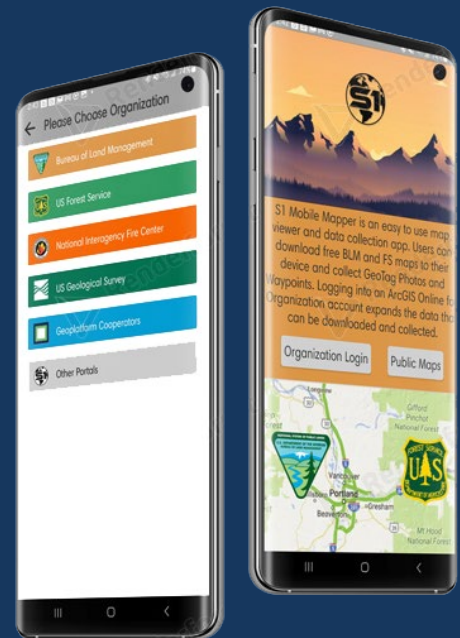




S1 Mobile Mapper Version 5.3 Agency User Guide



OR/WA Mobile GIS Team
3/31/2023



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About



The **S1 Mobile Mapper** is a custom application built by the S1 Mobile GIS team and sponsored by Oregon State Office Bureau of Land Management (BLM). The application is designed to extend offline mobile field data collection capabilities not available using commercial ESRI mapping applications and to meet the specific data collection needs of the federal agencies served by the OR/WA Mobile GIS program. The S1 Mobile Mapper application is built to run on a mobile device running the Android operating system, using the ESRI Runtime Software Development Kit (SDK) framework. It leverages the BLM agency ArcGIS Online for Organization site, internal ArcGIS Server deployments to distribute and collect enterprise, and project level Geographic Information Systems (GIS) data via agency field personnel.

Given that agency field personnel operate most commonly in remote areas with no network access, this application's emphasis is on the display, collection, and update of geospatial data and attributes with no network availability. Data is downloaded and cached on the device and edits can be synched to servers when network connectivity is available.

For additional information about the application, visit the S1 Mobile Mapper website:

<https://www.blm.gov/services/geospatial/mobile-GIS/s1mobile>

Application Specifications

Technical Requirement Specifications

- Android OS, version 6.0 or later.
- Developed using ESRI Runtime SDK 100.11.0 for (V5.2).
- Wi-Fi or cellular network availability for data download and synchronization.
- Internal GPS receiver or supported external Bluetooth receiver.
- Integrated digital camera (for capturing images).
- Hardware device sensors needed: gyroscope, accelerometer, magnetic (for calculating azimuth and inclination values).
- Affiliation with ArcGIS for Organization account dedicated login button for BLM, “Other organizations” & “Other Portals”.

Supported Hardware

- Samsung Galaxy S8, S8+, S9, S9+, S10, S10+ S20, S20+, S21, S21+, S21 ultra, S22, s22+ S22 ultra, S23, S23+, S23 Ultra, Note 8, Note 9, Note 10, Note 10+, Note 20, Note20 Ultra & XCover Pro XCover 6 Pro smartphones.
- Samsung Galaxy Tab A 2019 models (8” & 10”), S5E, S6, S7, S7+, S8, S8+, Tab Active 2 & 3, Tab Active Pro & Pro 4 tablets.
- Trimble R1 Bluetooth receiver.
- Juniper Systems Geode Bluetooth receiver.
- TruPulse Bluetooth Laser Rangefinder (Model 360(B)).
- Other Mobile & Bluetooth devices may be supported but have not been specifically tested by the S1 Mobile Team.

Known Hardware and App Limitations

Mock Locations & Bluetooth:

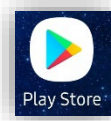
- With S1 Mobile Mapper version 5.1 and older, External GPS Receiver support requires the ability to enable Mock Locations, which is blocked by BLM Maas360 Policy. On devices running the Maas360 MDM software BLM Users must submit a help desk Remedy ticket to request the “mock locations Maas360 policy” to enable this functionality on the BLM government furnished equipment (GFE). Version 5.2 & higher of the S1 Mobile Mapper app does not require the user to enable mock locations, and therefore does not require a special Maas360 policy request.
- When using Bluetooth receivers, if switching between different Bluetooth receivers a restart of the mobile device may be necessary to receive correct GPS information from the second Bluetooth receiver.

Installation

Installation via the Google Play Store is the recommended way to obtain and receive updates to the application. BLM employees with Android Enterprise/Maas360 can access the play store either through the app catalog in Maas360 or via the Google Play app icon on the mobile device. S1 Mobile Mapper is available for download through either option. Forest Service employees may need to access this link to [create a Google Account with an existing email](#) (.gov email address) to access the Google play store with that account.

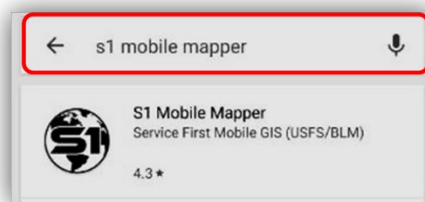
Google Play Store

- a. Go to the **Google Play Store Application**. Often you will see an icon shortcut on your devices home screen. If not on home screen, go to **Apps** and then tap on the **Play Store** app.



NOTE: A prerequisite to accessing the Google Play Store application on your devices is to either have a Google account logged in or have an Android Enterprise managed devices which uses a corporate identifier. The Google Play Store application will prompt you for credentials if they are needed. Check with agency IT or GIS staff if you need more information regarding device account setup. As per DOI Policy all DOI mobile devices must have Android Enterprise installed.

- b. Type **S1 Mobile Mapper** in the search bar and tap on **S1 Mobile Mapper** in the list.



S1 Mobile Mapper in the Search Bar

- c. Tap on **Install** to begin the installation process.



Installing the S1 Mobile Mapper App

Uninstalling S1 Mobile Mapper

Be aware that uninstalling the application will delete the contents of the S1 Mobile Mapper application directory including files located on both the internal storage and the SD card storage location, if applicable. Data deleted includes S1 Waypoints, Tracklogs, S1 GeoTag Photos, downloaded maps, and any map data/mobile versions that are downloaded to the device. Make sure to sync any field data back to ArcGIS Online (AGOL) prior to deleting the application.

If any of these files are needed or not easily redownload able to the device after reinstalling, consider copying these files to a local computer prior to uninstalling the application. However, the easiest way to deal with this scenario is to redownload your needed files after the reinstall. If needed, you can find these files in one of two following directories:

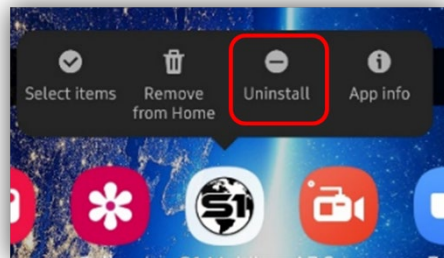
With an SD Card ...\\Card\\Android\\data\\gov.s1.s1mobile

Without an SD Card ...\\<Device>\\ Android\\data\\gov.s1.s1mobile

NOTE: *If the device has an SD card present S1 will store the data in that location. If not, it will be on the internal device storage.*

Uninstall S1 Mobile Mapper App

- a. Long press the S1 Mobile Mapper icon on the home screen of the mobile device.
- b. Tap on the Uninstall option, and S1 Mobile Mapper will uninstall. You should get a pop-up verification when done.



Uninstalling the S1 Mobile Mapper App

Launching the application

The application is launched by tapping on the S1 Mobile Mapper application icon found on the device application list.



Welcome Screen and Public Mode

The application opens to the welcome screen with a brief description of the application. The user can either log into the full version of the application by selecting the **Organization Login button** or select **Public Maps**.

To access the full suite of capabilities and functions in the S1 Mobile Mapper, BLM and USFS users will need to select the Organization Login button to log on with their ArcGIS Online for Organization account.

The public maps option allows anyone to download map products published by the BLM and USFS, capture S1 Waypoints and Geotag Photos, and deploy a few of the app's tools.

For more information on the S1 Mobile Mapper for Android Public Viewer, see the S1 Mobile Mapper Application for Android 5.3 Public Viewer user guide.



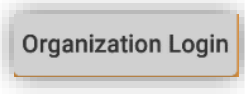
S1 Mobile Mapper Welcome Screen

Logging into the Application

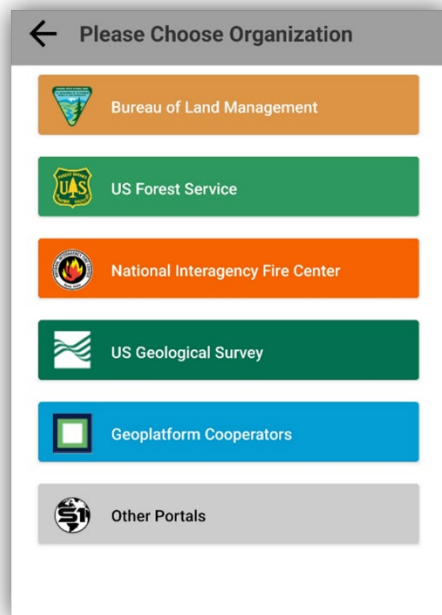
The mobile device must have a network connection (Wi-Fi or cellular) prior to logging into the application. Once logged in, the **ArcGIS Online for Organizations credentials** are stored on the device. It is necessary to have a network connection when uploading, downloading, or synchronizing data, or re-authenticating the application with ArcGIS Online (AGOL).

NOTE: There is a two-week token expiration for ArcGIS Online (AGOL) logins. This means that you will have to log out of and back into the S1 Mobile Mapper app once your token expires. However, this only affects downloads and syncs. So, if you are still logged into the S1 Mobile Mapper app even if your token is expired, you can still collect field data. You will just need to log out of and back into S1 once you have a data connection to sync your data back to AGOL or download any new content.

- a. Tap the **Organization Login** button on the splash screen.



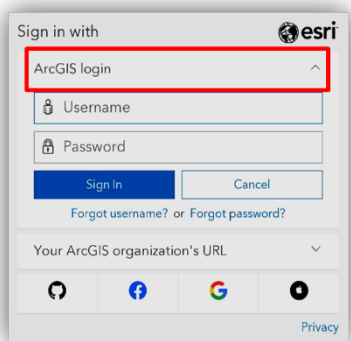
- b. To Login and authenticate the application, choose your Agency. If your agency is not listed, choose Other Portals.



Choose Agency on login screen

BLM User - Mobile Editor Account (Recommended login option with BLM AGOL account)

- c. After selecting **Bureau of Land Management** from the list of agencies, the Mobile Editor login page window will open.
- d. Select the **ArcGIS** login option.
- e. Type in your mobile editor username and password and select **SIGN IN**.



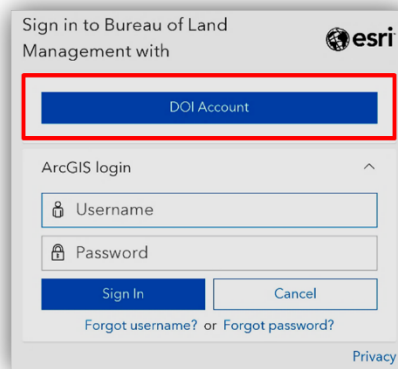
ArcGIS Login using Mobile Editor Username & Password

Login with SAML Account

Login with a SAML account is a login tied to BLM active directory credentials.

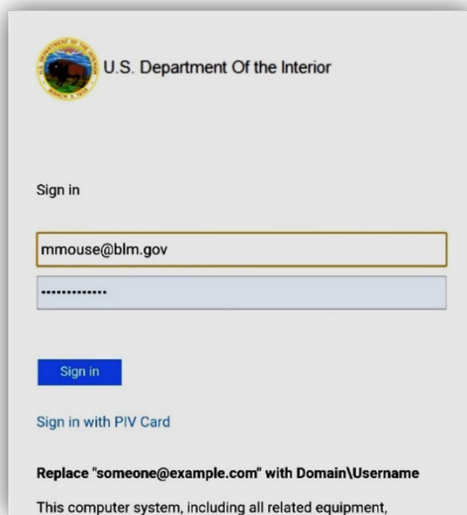
Assumptions:

- You have installed and have access to Microsoft Authenticator on your mobile device. See instructions [here](#) up through step # 6 if you need to set this up. This setup process is self-service and requires no help desk tickets.
- a. To log into S1 Mobile Mapper using Microsoft Authenticator and your SAML account and after selecting BLM from the list of agencies; select **DOI Account**.



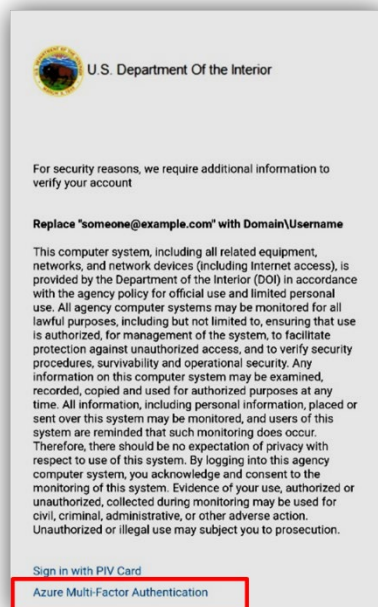
SAML Account with ArcGIS Login – DOI Account Button

- b. Enter your BLM Active Directory username and password (*this is your Windows username and password*), and tap **SIGN IN**.



Add Windows username and password for the BLM Active Directory

- c. Scroll down & select **Azure multi-factor Authentication** at the bottom of the page (when on a mobile device without a PIV card).



Selecting Azure Multi-factor Authentication on Mobile

- d. You should receive a notification pop-up on whatever mobile device you setup with Microsoft authenticator to approve or deny the sign in request. Tap **Approve**, and you should be logged in and put into the main map view of the S1 Mobile Mapper. Verify by tapping the S1 logo on the main toolbar (application toolbar) and see logged in username in the menu.

NOTE: You will likely need to use whatever method you have setup on your device to “unlock” the device to verify it is you approving the request. **If you do not tap the approve option on your mobile device in time and the pop-up goes away, you can find it again by swiping down from the top of the mobile device screen and access the notification panel. Select the notification there and tap approve.**

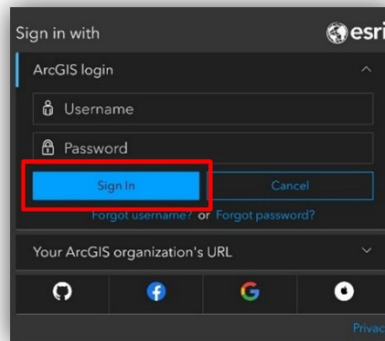


Approve Sign-in Pop-up

USFS and other AGOL Organization Users

- a. On the login screen, enter your agency ArcGIS Online (AGOL) username and password and tap **Sign In**.

