemark. If the marker is a custom type, the point number may be contained in a SimpleField named "LabelNmbr", and it must be of the type Int. Type Double is

- acceptable if the value is an integer.
- When the simplefield LabelNmbr and the name of the placemark are both present, the value in the samplefield is used

How to use:


Before launching

- Launch Apple Maps to verify that the device is receiving location data.
- Create a preplot file with the points of interest on desktop computer with access to iCloud Drive or/and iTunes
- Using its Bluetooth settings, connect the Apple device to the PG200 or XGPS150 if one is available. Launch EOM app(available at Apple store) to verify that GPS data are streaming into Apple device.
- If the GPS receiver outputs NEMA GPGGA records through a serial port, user may connect the port to a Serial I/O settingTruConnect serial-bluetooth dongle. Note the baud serial data stream of the receiver. Move the device and GPS receiver away(e.g. >20m) from other active TruConnect dongles before launching application.




-Using Application First Time


- When it is launched for the first time or after the location service & camera have been reset, this application asks the user for authorizations to access these services. Confirm them both. If user fails to do that, reset apple settings and re-launch application(see instructions below on resetting the Apple settings for location service & camera).
- When using this application for the first time, Connect device to desktop computer. Use iCloud download button or iTunes to transfer the preplot, i.e. a set of point of interest, to the Apple device(see instructions below for download). Point read from the preplot are shown as pins on the map.


The first point of a line is indicated by a brown pin and others are shown as red pins (See instructions below for meanings of the colors). The downloaded file is stored in the application document folder on the device.

- Use the settings button  to get to the settings pages, where the user can specify the source of the GPS data, e.g. Trimble GNSS receiver, or/and the baud of the serial data stream. The user can allow his/her location being shown on the map of other users from the same organization within certain radius by turn the "Show your location to others" switch (see instructions below for more). Using the settings button, the user can also change the type map (standard or satellite) to display by the application.



Using the Application


- User can load/reload a preplot file previously download from desktop by pressing the  button and select the file.
- When application is receiving positioning data within 5m or higher accuracy, a blue dot within a lighter blue circle, indicating your location, should appear and the  symbol (lower-right-hand corner) should gain its full luster. WARNING: It is up to user to ensure that the accuracies of the GPS coordinates fall within the level acceptable to the user.
- The symbol , in the upper-right-hand corner of the map shows the direction to the north pole. As you turn, the map turns with you so that top of the map is always showing your heading. Occasionally, the heading may be out-of-adjustment. User may adjust/calibrate the heading by rotating the device horizontally and vertically at the same time.
- Points are shown as pins. To find ID of the point, select a point interest by tapping on the head of the pin. Remember that the bottom of the pin is

where the point is located. When a pin is tapped, a callout appears showing the number of the point above its line number. Tapping on the (i) symbol in the callout selects the point. The application draws a blue line between the blue dot (user location) and the point after the selection. To select a point on another line, tap on the brown pin, which indicates the first point of the line, and then tap the (i) symbol, which causes the map to show all the points on the line. Then tap on the point of interest to get the callout for the (i) symbol. See instruction below if dot or line doesn't appear. At this point you may let the blue line guide you to that point. A line of text containing value right of a walking man  also appears at the lower-right-hand corner. This value shows the distance to travel to get to the point.


- If "Shown locations to others" switch is on, symbol  may appear on the map indicating the last known locations of other users of the same organization in the area. Tap the symbol to see the name and time of last location update. Locations that have not been updated for more than 2hrs are not shown.
- User may change the scale of the display and inspect other part of the map by getting out of and back into heading oriented display (see instruction below).
- If location service or differential receiver is used to provide the GPS coordinates, the distance value is followed by the accuracy of the horizontal position. The accuracy value is always preceded by a \pm sign. The accuracy is followed by the values of HDOP and number satellites in the current the GPS coverage.
- When you get within 5m of the point of interest, a bull's eye view appears. The center of the view indicates your position, and the point interest, shown as a pin head, also appears in the view indicating the relative position between you and

the point. The arrow head at top of the view is the direction you are heading. The diameters (width & height) of the pin head and the large blue dot in the center are one meter. To get rid of the bull's eye view, get out of heading-oriented display mode.