NOTE: This username and password is AGOL specific and different from your Agency Active Directory (AD) username and password.

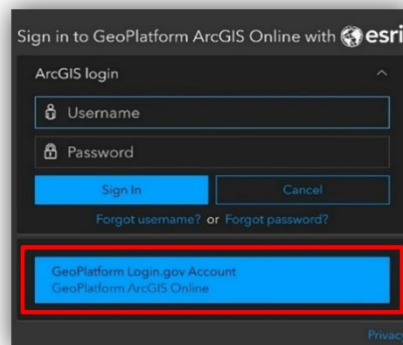


ArcGIS Online Sign-In

GeoPlatform Cooperators

If needed, here is a link with [BLM Geoplatform SOP & Getting Started](#) that will explain how to setup an account and use Geoplatform for project cooperators outside the BLM.

- a. Select **GeoPlatform Cooperators** from the list of available agencies, the login page window will open.
- b. Select the **GeoPlatform Login.gov Account** option.



GeoPlatform Login.gov Account

- c. The GeoPlatform.gov login page will open. Enter the **email address** you registered with your Login.gov account.
- d. Input your **password** and select **Sign in**. It may take 30 seconds to a minute for the website to log you in.

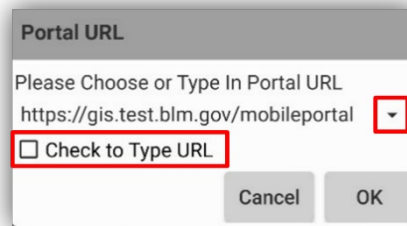


Login with Login.gov Account

NOTE: FYI This Login.gov option seems to be very finicky. Users may have to try up to 3 or 4 times for it to finally accept your login and allow the user access to their groups in the GeoPlatform organization.

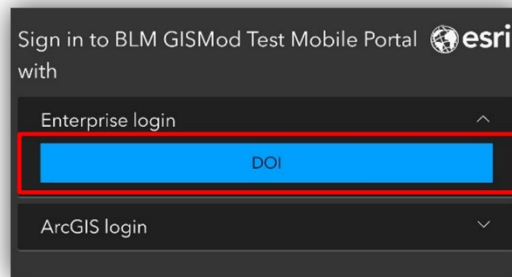
Other Portals

- a. After selecting **Other Portals** from the list of agencies, the Portal login page window will open.
- b. There is a pulldown with several options available, if you see the portal you want to connect to in the list select it, then tap **OK**.
- c. If you do not see the portal you want to connect to, tap on the **Check to Type URL** check box and type in the URL to the portal you would like to access. Then tap **OK**.



Other Portal Login Options

- d. In all known portal instances SAML MFA login is required, so choose the Enterprise login option.
- e. If this is a BLM Portal, follow the instructions in the [BLM User - SAML Account section](#) to login as the steps are identical from this point on.



Enterprise Login Option

- f. If this is another agency portal, steps should be like the BLM SAML method but do follow login instructions from your agency Portal administrator.

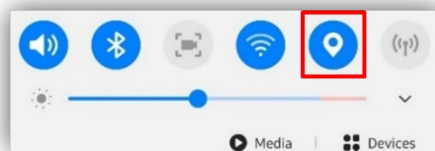
Configure GPS Location and Power management best practices

Android 10 & 11 implemented a host of changes related to GPS use, power management and battery life. What this essentially did was give user more control over GPS management but made it a bit more complicated to keep the GPS running in the background when the OS is constantly trying to shut it down to save battery. So, we are including a few best practices to get the best performance and accuracy from your device while using the S1 Mobile Mapper application.

Location Services settings

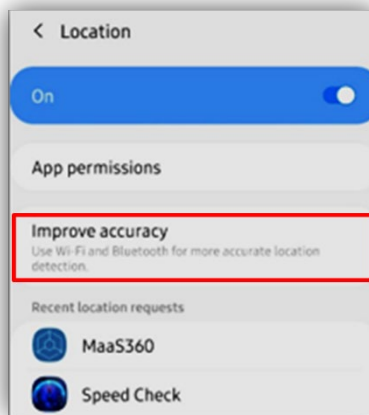
This relates to the last few iterations of the Android OS but is similar in Android 10 & 11. When collecting field data via GPS, all location services not coming directly from GPS satellites should be turned off to ensure that you are only receiving measurements from the device's GPS receiver and not from Android network location services.

- a. Access the Quick toolbar on the device by swiping down from the top of the screen, the toolbar, notifications, and settings options should scroll down into view.
- b. Long press on the Location icon to access the location settings.



Accessing the Quick Toolbar in Android Mobile

- c. From the location settings, Tap **Improve accuracy**.



Improve Accuracy Option on the Location Quick Menu

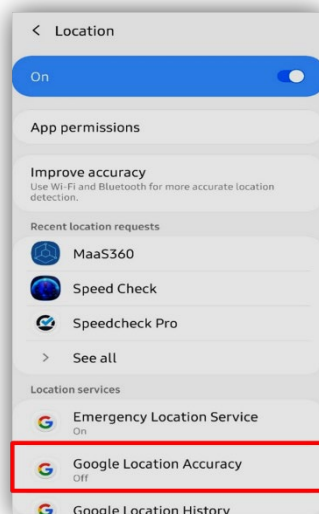
- d. Ensure both **Wi-Fi & Bluetooth scanning** options are toggled “Off”.

NOTE: If you need to get location inside a building, you can toggle these to “On”, but for field data collection they should be off.



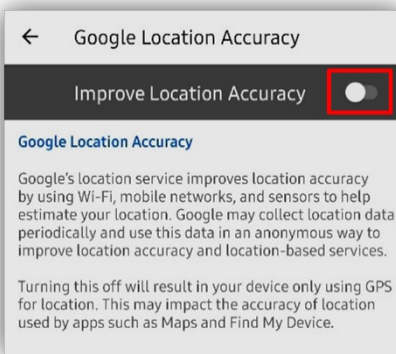
Toggle Off Wi-Fi & Bluetooth

- e. One other setting to ensure is **turned off** is “**Google Location Accuracy**”.



Turn Off Google Location Accuracy

- f. Ensure “Google Improve Location Accuracy” is set to “Off”.



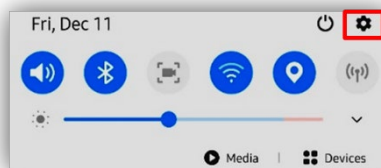
Turn Off Improve Location Accuracy

Battery Saving Settings to check

One of the things Android 10 & 11 does is constantly try to turn off GPS for apps that are not being used and put apps to sleep if they are backgrounded. If you use any workflows where you start collecting a feature and then turn off the screen while S1 Mobile Mapper continues to collect location information in the background, you want to check this setting.

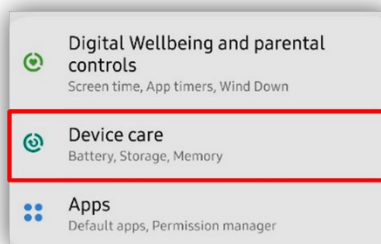
- a. Go to device settings by swiping down from the top of the screen and tapping the **gear icon** in the upper right.

NOTE: These settings may be found in slightly different locations on your device, you can also use the search function in the device settings to find what you are looking for.



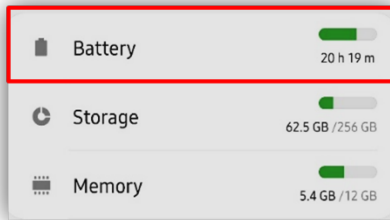
Gear Icon for Device Settings

- b. Once in the settings menu, scroll down and Tap **“Device care”**.



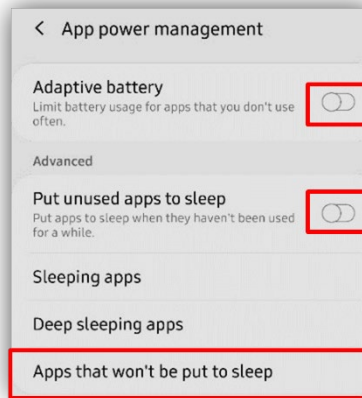
Device Care in the Settings Menu

- c. Once on the **device care menu**, Tap the **“Battery”** option.



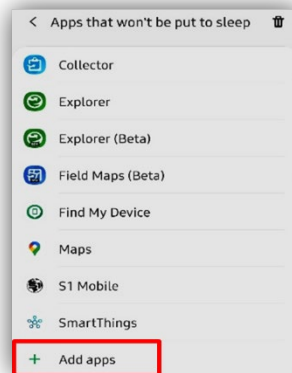
Battery Option on the Device Care Menu

- d. Ensure “Adaptive Battery” & “Put unused apps to sleep” are toggled OFF and then select the option at the bottom, “Apps that won’t be put to sleep”.



Turn Off Battery & Sleep Settings

- e. If the S1 Mobile App does not show up in this list, then tap “Add” and scroll through the list of available apps and add it to the list.

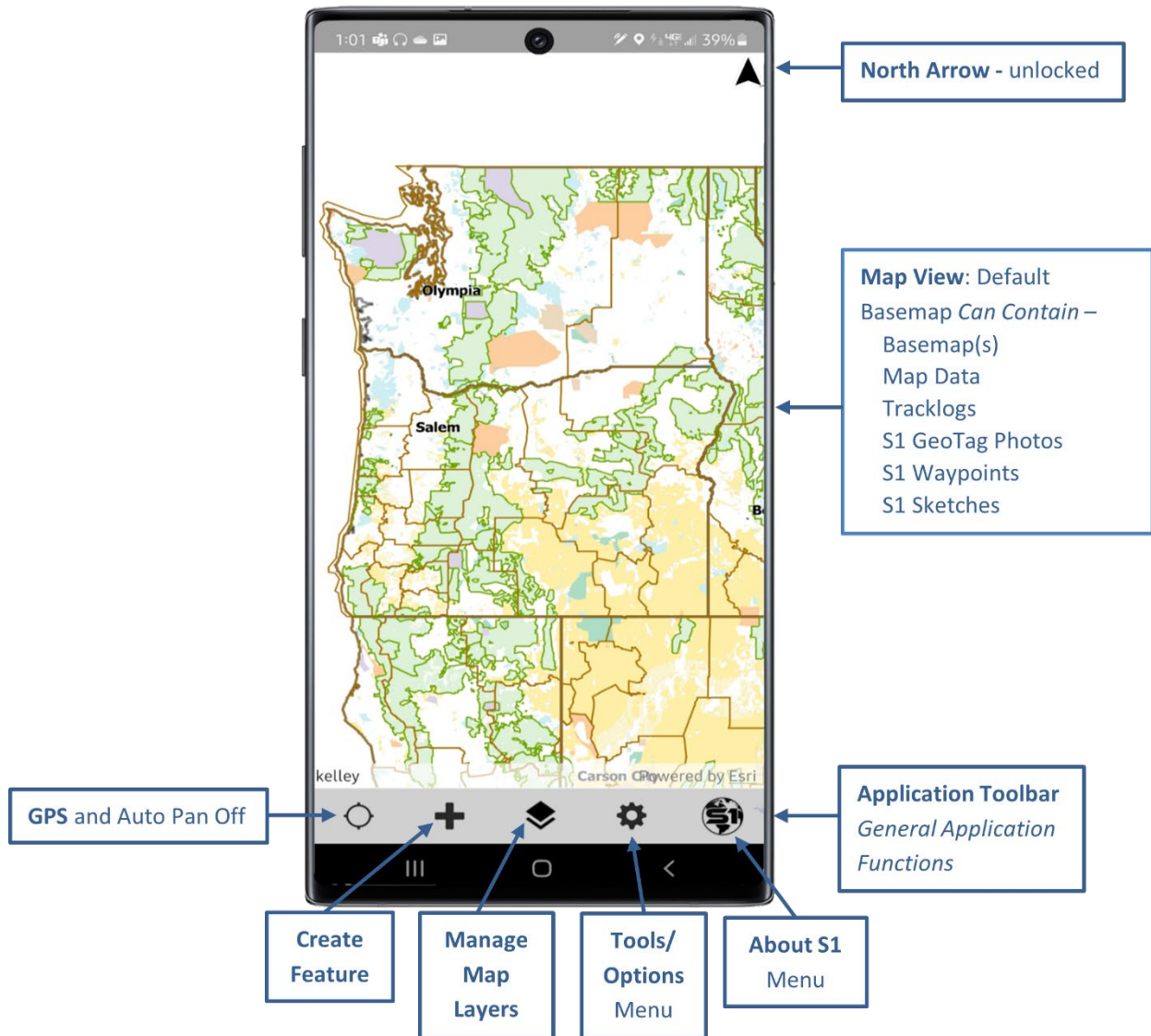


Add Apps to Not be Put to Sleep

- f. These settings should keep Android 10 and above from putting the S1 app or the GPS to sleep while you are collecting data.

NOTE: If you change to any of the power saving modes on the device, these settings may be changed to save power and should be checked periodically to ensure they still mirror the recommendations above.

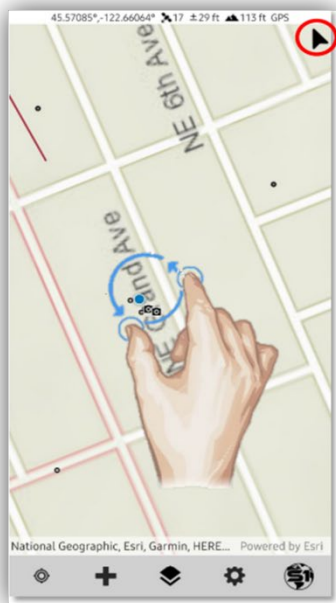
Application Interface



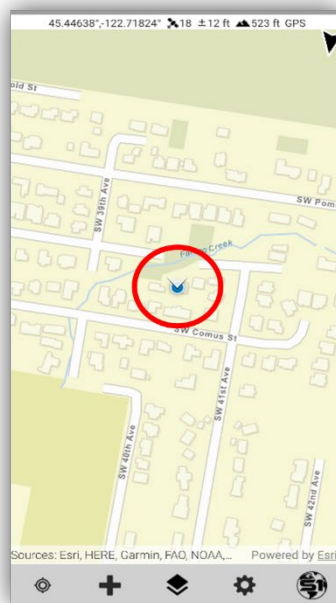
NOTE: When first opening the S1 Mobile application, you should see the default basemap shown above. If not, try zooming out to see a larger area by placing two fingers on the Map View and sliding them together on the screen.

Map View Rotation



Users can rotate the main map view manually to the direction desired. This option allows the user to orient the map view relative to the direction they are facing on the ground. Other options are, tapping the North arrow once will engage auto rotation of the map view based on the direction the device is facing (using internal device sensors). Tapping it once more will return to “North up” mode.

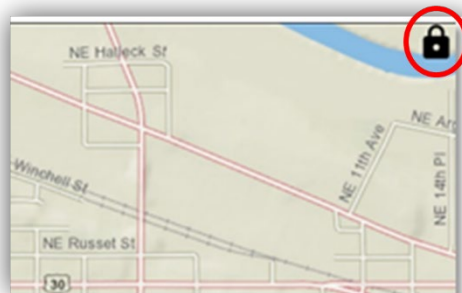


Map View Rotation



Navigation Viewshed

- a. To rotate the main map view manually, place two fingers on the screen slightly apart and **rotate** them to whatever orientation you would like.
- b. Tap the arrow  to engage auto-rotation and then the navigation viewshed will indicate the direction of travel.
- c. To orient the map back to North and turn off autorotation, tap the **black arrow** again in the upper right.
- d. To lock the screen and temporarily disable screen rotation, **Long press** the black arrow  until it turns to a padlock icon, shown below.

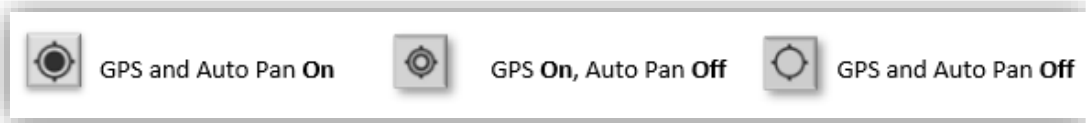


North Arrow Locked in Place

- e. To unlock the screen rotation again, **Long press** the padlock icon again.

Activate GPS

- a. Tap GPS Icon to turn on GPS and to activate Auto Pan.



- b. If you pan on the map, Auto Pan turns off, but GPS remains on.
- c. Tapping the GPS icon again will turn Auto Pan back on.
- d. Tapping the GPS icon when both GPS and Auto Pan are on will turn GPS and Auto Pan off.
- e. Once GPS position fix is obtained, your current location will display on the map view from a grey dot to a blue dot.
- f. When the GPS is turned on, the GPS Status bar appears at the top of the screen, which displays:



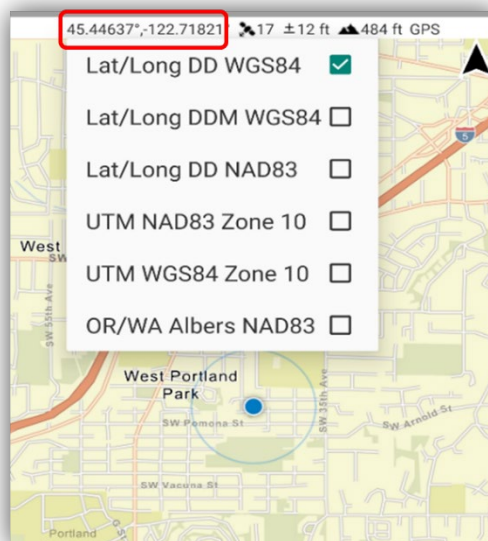
- **Current GPS Location information.**
- = Number of satellites used in position fix.
- \pm = Estimated accuracy of location (in meters or feet).
- = Estimated elevation of location (in meters or feet).
- **GPS Source/Quality** will be displayed as one of the following:
 - No Fix – no satellite fix
 - GPS – using mobile device onboard GPS location.
 - DGPS – using Bluetooth GPS receiver location.
 - RTK - using Bluetooth GPS receiver location with Real-time corrections.



GPS Status Bar

- g. **GPS location Coordinates** are displayed in World Geodetic System 1984 Decimal Degrees (WGS84 DD) by default. To change the coordinate system displayed, **tap the GPS Status bar**, and select another coordinate system. Alternatively, change this in **S1 Options**.

NOTE: The coordinate system displayed by the application changes how the XY values are **displayed** on the **GPS Toolbar** as well as the XY information displayed in a **selected feature information menu**. It is only a visual effect in the application.



Coordinate System Menu

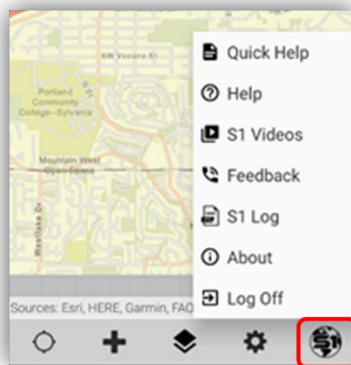
- h. Estimated **Accuracy** is displayed to a 68% confidence interval by default. The display value can be changed to a 95% confidence interval in S1 Options. The default accuracy units are displayed in meters, but this can also be changed in [S1 Options](#).

NOTE: This function only affects the display value on the device. All data collected with GPS uses the 95% confidence interval to record data.

- i. For the highest possible location accuracy, set your device's Location setting to **GPS only** in the mobile device settings. Once GPS is activated, the app will alert if the device is set to any other Android Location setting such as High Accuracy mode.
- j. It is possible to connect an external, high accuracy GPS receiver to provide location information to the app instead of using the device's internal GPS. For more information on this topic, see [External Bluetooth GPS Receiver Support](#) section.

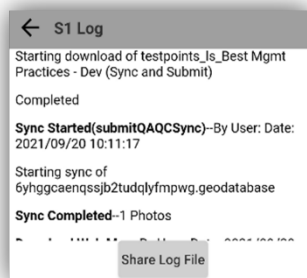
About S1 Menu

The About S1 Menu is located on the Application Toolbar and includes several useful pieces of info.

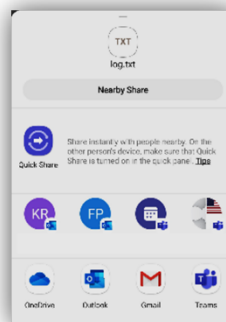


About S1 Menu

- **Quick Help** opens a Quick Reference PDF guide which labels the different S1 Mobile Mapper Application modes, toolbar labels and button ID labels.
- **Help** opens the S1 Mobile Mapper User Guide (this document).
- **S1 Videos** launches the Vimeo app to a collection of help videos. Requires a network connection.
- **Feedback** opens a form to submit feedback or S1 Ideas; requires a network connection.
- **S1 Log** is a running log of S1 actions that are user readable log files for troubleshooting, and they can be shared. S1 log files track feature service & web map downloads and syncs, noting the number of features and attachments. They also track downloaded basemaps, but do not track any app activity involving sideloading, only with content in ArcGIS Online (AGOL).



S1 Log file



Apps list for sharing text logs

- **About** provides information on the current version of the app installed, the app description, the **Privacy Policy**, and **End-User License Agreement**.
- **Log Off** will log the current user out of ArcGIS Online. The app will be placed in the Public Mode. To log back in, select **Log in**, and choose the appropriate organization.

NOTE: Logging on/off is only available while device is connected to a network.

Downloading Content

The S1 Mobile Mapper application can download and store a variety of **basemap file types** including: TPK, TPX, MMPK, VTPK and GEOTIFF.

The app supports a variety of options for **editable data downloads** including standalone hosted and on-premises features services, web maps with one or more editable layers as well as **non-editable reference layers, for example Mobile Map Packages (.mmpk)**. Downloading editable data layers to the device allows the user to interact with maps and collect data when in areas of limited or no network connectivity.

NOTE: *Web maps are a great way to streamline data collection workflows by packaging commonly collected data themes together to allow field users to collect or edit any of the layers in the web map without having to switch databases in the S1 Mobile Mapper App.*

About Basemap Services

Basemaps provide reference information for field users while collecting or editing data. Basemaps are the foundational map layers in the application. The options under “Basemap Services” are Esri hosted, or agency curated Tiled map services that allow the user to choose an extent to download for offline use. These are multi-scale tiled packages (.tpk or .vtpk), which quickly display image tiles appropriate for the current map scale. These basemap services are downloaded at the selected extent to the mobile device as a tile package when connected to Wi-Fi or cellular network.

Basemaps are typically authoritative reference maps, and can be sourced commercially, for example from Esri or produced and distributed by an agency such as the BLM or USFS. Esri basemaps are a gallery of pre-defined basemaps in ArcGIS Online (AGOL).

The application can store many basemaps on the device, allowing users to switch between basemaps, toggle on and off any of the basemaps or layer many basemaps on top of each other with different levels of transparency settings. See [Download Basemaps](#) and [Manage Basemap Layers](#) below.

Default Basemap

Upon first opening the S1 Mobile Mapper, a **Default Basemap** of the United States is displayed. Like other basemaps, the Default Basemap can be toggled off, but unlike other user downloaded basemaps, the Default Basemap cannot be deleted from the device.

Tile Packages

Tile Packages (.tpk or .vtpk) can be from basemap services, as described above, or can be prepackaged for a geographic area into one of the supported [file types](#), and then shared either via groups in ArcGIS Online (AGOL) or by sideloaded directly to the mobile device via desktop computer and SUB cable. See [section on sideloaded Basemaps](#).

Download Basemaps

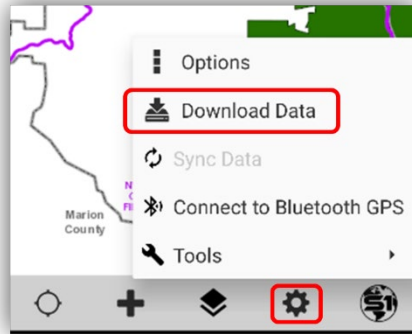
Starting with S1 Mobile Mapper v5.3, we can **download multiple basemaps** without a **constraint** that the map data must overlap the underlying basemap; unlike earlier versions.

- a. To download a new basemap, tap the **Tools/Options menu** button on the **Application toolbar**.



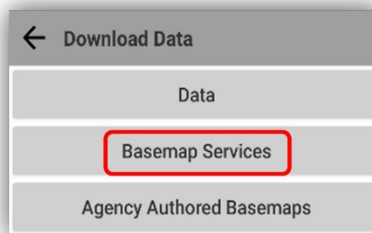
Tool/Options Button on the Application Toolbar

- b. Tap Download Data.



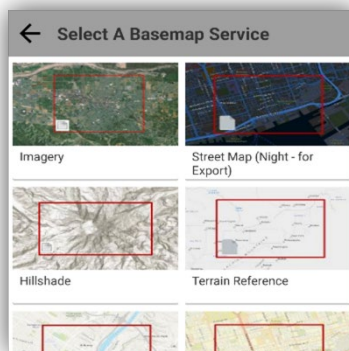
Download Data on the Tools/Options Menu

- c. Tap Basemap Services.



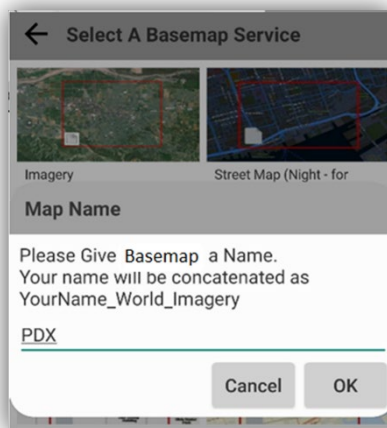
Basemap Services on the Download Data Menu

- d. Choose a Basemap from the available tiled Agency Map Services or Esri Map Services.



Basemap Service Menu

- e. You are prompted to enter a **unique name** for this basemap. Choose a name and enter it, then tap OK. Multiple versions of the same basemap can be downloaded with different extents for different data collection areas.



Basemap Name Input

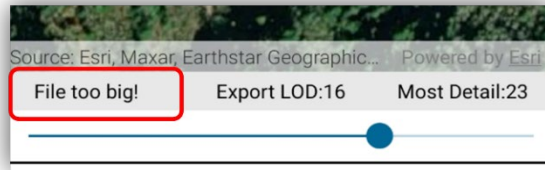
- f. In the open map view, the **top map view** window is where you set the **maximum map extent**. Pinch and pull to set a map extent. The **bottom map view** window and **slider** will set the **maximum Level of Detail (LOD)** of the map (except for **vector tiled map services**, which will only require an extent to be chosen). As you adjust the **LOD slider**, the application will adjust and report the **estimated download size** for the map. The larger the download size, the longer it will take to download.



Basemap Extent Download

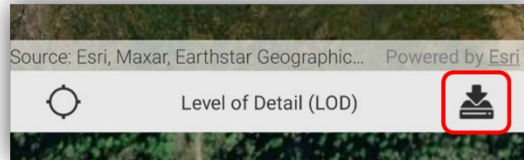
Hint: You can tap the **GPS On** button if you want the map view to zoom into your GPS location.

- g. Again, always check the **Estimated Download Size** before trying to download in case the file is too big to download (see image warning below). You would then have to adjust the **maximum map extent** and/or **maximum level of detail (LOD)** before downloading.



Estimated Download Size

- h. When satisfied with the extent and LOD, tap the **Download Data** button to initiate download.



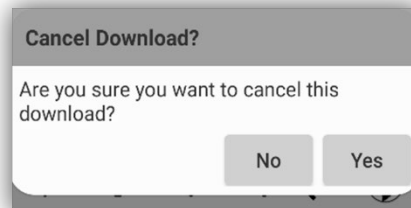
Download Data Button

- i. A **progress spinner** will appear on the Application toolbar with the percent complete for the download in the center of the spinner, allowing you to track the download progress.



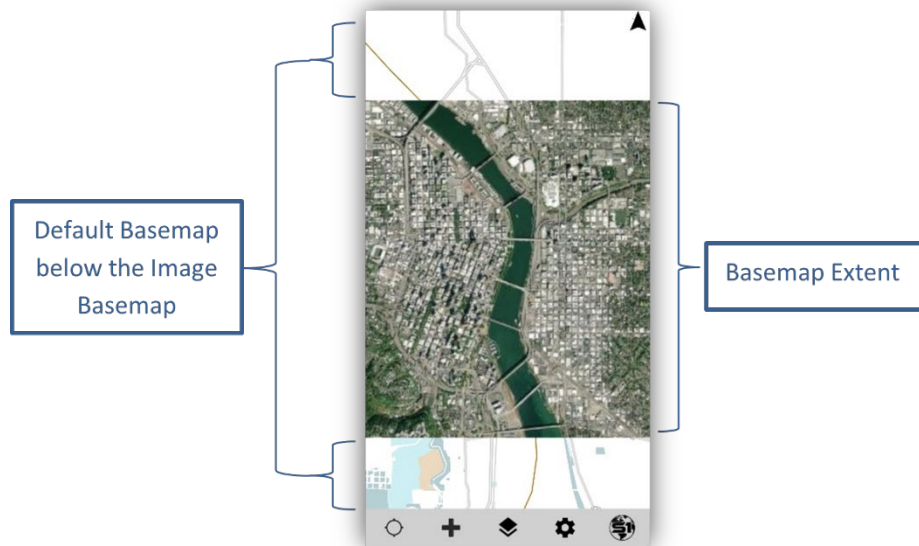
Progress Spinner

- j. If necessary, the download can be **anceled** by tapping the progress spinner and selecting “Yes” in the cancel download prompt.