- The symbol  at the lower-right-hand corner of the full view of the device is there for marking a point on the map. Press it to initiate the marking process. User has to enter a point ID and a note if needed. The ID, note, and the coordinates of the point are dumped to a text file in the application document folder. The name of the file contains the date on which the points are surveyed.
- User has the option to request the application to activate the back camera to take a photo, which is also dumped into the application document folder. The names of the text-based coordinate file and the photo begin with the same date-based string, which ties them together as a file group.
- These files can be uploaded to iCloud or transferred by iTunes onto a desktop or laptop computer (see instructions below).
- This application changes the color of the pin after the point is marked. The color of the pin head turns to cyan for the first point of a line and green for others.
- User may select a marked point as a point interest by tapping on the head of the pin indicating the point. A marked point can be re-marked and a new line of coordinates get stored into the same text output file.
- If TruConnect dongle is chosen as the source of GPS data and the special command in the GPS settings is not null, the  button appears at the bottom of the screen. Pressing this button sends the command to the GPS receiver.
- When the user terminates the application, gScouts stores the data related to the points in its document folder. These values are reloaded when

the application is re-started the next time. To erase these data, tap , change the setting for "Save session data" to off and restart the application.

To download a preplot file

- Put preplot file on iCloud Drive. Tap download icon () lower-left-corner) to load a file from iCloud Drive. Select the preplot file. Tap "Done" button.
- If iCloud access is not possible, sync device with main computer using iTunes. Select smart phone icon(upper-left-corner). Select the icon of this application at lower part of page to show the document folder. Use Add button to transfer preplot file to the document folder.


To upload a file to iCloud Drive

- Tap upload icon  on the left-end of navigation bar to transfer a file to iCloud Drive, or

To upload files using iTunes(faster)


- Connect device to a computer that has a copy of iTunes running. Click the device symbol(upright rectangle) in the upper-left corner of iTunes window. On the new page, select Apps at the upper-left pane. Scroll down to the File Sharing panes at the bottom of the page. On the left pane, select Name of this application. A list of the files in the document folder of this application should appear on the right pane. Select files to be transferred and use Save As button at the bottom of the pane to copy them to computer.

To delete a file in application folder

- Tap  icon on the navigation bar. Select the "Delete File" cell. When a list of files in folder is shown, tap the file to delete and confirm your

intention when asked.

**To get out of or into the heading oriented display ,
i.e. map turns with you and center point is always the
user location**

- Toggle the  button. Bull's eye view only appears when map is displayed in heading-oriented mode.

To mark a point

Tap mark button. When it has full luster(it is disabled when there is no position data). The background color of the button turn green. When the dialog box appears, user

- must enter a string in the ID box and optionally type in a note in the second text box from the top,
- may accept and store point,
- may choose to store the point and request to take a photo associated with the point, or
- cancel the marking.

When user chooses to take a photo, The back camera is activated. User may take a picture

If the user chooses the to accept the contents of the dialog, the point numbers of the, their GPS coordinates, and the note are stored into a TXT file in the folder(see information below for the file)

Pin Coordinates

Line	Point	Latitude(dms)	Longitude(dms)	Height(m)	sigmaE	sigmaN
sigmaU	HDop	NSat	Time	Note		
00001	00001	29 38	5.41800 -95 34 38.40600	0.950	0.5	0.6 1.0
	1.0	09	14:59:54	Note 1		
00001	00003	29 38	5.81800 -95 34 37.41200	1.090	0.5	0.5 1.1
	1.0	10	15:10:17	Note 2		

The file name of the text coordinate file follows the following format: PinCoorYYYYMMDD, where YYYY is the year, MM is the month, and DD is the day of the day of

recording. To correlate the photos and the text coordinate file, the names of all the photos(PNG) files start with the name of the coordinate file follow by the order-number, which is then followed by the point ID. The order number starts with 1 when the first point is marked and it increases every time a point is marked. One can use this number to tie a photo to its coordinates listed in the coordinate file.