Canceled Download Prompt

- k. When the download is complete, the map is automatically added to the map view overlaying the **Default basemap** and the basemap will be added to a basemap list on the **Manage Map Layers** page. [See the Manage Map Layers section](#) on how to manage basemaps; **reorder, transparency settings, toggle on/off, and the Zoom to Layer tool.**



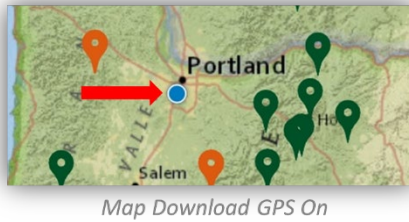
Map View of an Imagery Basemap over the Default Basemap

Agency Authored Basemaps

The Agency Authored Basemaps are a basemap collection of map products produced and distributed by the Bureau of Land Management (BLM) or the U.S. Forest Service (USFS). S1 Mobile Mapper can store many basemaps on a device at a time (limited only by available storage space on device) and the user can switch between maps to set the appropriate basemap for their current viewing needs.

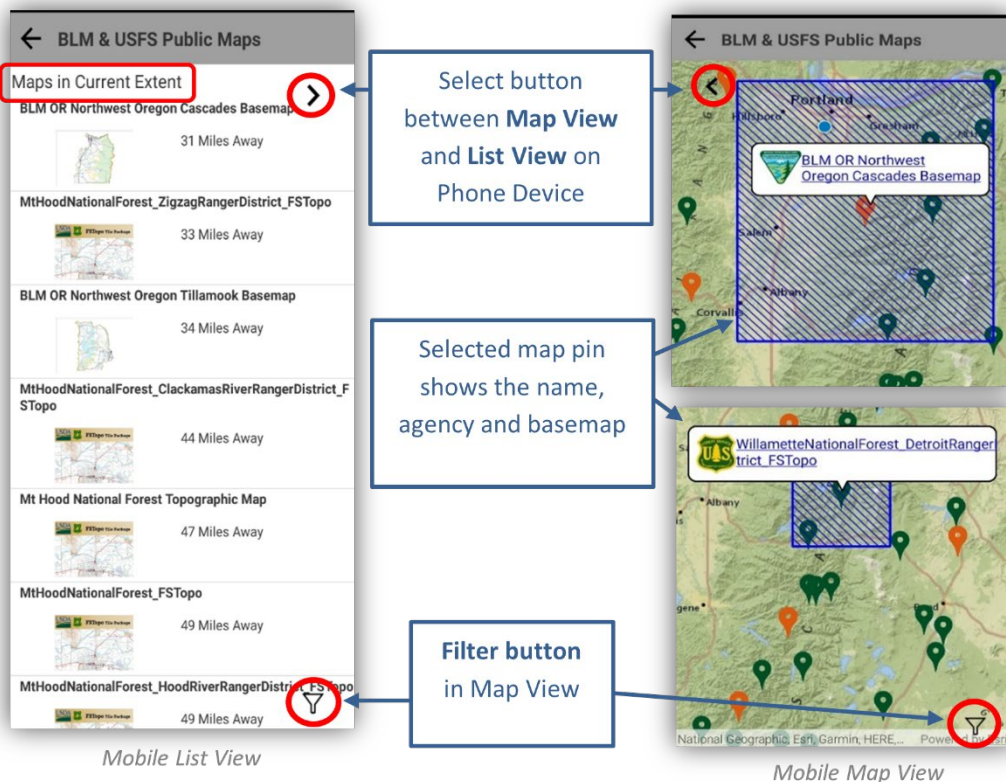


- a. The Agency Authored Basemaps can be used as offline basemap downloads in the S1 Mobile Mapper application. The basemaps are multi-scale tiled image cached packages (.tpk), which can quickly display image tiles appropriate for the current map scale. They can be **downloaded to mobile devices over Wi-Fi or cellular networks** or can be manually copied to a mobile device by [side-loading](#).
- b. Upon opening the **Maps available for download** in map or list view, the GPS is automatically activated on your device just during the map download selection.

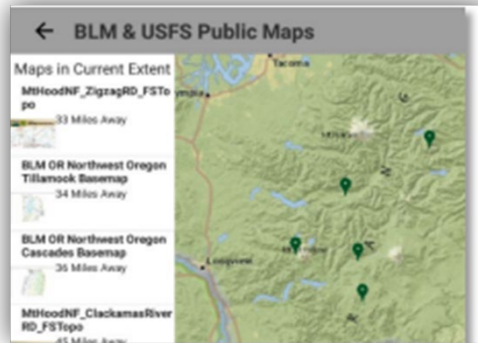


NOTE: The map list can take time generating depending on how easily the device can determine your current location. To reduce the time it takes to generate the map list, open the device Android **Settings** menu and search for the **Location** settings. Ensure the device is in [High Accuracy mode](#).

- c. Once your location is determined, the application displays all the maps available for download. The **orange pins** are BLM maps and **green pins** are US Forest Service maps that represent the centroids of the map available in that area.
- d. **On mobile devices**, a map is displayed, and an arrow button (<) is displayed at the top of the map. Selecting the arrow button (<) will allow you to access the **Maps in the Current Extent** menu (List View).



- e. **On a tablet**, the **Maps in the Current Extent** menu are displayed along the side of the Map View.

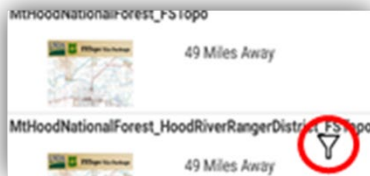


Tablet List and Map View

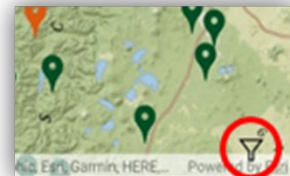
Filtering Maps by Keyword, Distance, or Sort

The **Map view** and **List view** maps can be filtered and sorted using the **Filter Tool**.

- a. Tap the Filter button.

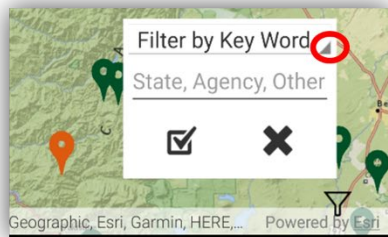


Filter Tool for List View

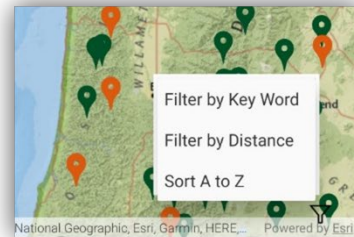


Filter Tool for Map View

- b. To filter by Key Word, by Distance or Sort A to Z, select your option from the filter pulldown list.
- c. If filtering by **Key Word**, type a key word such as State, Agency, or location. (Example: Deschutes) and then tap the **Submit** button.
- d. If filtering by **Distance**, type a numerical value for the distance radius in miles and then tap the **Submit** button.
- e. If sorting by **Sort A to Z**, select Sort A to Z option and then tap the **Submit** button to initiate the list filter.



Filter Tool Options



Filter Tool Pulldown List

- f. To clear the Filter, tap the Cancel button at the bottom right of the screen (X).

Selecting and downloading the Agency Basemaps

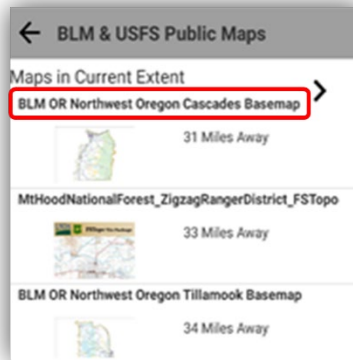
- a. **Map View:** Pinch and pull on the map view to place your area of interest in the center.
- b. Select a **Green Map Pin for USFS Maps** and an **Orange Map Pin for BLM** in an area of interest.

- c. A box containing the name of the map and the icon of the agency that published the map appears.
- d. Tap the blue text displaying the map name to open the selected **Map Information Window**.



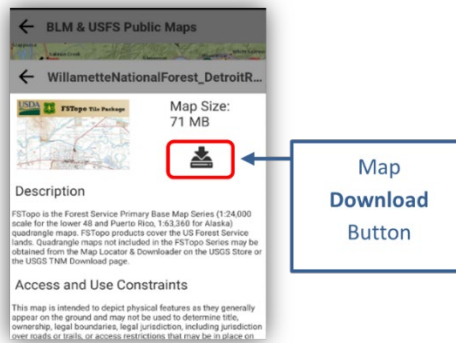
Selected Map View Extent

- e. **List View:** The list view opens with all the maps available in the map extent from the map view.
- f. The initial list order is determined by distance of the centroid of the map to your current location.
- g. To add more maps to the map list, go to the Map View, zoom out or pan to another location.
- h. In the List View, tap the map name to open the selected **Maps Information Window**.



Selected Map Name in the List View

- i. The Map Information Window list the map Description, Access and Use Constraints, Map Size, and the **Map Download** button. To close the Map Information window, select the back button.
- j. Use the **Map Download** button to download the **Agency Authored Basemap**.



Map Information Window

- k. A **spinner** will appear in the application toolbar with the **percent downloaded** in the center of the spinner.



Percent Download Spinner

- l. When download is complete, the basemap is automatically added to the Map View as the current basemap.



Default Basemap turned off, [See Manage Basemap Layers](#)

Downloaded Agency Authored Basemap

NOTE: Map download speed depends on the size of the map and network speed.

Sideloading Basemaps

Assumptions:

- Android Device with available storage space on the SD card or internal memory if no SD card present.
- S1 Mobile Mapper application installed on mobile device.
- USB cable connected and mobile device set as media storage/not charging only.
- Basemap is already created.

While sharing basemaps via ArcGIS Online (AGOL) is often the easiest way to distribute user-generated basemaps to multiple devices, if the basemap is very large in file size or network connectivity is unreliable, it can take a long time to download to a device. An alternative is to connect the device to a desktop computer via USB cable and use Windows Explorer to copy or (sideload) the basemaps directly onto the device.

- a. Using Windows Explorer, navigate to the network location or local directory where the basemap resides. Right click on the file and choose Copy.
- b. Navigate to the following directory to paste the basemap file (see below if you cannot get to files):

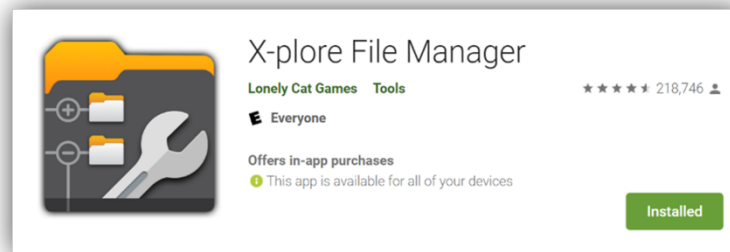
Devices with SD Card: \Card\Android\data\gov.s1.s1mobile\Reference_Data\Offline_Base_Maps

Devices without SD Card: \Phone\Android\data\gov.s1.s1mobile\Reference_Data\Offline_Base_Maps

NOTE: There are several caveats related to file storage location to be cognizant of.

Scoped storage (essentially where S1 Mobile Mapper must store files) on the Sd card is not accessible to view manually with the file explorer application on the mobile device or when connected via USB cable and windows file explorer. So sideloading (copying) to this location can be tricky. Here are a few tips:

- If the device is not running a mobile device management application Maass360 for BLM, MOM for the Forest Service, then you can remove the SD card from the mobile device and insert into a card reader connected to your computer and navigate to the folder below and copy your basemaps there, and then reinsert the SD card in the device, and it should show up in S1 basemap options.
- However, if the device is running an mdm app for mobile device management, most likely that SD card is encrypted and cannot be used if removed from the device.
- There is a potential workaround with a third-party mobile app called “X-plore”.



X-plore is a Third-Party App

- Installing the X-plore application will allow you to see and navigate to the scoped storage location on the mobile device that is not visible in the native file explorer application. So, essentially you can copy the basemap file to a file location on the mobile device internal storage that you can access and then with the Xplore app, you can move it to the SD card location shown below. This will allow you to use the space on your SD card instead of internal storage space which can quickly be used up depending on the internal storage size.
- c. Double click on the folder **Offline_Basemaps** to open it. This is the folder where all downloaded and sideloaded basemaps must be stored. Basemaps include tile packages, user created georeferenced GeoTIFFs, or vector tile packages.
 - d. Right click to paste the file into the directory.

NOTE: When downloading from AGOL, basemaps are automatically added to the map view when the download is complete. If the map is sideloaded, the user must manually add it to the map view using the **Manage Map Layers** menu. See [Managing Downloaded Content](#) for more information.

Mobile Map Package

A **Mobile Map Package** consolidates maps and basemaps along with all referenced data sources into a single read only .mmpk file. The mobile map package format is optimized for modern mobile devices and

for use offline in areas with no connectivity. There is no limitation of file size except for available storage space. Follow the same procedure described above for basemaps to sideload them to your device.

Devices with SD Card: ...\\Card\\Android\\data\\gov.s1.s1mobile\\Reference_Data\\SideloadMmpk

Devices without SD Card: ...\\Phone\\Android\\data\\gov.s1.s1mobile\\Reference_Data\\SideloadMmpk

Manage Basemaps Layers

Starting with S1 Mobile Mapper v5.3, we can **download and view multiple basemaps** and there is **no longer a constraint** that map data must overlap the underlying basemap; unlike earlier versions.

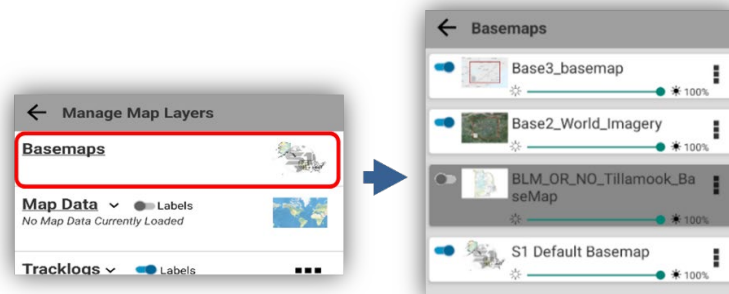
We can manage basemaps and basemap tools from **Manage Map Layers**. The **Basemap page** allows users to change or add any of the available downloaded basemaps to the map view and has added tools to manage basemaps; **reorder, transparency settings, toggle on/off, delete the basemap and the Zoom to Layer tool**.

- a. Tap the **Manage Map Layers button** on the Application Toolbar. This is where you will manage basemaps that have been downloaded to the device.



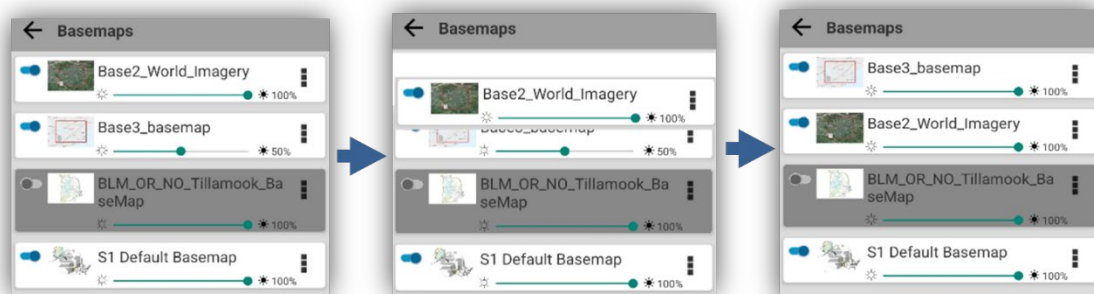
Manage Map Layers Button

- b. Tap on **Basemaps** (or the map image icon) to open the **Basemap page**. In the image below, there are four basemaps listed on the Basemap page; three User downloaded basemaps and one **S1 Default basemap**.



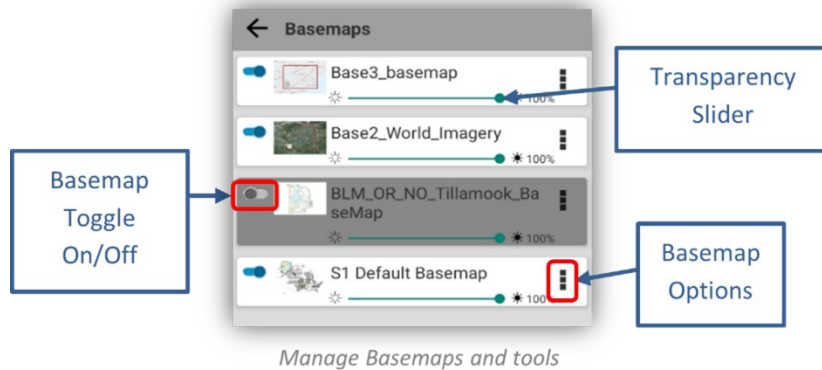
Basemap Page

- c. Basemap layers can be reordered by a long press and hold on a basemap layer tile and then drag the layer up or down in the list view.




Rearrange Basemap Order

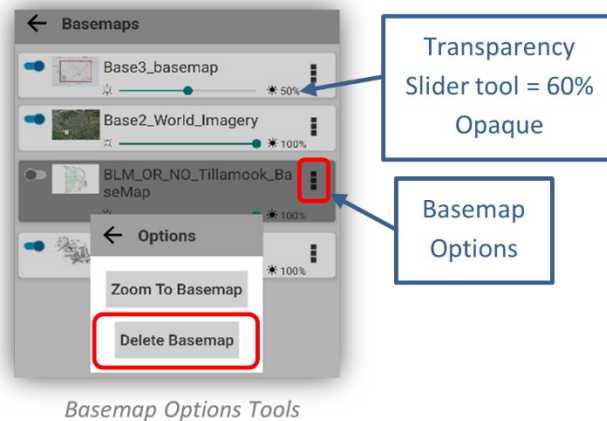
- d. The **basemaps are listed in the same drawing order as seen in the main map view**, meaning if a basemap is listed at the bottom, it will be drawn as the bottom layer when viewed in the map.



- e. On the Basemap page, there are basemap tools linked to each downloaded or sideloaded basemap:
- **Transparency Slider** allows the user to adjust the transparency of each individual basemap by moving the slider on the tile. ☀️ 0% is fully transparent, 🌑 100% is fully opaque. See image above.
 - **Toggle On/Off Switch** on the basemap layer. This toggle on/off switch controls whether the basemap is visible in the main map view. the basemap. See image above.

- f.  **Basemap overflow option** includes **Delete Basemap** and **Zoom to Basemap (layer) Options** for that selected basemap. Unlike toggle off, the delete will completely remove the basemap layer download from the device.

NOTE: The S1 Default Basemap can be turned off but cannot be deleted.



- g. Here are some examples of using the transparency tool with basemap layers:



Transparent Street layer over Imagery



Transparent Topo layer over Hillshade

Download Data File Types

To download Map Data, like a **Feature Service layer** or a **Web Map**, they must be shared to an ArcGIS Online (AGOL) group that the user is a member of. There are two styles of **data download icons** next to a data type on the **Select Map Data** list.



Need to set a map extent



Static download, no extent set

Hosted Feature Layers (Services)

Hosted feature layer service is a dataset that has been created in either ArcGIS Online (AGOL), created in ArcMap and then published to AGOL, or created in ArcGIS Pro and published to AGOL. Hosted feature layer services are appropriate for visualizing data on top of basemaps and capturing project level field data. Creating and publishing a hosted feature layer service requires both an ArcGIS Online account and the appropriate user roles. **Hosted layers must be edit and sync-enabled** in the AGOL layer settings for data to be downloaded, taken offline, and used to collect data in the S1 Mobile Mapper application.

For more information on hosted feature service layers , see the Esri help document here: https://doc.arcgis.com/en/arcgis-online/manage-data/publish-features.htm#ESRI_SECTION1_94021BE7D875474681DAD20D05A90AF6

On-Premise Feature Services

On-premise feature services are services that have been published to the ArcGIS Server by a state or organization server administrator which are hosted on internal agency servers and then shared with users via ArcGIS Online for Organizations. These layers may be versioned or non-versioned. On-Premise services may be set up to use a mobile QA/QC process that sends field collected data to a corporate versioned database (BLM Only; ORWA sync and submit themes & the National VMAP project). See the section on [Sync and Submit](#) for more information.

Tile packages

Tile packages (.tpk) are a set of tiles (images) from a map or raster dataset that can be published as a web tile or a web elevation layer. Alternatively, the tile package can be used as a basemap in ArcGIS applications. The tiles are wrapped into a single file, a .tpk file, so you can share the file as you would any other file type (i.e., pdf). You can email it, copy it to a network locale, upload it to ArcGIS Online or ArcGIS Enterprise, and so on. The tiles, known as a **tile cache**, are static. Updates to the input data are not reflected in the tile cache.

Compact Tile packages

The newer more compact Tile Packages (.tpkx) are created in ArcGIS Pro 2.3 and later releases and they allow you to specify the output of a geoprocessing tool to be either a .tpk file or a .tpkx file. Or they can also be created in ArcGIS desktop (Map or Catalog) with the data management toolbox > “Create map tile package” tool. The .tpkx format uses a compressed file structure, which provides improved performance and smaller output file sizes than standard tile package (.tpk) format.

For more information on Tile Packages, see the Esri help document [Here](#):

Also see the S1 Mobile Mapper team’s help doc [Create Basemaps for Offline Use: \(TPKs and GeoTiffs\)](#).

Vector Tile Package

Vector Tile packages (.vtpk) reference a set of cached vectors and the information for rendering the vectors. Data in Vector Tile layers are stored in individual layers containing geometry, attributes, and styles. Styling information is stored separately from the tile geometry and attributes, and more than one style can be defined. This means that one set of vector tiles can be styled numerous ways without having to generate a new cache for each style. This saves space and speeds up the process of creating map styles. Accessing vectors as separate tile layers also improves performance. **Note:** One other benefit to .vtpk files is that labels rotate with the map view in mobile applications.

For information on Vector Tile Packages, see the Esri help document [Here](#).

Also see the S1 Mobile Mapper team’s help doc on publishing [Vector Tile Packages & S1](#).

GeoTIFF

GeoTIFF is an image format which contains embedded georeferencing information. The benefit of GeoTiff files is they are very easy and quick to create directly from ArcMap desktop. The downside to GeoTIFF files is that the output is at only one resolution; unlike tile packages that produce scale dependent tiles depending on zoom level. This leads to GeoTIFF files not working well for large areas of detailed information since they do not refine as you zoom in. But for areas that are a couple sq miles or smaller they work very well. GeoTIFF files can be shared to AGOL and downloaded to mobile devices or side-loaded via USB cable and used in S1 Mobile Mapper as a basemap.

- Upload the GeoTIFF file to ArcGIS Online and share to any groups that may need access. This allows the file to be shared with others for download.
- Publish the GeoTIFF file as a tile service to ArcGIS Online. Add the GeoTIFF file to ArcMap or ArcGIS Pro, create a tile service from the file, and publish the service to ArcGIS Online. The GeoTIFF file can be used in web maps or applications.

For more information on GeoTIFF formats, see the [Esri support article](#).

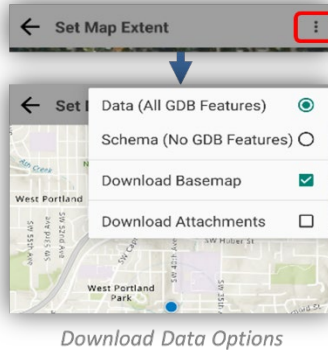
Also see the S1 Mobile Mapper team’s help doc [Create Basemaps for Offline Use: \(TPKs and GeoTiffs\)](#).

Web Maps

Users may wish to collect and view multiple feature service layers together. This may be done by adding all data layers to a web map saved in ArcGIS Online (AGOL), including basemaps.

- a. The services may be a collection of editable and non-editable hosted services, on-premise services, or ESRI hosted services.

- b. From AGOL, add the layers to the same web map, save it, and share with an AGOL group.
- c. Feature services contained in the web map are downloaded to the mobile device as a single web map **Data download**. Before downloading the Web Map, make sure to check the **download options** for downloading basemaps with the data layers. **Click on the ellipsis** on the download page in the upper right-hand side to see the download options. Also see the [data download section](#).



- d. The web map data layers are managed in the **Map Data section** on the **Manage Map Layers** page. The basemaps downloaded with the web map are managed in the **Basemaps section** on the **Manage Map Layers** page.

For help on creating a web map for offline use, see the Esri help document [Here](#).

Web Map Sync and Submit Notes:

S1 Mobile Mapper users no longer need to use tags for **Sync and Submit /BLM Mobile Themes as of v5.2**. S1 Mobile Mapper recognizes the URL where these services are hosted and acts accordingly. See more information in the [Sync & Submit section](#) of the document.

NOTE: S1 Mobile Mapper v5.1 and older:

- *BLM only:* The service must be tagged appropriately to continue to leverage the **Sync and Submit workflow**. Users will need to Sync and Submit the web map to submit the on-premise service data, even though not all datasets utilize the workflow. After Sync and Submit, the web map will be deleted from the device.
- If the web map contains a Sync and Submit service, the AGOL Web Map needs to contain the Tag `VersionTracking =` (ex. `VersionTracking = HAZ_TRES`)
- You can add as many Sync and Submit services to the same Web Map to collect data in the field, your **Tag** should follow the example below (for the BLM Mobile Themes you'd like to work with):



Sync and Submit Tags

Mobile Map Package

A Mobile Map Package (.mmpk) packages maps and basemaps along with all referenced data sources into a single .mmpk file. Mobile map packages support simple features, raster datasets, tables, relationship classes, locators, network datasets, and maps that contain Map Tiles (.tpk) or Vector Tile (.vtpk) packages. **Mobile map packages created in ArcGIS Pro 2.8 for use in apps** are created with ArcGIS Runtime SDKs that currently only support the following layer types: feature layers, raster layers, raster tiled layers from previously created .tpk files, and vector tiled layers from previously created .vtpk files.

NOTE: A Mobile Map Package (.mmpk) does not have editable layers for collecting data; viewing only.

Mobile map packages can be shared with others by uploading them to your organization in ArcGIS Online or by sharing an .mmpk file through common file sharing methods.

For more information on Mobile Map Packages, see Esri source [Here](#).

Download Map Data

The main function of S1 Mobile Mapper is to collect data in an offline environment and sync that data back to a web-based feature service when connected to a network with internet access. The **Data** option in the download Data menu is the dataset that captures the data collected via GPS or from digitizing on the map screen. **Data** may include a single feature layer service (hosted or on-premise), Tile Package (.tpk or .tpkx), Vector Tile Package (.vtpk), GEOTIFF or a collection of feature layers saved in a web map or a Mobile Map Package (.mmpk).

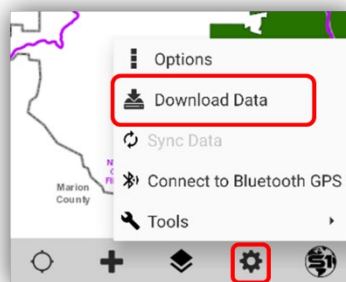
To download Data, the data layer or web map must be shared to an ArcGIS Online (**AGOL**) group the user is a member of.

- a. Tap the **Tools/Options** button on the Application Toolbar.



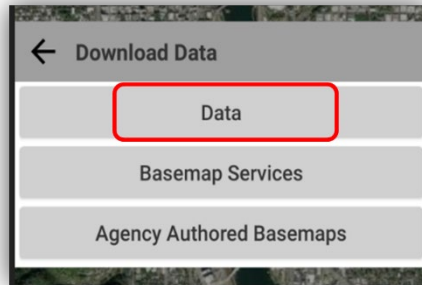
Tools/Option Button

- b. Select **Download Data** from the list.



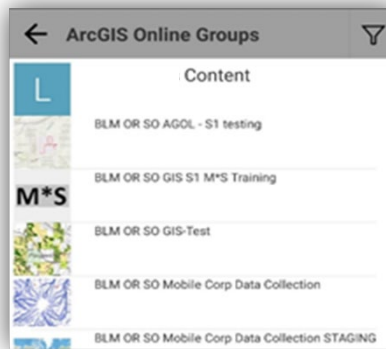
Tools/Option Menu

- c. Select **Data** from the Download Data menu.



Download Data Menu

- d. A list of the user's membership AGOL groups will appear.

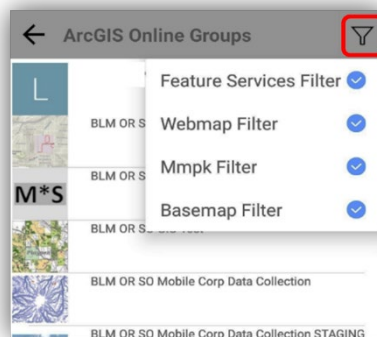


ArcGIS Online Groups List

Data Filter Tool

- There is a **Filter Tool** available at the group and item content level in the upper right that will allow the user to filter for specific data types they are looking for and then only display the filtered data types. The user has the option to filter results to only list Feature Services, Web maps, MMPK, Basemaps or any combination of them. The user can add or remove checkmarks to update data type Filter Tool and refresh the view. This tool can help find specific data more easily for groups with a large amount of items available in them.