To re-mark a point

Return to the point and mark it using the same point ID. A new line of coordinates with a new order number is added to the coordinate file.

To select a point as point of interest

Tap on pin to show callout which shows its point ID.

Tap on ⓘ in callout to select.

To identify the pin representing the points

📍 First point of a line. It is yet to be positioned. Always shown on map. Select to show points on the line.

📍 Point on a line that isn't the 1st point. It is yet to be positioned. Shown only when line has been selected.

📍 First point. It has been positioned at least once. The position is the last marked position

📍 Point on a line that isn't the 1st point. It has been positioned at least once. The position is the last marked position

To make user location symbol(blue dot) or direction line(blue line) appear


If blue dot does not appear, check to make sure that Bluetooth is turned on, device is connected to GPS receiver properly, and receiver is outputting GGA data if it is using TruConnect dongle. Check to see that location service is authorized(see instructions above if it isn't). Launch Apple Maps to get the location service activated to get heading data. You may dismiss Maps after the dot has appeared. If blue line doesn't

appear, make sure that the GPS position accuracy is better than 1m (use receiver monitoring application from the manufacturer). If the accuracy is too low, this application refuses the positions and considers the user location unknown.



To reset location service and camera access

If for some reasons, the user failed to give the authorization for access to the location service or camera, user may reset the authorization settings by pressing device's Settings=>General=>Reset=>Reset Location & Privacy setting. Then, relaunch the application.


To set the GPS data source

Press the  button. Select the GPS Settings. Click the text field for GPS data source and select the source using the picker view that appears at the button. Also, select the baud in baud text field if the source is TruConnect.

To show your location to other users

Press the  button. Select General settings cell, Turn on "Show you location to others". Enter name of organization, which is used to identify other users in the same organization; your name; and the radius of the user-centered region to search for the users. When the switch is on, the last known locations of the users in the region are shown as the symbol . Tap the symbol to see the name and time of update for the user. It might take a few minutes before all the users are located and show on the map.

To get version

Press the  button. Select "Version" cell to get a dialog showing version and build numbers.

To connect a GPS receiver to Apple device

Go to device's GPS Settings=>Bluetooth. If the GPS/

GNSS receiver, e.g. PG200 or XGPS150, is Apple compatible, it should be detected and listed under My Devices. Tap the receiver item on the list to connect. To refresh the connection, go to GPS settings and save the current settings.

To use Serial I/O TruConnect dongle to get serial GPS data

Find out/set baud rate of GPS receiver data output port and make sure it is outputting GGA records. Powered-on TruConnect dongle. On gScoutS GPS settings, select TruConnect option, enter serial output rate, and press Save button. Immediately, user should see a blue flash on dongle indicating that a connection between gScoutS and dongle has been established. The power on the dongle may go off and a dialog is shown on gScoutS display to remind user to turn it back on, which saves the baud rate on the dongle. Connect dongle to receiver serial port. Blue dot for user location should soon appears on map.

To correct out of alignment north arrow

Occasionally the north arrow may go out of alignment. It usually occurs after the device has been flipped to a face-down position. To re-align the arrow, place device in the portrait position, i.e upright with home bottom at bottom and then return it to desired position after the arrow has reset itself.

Other Information:

Calibration

This application needs the heading sensors in the device for heading information. Occasionally, the sensors requires a calibration, especially after the location or environment has been drastically changed. When that happens, the screen goes black and a circle of concentric white dashes appear. A red ball is also shown within the circle and the user is asked to tilt the device such that the ball can roll around the circle of dashes. The application display returns when

the calibration is completed.

End of Help File

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