NOTE: The filter tool will reset after exiting from the data download pages.

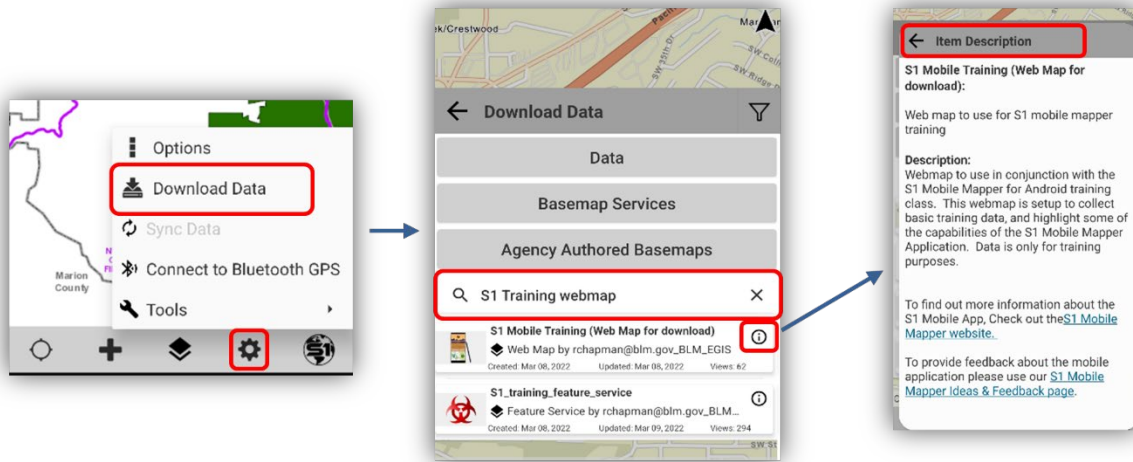


Filter Tool Pulldown Menu

AGOL Data Search Tool

The **Search box** allows users to locate ArcGIS Online (AGOL) content they have access to in the **download data menu** and **preview item descriptions** before downloading. **Note:** Does not return group names in the results, only AGOL items within all groups the user is a member of and available to the Organization.

- a. The search data tool is on the **Download Data page**. Tap the Tools/options button on the Application toolbar, then select the Download Data option.



Data Search Tool and Item Description

Data Download Icons

- a. There are two styles of **data download icons** next to a data type on the **Select Map Data** list. These two icons inform us that the data we select to download will need a **Map Extent setup** or if the data is a **Static Download**: without an extent setup.

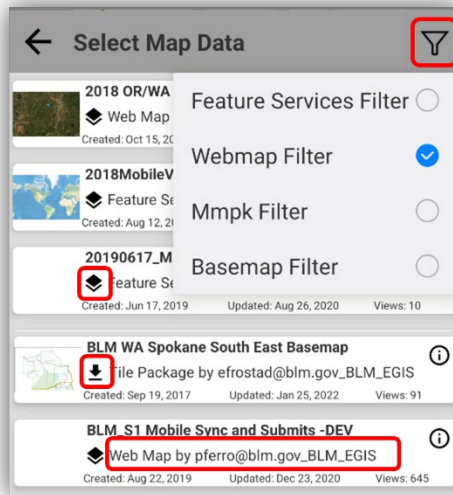


Need to set a map extent



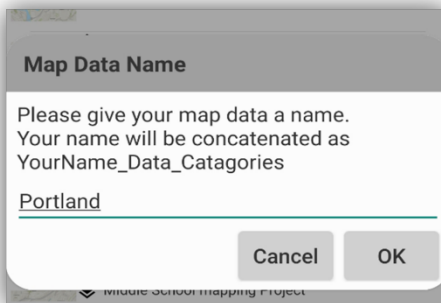
Static download, no extent set

- b. The **Search tool** and the **Filter tool** can work in conjunction to help you find the dataset you are looking for (both tools are listed above also).
- c. The image below shows using the Filter tool to search for Web Maps. The Image below also shows examples of the data detail that is listed with the datasets: Data download icon types, dataset type, name of dataset, created date, updated date, number of views, creator account and a data tile image.



Map Data List and Data Type Filter

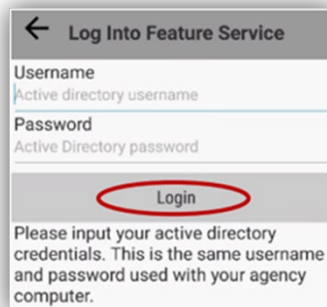
- d. Prior to initiating a Data download, the selected item will need to be given a project name. **This allows for multiple copies of the same hosted service to be downloaded to the device.** After adding a name, tap OK.



Input for Map Data Name

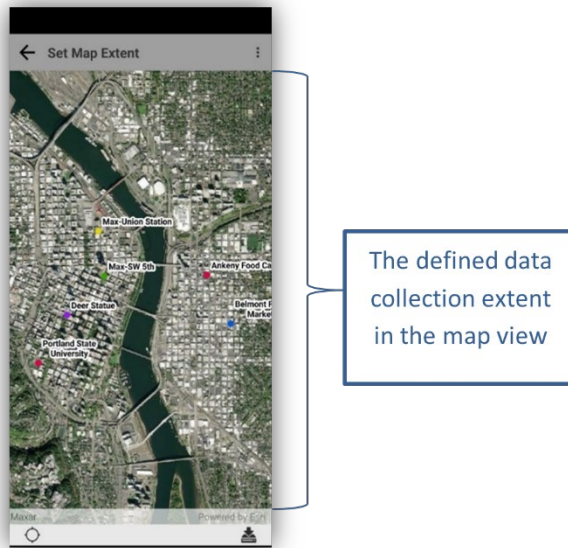
NOTE: Special characters and spaces are not allowed and will be removed automatically prior to saving.

- e. If a feature service, be it in a web map or not, is a secured on-premise service, users will be prompted to enter their **Agency Active Directory credentials** before the download will initiate.



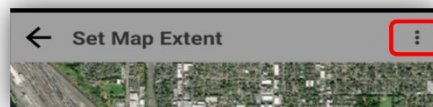
On-Premise Data Service Login

- f. After typing the username and password, tap Login. If the feature service is an Esri Hosted Feature Service, the user will not be presented with this menu.
- g. Set the **extent** (unless it is a Static data download) of the map data by pinching and pulling to zoom and pan the map view. Set the extent to the whole data collection area.



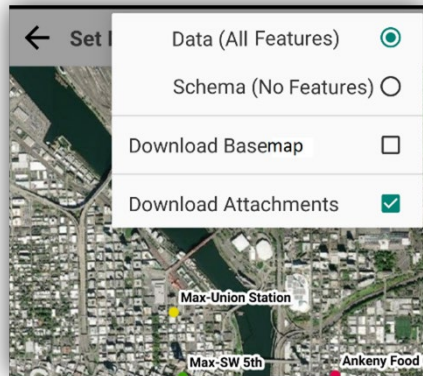
Download Data Extent

- h. **Before downloading map data**, in the top right corner is an additional menu with two options for downloading data and additional options for downloading a basemap and downloading attachments.



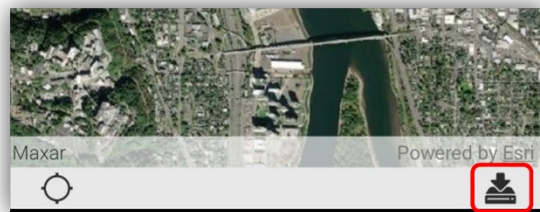
Download Data Options

- **Data (All Features)** – Default choice. Downloads all existing features that fall within the extent of the current map view to the device.
- **Schema (No Features)** – None of the existing features in the current map extent will be downloaded to the device, only new data will be created.
- **Download Basemap** – Check this box to download a basemap. This option is only available when downloading a web map.
- **Download Attachments** – Check this box to download attachments or uncheck this box if you do not want to download attachments.



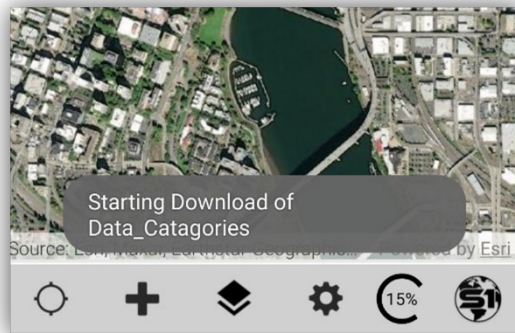
Download Data Options List

- i. When extent and download options are set, tap the Download button.



Map Data Download button

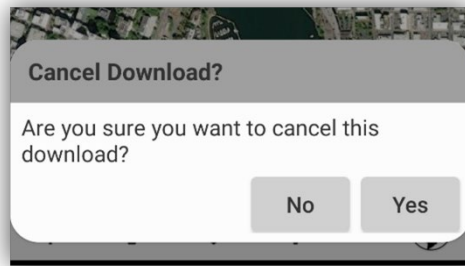
- j. While the download is underway, a progress indicator will display on the toolbar with the current download percentage displayed in the center. Also, a pop-up stating “Starting Download of ‘name_of_the_original_map_data’ will show.



Map Data Download Indicator

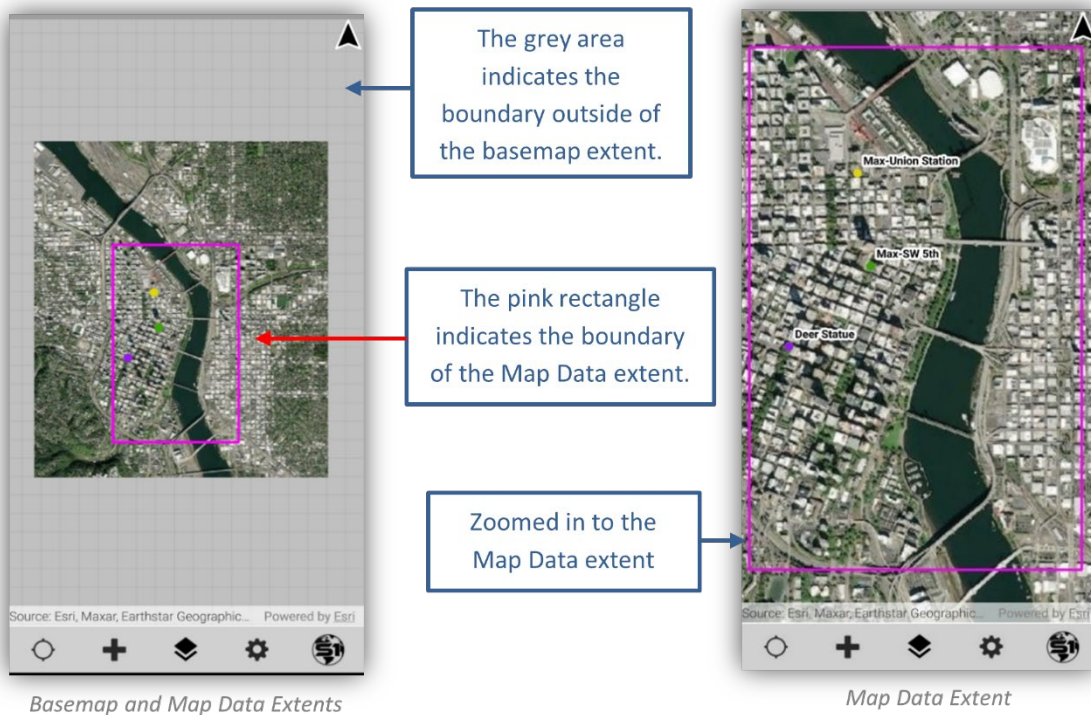
NOTE: The time it takes to download depends on the size of the extent downloaded and the number of features present in the download area extent, as well as the speed of the network connection.

- k. If necessary, the download can be **anceled** by tapping the progress spinner and selecting “Yes” in the cancel download prompt.



Cancel Map Data Download

- I. When the download is complete, a **pink rectangle** will indicate the maximum extent of the Map Data. **Data cannot be collected outside of this extent.** You can redo the extent if it is not correct for your data collection by deleting the map data download and starting over. See [Manage Map Data Content](#) below for more information on managing map data downloads.



Manage Map Data Content

The application map view will display basemaps and a map dataset at time. Users can change the basemap, rearrange the layer order of the basemaps or change the map data via the **Manage Map Layers** menu. The symbology of map data can be viewed, and the visibility of the layer can be controlled from the Manage Map Layers menu (for managing basemap data, see [Managing Basemap Layers](#) above).

Map Data Visibility & Symbology Details

The **symbology of Map Data** can be viewed, and the visibility of the layer can be controlled from the Manage Map Layers menu.

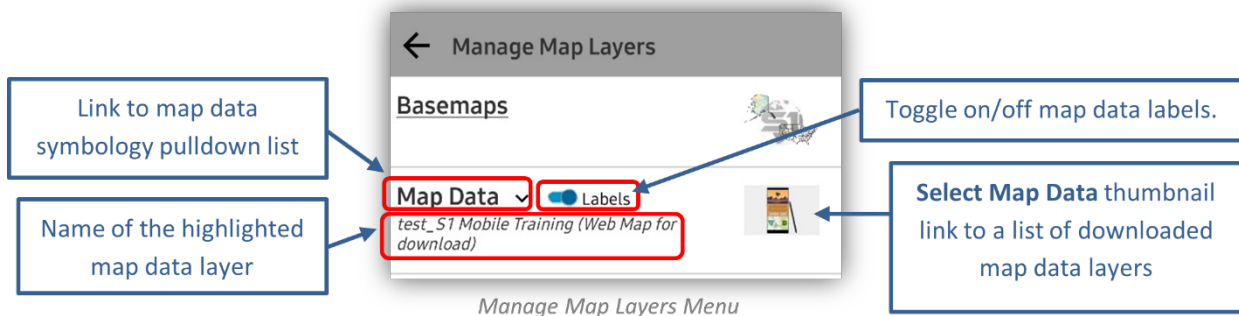
Assumed map data has been downloaded to the map.

- a. Tap the **Manage Map Layers** button on the Application toolbar to view the map data content section.



Manage Map Layers Button

- b. Tap on the underlined **Map Data** words or the chevron (∨) to expand the individual data layers and the symbology of the map data layers.

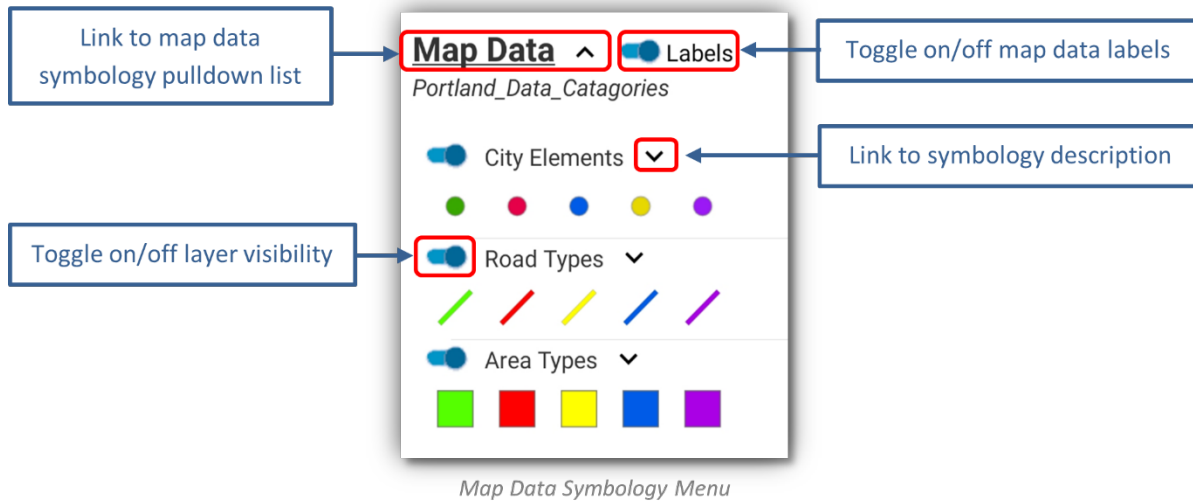


- c. To toggle the visibility of an individual data layer, use the toggle switch next to the layer name. Toggling the switch to the right will make the layers visible.

NOTE: Layers with visibility turned off will not show up in the **Create Features** menu (see [Create Features](#) below).

- d. Use the Labels toggle switch to turn on and off labels for features in the map data. If labels have been configured in the web map it will use these, otherwise it will use default labels for features.

NOTE: S1 Mobile Mapper only supports labeling when configured in a web map; not for standalone feature services that are downloaded.

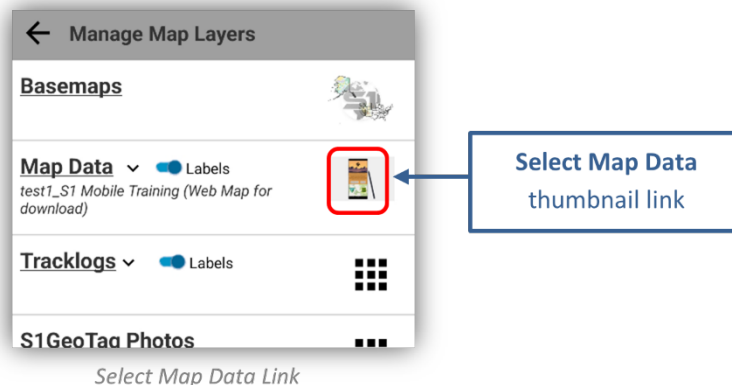


- e. When a layer is symbolized based on an attribute value (for example, a feature subtype), tapping the chevron (▼) next to the layer’s name will display a full description of each symbol in a new menu.



Switch Map Data

- a. To select, change, remove, recover, or delete map data content displayed in the map view, tapping the thumbnail on the right-hand side of the Map Data section to get to the **Select Map Data**.



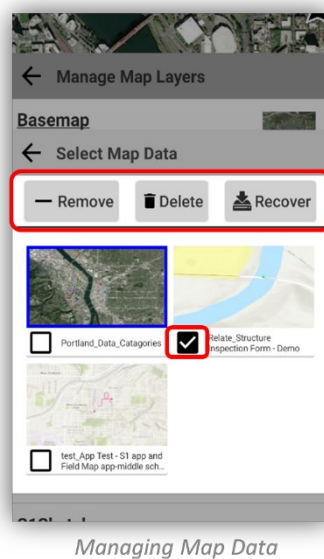
- b. A list of content currently downloaded to the device will appear as thumbnails in the **Select Map Data** menu. The item currently displayed in the map view is highlighted in **Blue**.

- c. To change the map data currently on the map view, tap its thumbnail. The map data will draw over the basemap(s).



Remove, Delete or Recover Map Data

- a. **To Remove, Delete or Recover a map data layer**, you first check the box below the map data thumbnail you want to work with then select:
 - o **Remove** will remove the map data layer from the map view but keep it in the Select Map Data menu where it can be selected again.
 - o **Delete** will delete the map data from the device. To get that map data back you will have to download it again.
 - o **Recover** pertains to a device that has an SD card. The recover button copies the data to the S1 internal storage folder so the user can grab it later (a workaround for Android 11 lockdown of its SD card storage access).



NOTE: If deleting map data, you must have a network connectivity prior to attempting delete. Be sure all data edits have been synced prior to initiating delete or edits will be lost.

Collect and Manage New Features

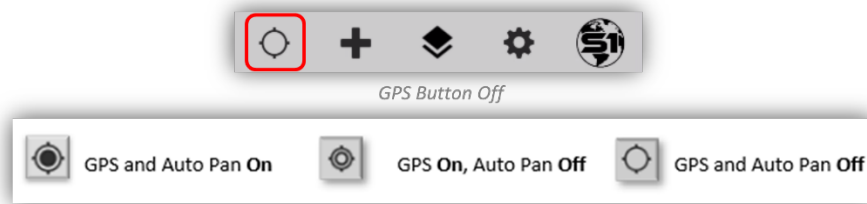
Assumptions:

- Basemap(s) downloaded and added to the map view (or default basemap used) as a bottom layer. Map data extent needs to overlap this basemap extent or use the default basemap.
- Map data has been downloaded to device covering the desired data collection extent.
- Map data is set as the current data layer in Manage Map Layers.
- Layer visibility for desired layer is turned on in Manage Map Layers.

To Add a Point via Digitizing

Digitizing is the act of manually drawing the feature on the map view rather than using GPS Averaging to collect the location.

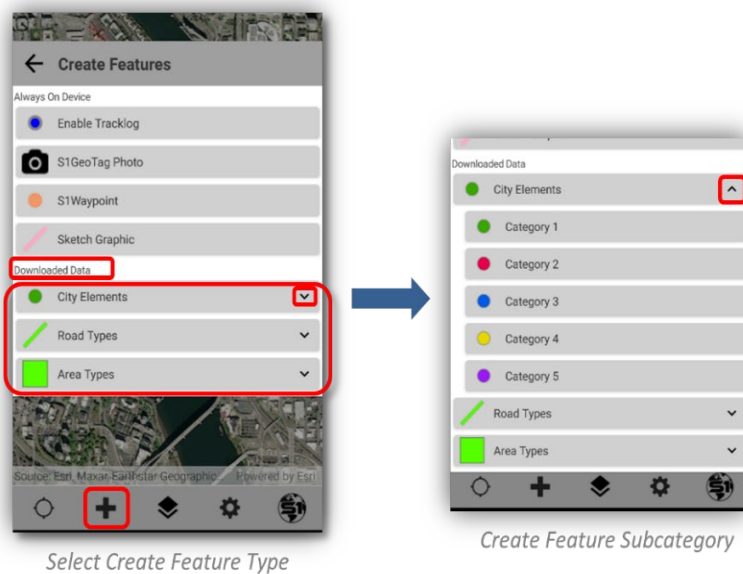
- a. If GPS is activated, turn off GPS by tapping the GPS button on the Application toolbar.



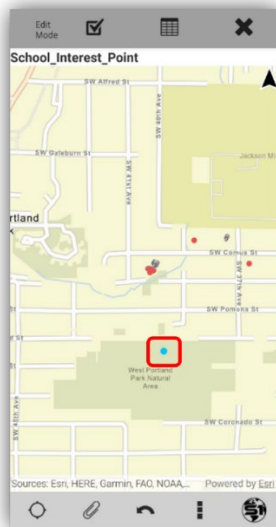
- b. Tap the **Create Features** button to list the feature types that are available from the map data.



- c. Choose the feature type to create, listed in the Downloaded Data group. The data collection workflow will be dictated by the geometry type of the layer chosen (point, line, or polygon).
- d. When a layer has subcategories based on an attribute value, tapping the chevron (▼) next to the layer's name will display the subcategory list. The layer subcategory can be selected as the create a new feature option.



- e. Select a **Point feature type** from the **Create Feature list** under the **Downloaded Data** group.
- f. Tap on the screen at the location where the point geometry is to be created. A Blue Dot will appear on the map for the feature.



New Point Feature Added to Map Data

NOTE: After selecting a feature type from the **Create Feature** list, notice that the bottom and top toolbar options change.

- g. You have the option to tap the **Undo Vertex** button to remove the last consecutive vertices added. Works on vertices before they are submitted.

NOTE: The **Undo Vertex** button will undo feature geometry only, not attribute values.



Undo Vertex Button

- h. If you want to add an **attachment** to the newly created feature, tap the **Add Attachment button** on the bottom toolbar (see [about Attachments](#) for more info).



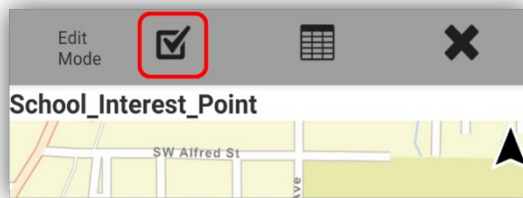
Add Attachment Button

- i. Tap the **Attribute View** button, from the **Edit Mode toolbar**, to pull up the feature's associated attribute table for editing. Filling in the attribute values right after creating a new feature is a good workflow to practice (see the [Edit Attribute Table](#) section for more information).



Add Attachment Button

- When finished with creating a new feature, filling out the feature attributes and adding attachments, then tap the **Submit Edit button** on the **Edit Mode toolbar** to save the geometry, attributes and attachments entered.



Submit Edit Button

Create New Line/Area Feature via Digitizing

Digitizing is the act of manually drawing the feature on the map view rather than using GPS to collect the location.

- a. If GPS is activated, turn off GPS by tapping the GPS button.



GPS Button Off



- b. Tap the **Create Feature** button to list the feature types that are available from the map data.



Create Feature Button

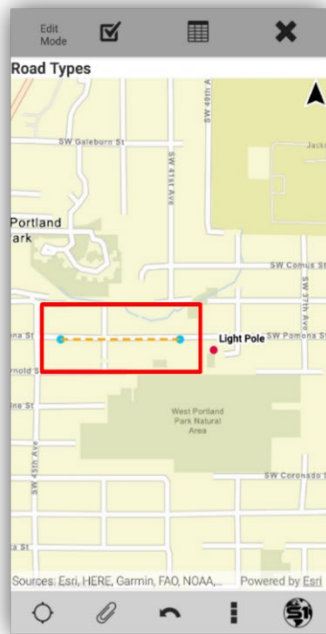
- c. Choose the feature type to create, listed in the **Downloaded Data** group. The data collection workflow will be dictated by the geometry type of the layer chosen (point, line, or polygon).



Selected Create Line Feature

NOTE: After selecting a feature type from the **Create Feature** list, notice that the bottom and top toolbar options change.

- d. After selecting the feature type, the screen opens to the map view. **Tap on the screen** at the location where the line or area is to begin, **a blue dot will appear**.
- e. **Tap again on the screen to place a second vertex location**, a second dot will appear and a line that connects the two vertices.
- f. Continue tapping on the screen to create the line or polygon. For polygons, by the third vertex you will see the polygon start to take shape as an area cover.



Creating a Line Feature



Creating a Polygon Feature

NOTE: Lines need a minimum of two vertices to be saved, while polygons need a minimum of three vertices.

- g. You have the option to tap the **Undo Vertex button** to remove the last consecutive vertices added. Works on vertices before they are submitted.

NOTE: The **Undo Vertex button** will undo feature geometry only, not attribute values.



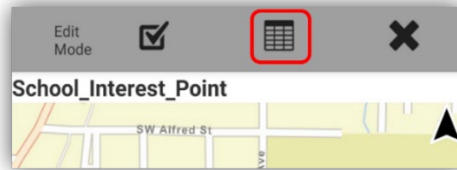
Undo Vertex Button

- h. If you want to add an **attachment** to the newly created feature, tap the **Add Attachment button** on the bottom toolbar (see [Attachments](#) for more information).



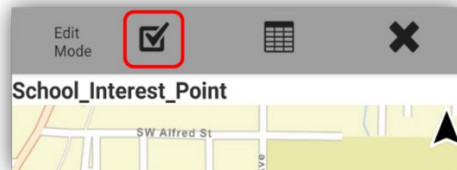
Add Attachment Button

- i. Tap the **Attribute Table View** button, from the **Edit Mode toolbar**, to pull up the feature's associated attribute table for editing. Filling in the attribute values right after creating a new feature is a good workflow to practice (see the [Edit Attribute Table](#) for more information).



Attribute Table View Button

- j. When finished with creating a new feature, filling out the feature attributes and adding attachments, then tap the **Submit Edit button** on the **Edit Mode toolbar** to save the geometry, attributes and attachments entered.

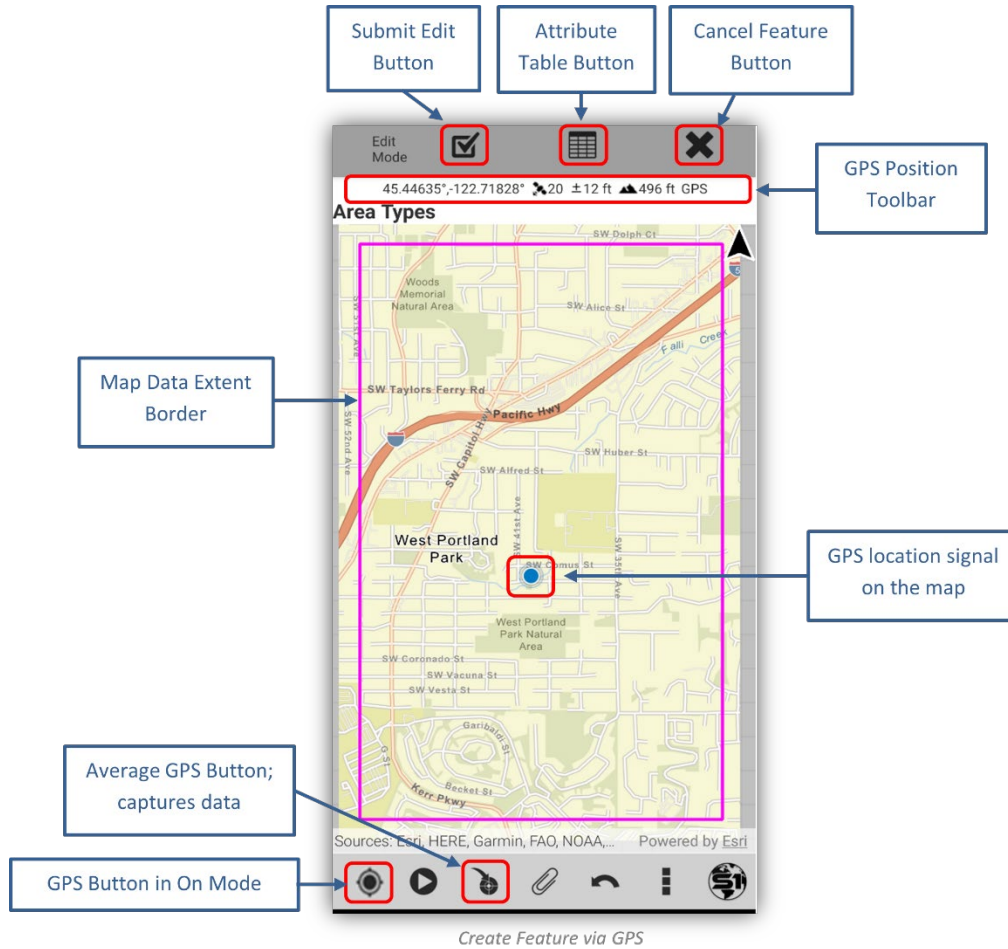


Submit Edit Button

Create Point Feature via GPS Averaging

When collecting a point with GPS, the feature location is captured with GPS Averaging. GPS Averaging consists of taking several GPS position measurements at the same location and averaging them to minimize positional error associated with the final GPS position.

In locations where GPS accuracy is poor, averaging can improve the spatial quality of the feature being captured. The number of GPS positions collected to achieve the averaged vertex is determined by the number of GPS positions specified in the [S1 Application Options](#) menu.



- a. Activate GPS by tapping the GPS button to the **On Mode**.



- b. Wait until a strong GPS position fix is indicated by the **GPS Position toolbar** at the top of the screen.

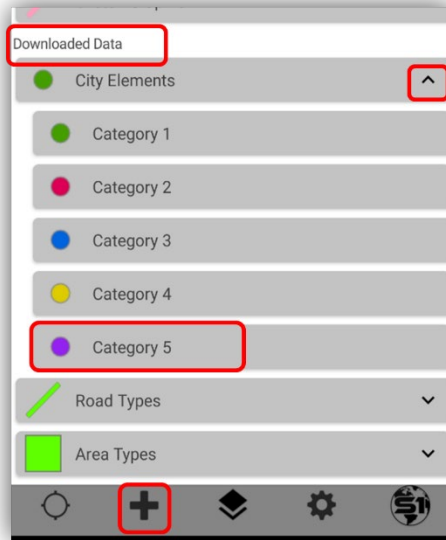


- c. Tap the **Create Feature** button to list the feature types that are available from the map data.



- d. Choose the feature type to create, listed in the **Downloaded Data** group. The data collection workflow will be dictated by the geometry type of the layer chosen (point, line, or polygon).

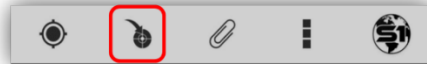
- e. When a layer has subcategories based on an attribute value, tapping the chevron (∨) next to the layer's name will display the subcategory list. **The layer subcategory can be selected as the create a new feature option.**



Create Feature List

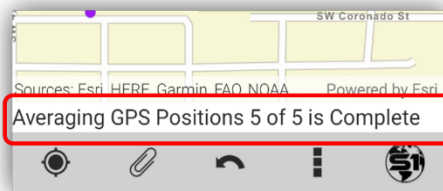
NOTE: After selecting a feature type from the **Create Feature** list, notice that the bottom and top toolbar options change.

- f. Tap the Average GPS button to capture the geometry of the point feature by averaging your GPS position. **Pause in position** until the averaging GPS position is complete.



Average GPS Button

- g. GPS Averaging status appears at the bottom of the screen in the **Position Capture Status bar**.



Position Capture Status Bar

- h. You have the option to tap the **Undo Vertex button** to remove the last consecutive vertices added. Works on vertices before they are submitted.

NOTE: The **Undo Vertex button** will undo feature geometry only, not attribute values.



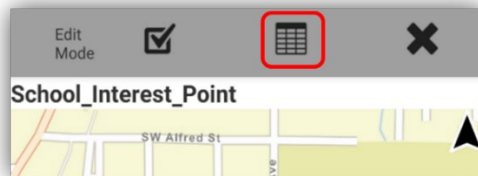
Undo Vertex Button

- i. If you want to add an **attachment** to the newly created feature, tap the **Add Attachment button** on the bottom toolbar (see [Attachments](#) for more information).



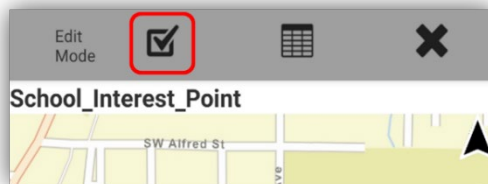
Add Attachment Button

- j. Tap the **Attribute View** button, from the **Edit Mode toolbar**, to pull up the feature’s associated attribute table for editing. Filling in the attribute values right after creating a new feature is a good workflow to practice (see the [Edit Attribute Table](#) for more information).



Attribute Table View Button

- k. When finished with creating a new feature, filling out the feature attributes and adding attachments, then tap the **Submit Edit button** on the **Edit Mode toolbar** to save the geometry, attributes and attachments entered.



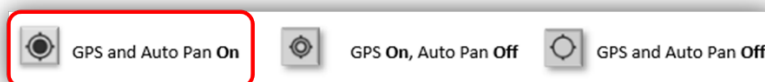
Submit Edit Button

Create New Line or Polygon Feature via GPS Averaging

When collecting a single vertex with GPS (one point), the vertex location is captured with GPS Averaging. GPS averaging consists of taking several GPS position measurements at the same location and averaging the location of all GPS positions collected to minimize positional error associated with the final GPS position. In locations where GPS accuracy is poor, averaging can improve the spatial quality of the feature captured.

In terms of a line or polygon, you are averaging the location for a single vertex that makes up the final feature. If collecting a line, a minimum of two vertices must be collected, for a polygon a minimum of three vertices must be collected. The number of positions collected to achieve the averaged vertex is determined by the number of positions specified in the [S1 Application Options](#) menu.

- a. Activate GPS by tapping the GPS button to the **On Mode**.



- b. Wait until a strong GPS position fix is indicated by the GPS Position toolbar at the top of the screen.

45.44635°,-122.71828° 20 ±12 ft 496 ft GPS

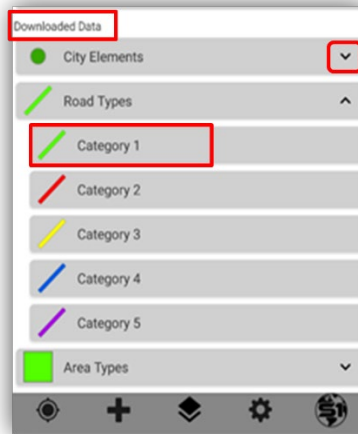
GPS Position Toolbar

- c. Tap the **Create Feature** button to list the feature types that are available from the map data.



Create Feature Button

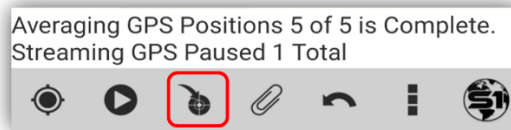
- d. Choose the feature type to create listed in the **Downloaded Data** group. The data collection workflow will be dictated by the geometry type of the layer chosen (point, line, or polygon).



Create Feature List

NOTE: After selecting a feature type from the **Create Feature** list, notice that the bottom and top toolbar options change.

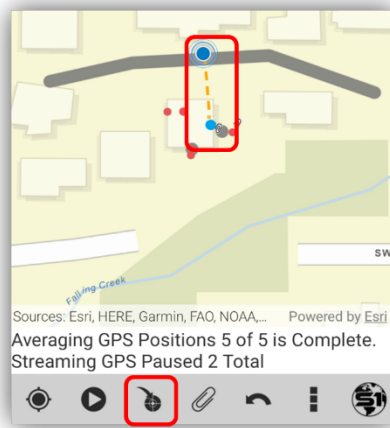
- e. Stand at the start of the line feature or polygon area you want to create. Tap **Average GPS button** to capture the first vertex. **Pause in position** until the averaging GPS position is complete.
- f. Averaging status appears at the bottom of the screen in the **Position Capture Status** bar.



Average GPS Button

- g. When averaging is complete for the first vertex, move to the next location where the line or area vertex will be collected. Tap **Average Vertex button** to capture another vertex at this location.
- h. Repeat moving to the next location and tapping Average GPS button until the feature has been captured.

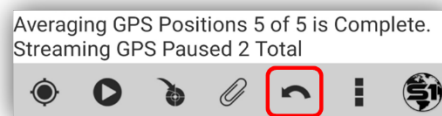
NOTE: A feature is unable to be saved until all the Averaging GPS Positions have been collected, though, you can populate the attributes prior to collecting all positions. The number of Averaging GPS Positions collected is based on [S1 Application Options](#) settings.



Second Vertex Captured

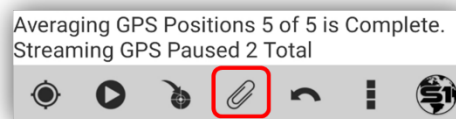
- i. You have the option to tap the **Undo Vertex button** to remove the last consecutive vertices added. Works on vertices before they are submitted.

NOTE: The Undo Vertex button will undo feature geometry only, not attribute values.



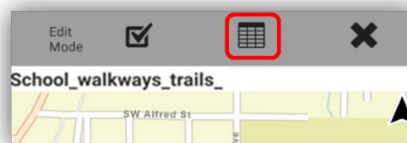
Undo Vertex Button

- j. If you want to add an **attachment** to the newly created feature, tap the **Add Attachment button** on the bottom toolbar (see [Attachments](#) for more information).



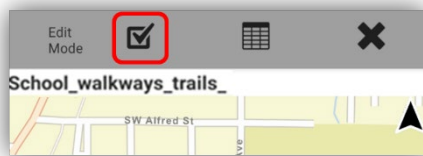
Add Attachment Button

- k. Tap the **Attribute View** button, from the **Edit Mode toolbar**, to pull up the feature's associated attribute table for editing. Filling in the attribute values right after creating a new feature is a good workflow to practice (see the [Edit Attribute Table](#) for more information).



Attribute Table View Button

- l. When finished with creating a new feature, filling out the feature attributes and adding attachments, then tap the **Submit Edit button** on the **Edit Mode toolbar** to save the geometry, attributes and attachments entered.



Submit Edit Button

GPS Streaming

GPS Streaming is the capture of the geometry of a line or polygon feature by automatically recording GPS positions or vertices based on interval settings (time or distance) specified in [S1 Application Options](#). Once initiated, the application will continue to collect these measurements until GPS streaming is Paused or the feature is Saved.

- a. Activate GPS by tapping the GPS button to the **On Mode**.



- b. Wait until a strong GPS position fix is indicated by the GPS Position toolbar at the top of the screen.

45.44635°,-122.71828° 20 ± 12 ft 496 ft GPS

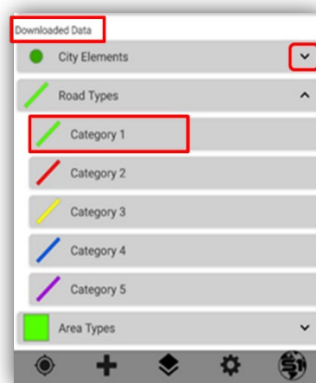
GPS Position Toolbar

- c. Tap the **Create Feature** button to list the feature types that are available from the map data.



Create Feature Button

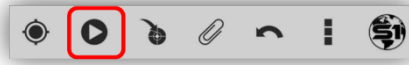
- d. Choose a line or polygon feature type listed in the **Downloaded Data** group. The data collection workflow will be dictated by the geometry type of the layer chosen (line or polygon).



Create Feature List

NOTE: After selecting a feature type from the **Create Feature** list, notice that the bottom and top toolbar options change.

- e. Stand at the start of the line or polygon feature location. Tap the **Begin GPS Streaming** button to start recording GPS positions for your feature and start moving.



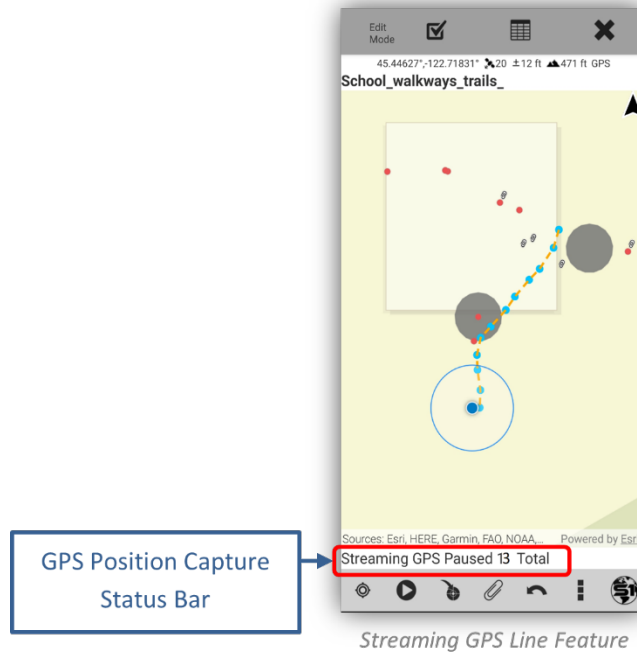
GPS Streaming Play Button

- f. To temporarily suspend capturing vertices via streaming, tap the **Pause GPS Streaming** button.



Pause GPS Streaming Button

- g. The total number of GPS positions recorded will be displayed in the **GPS Position Capture Status bar** when in Paused Streaming status.



Streaming GPS Line Feature

- h. You have the option to tap the **Undo Vertex button** to remove the last consecutive vertices added. Works on vertices before they are submitted.

Note: The Undo Vertex button will undo feature geometry only, not attribute values.



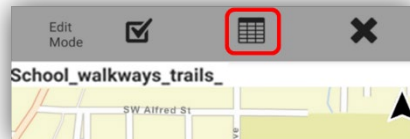
Undo Vertex Button

- i. If you want to add an **attachment** to the newly created feature, tap the **Add Attachment button** on the bottom toolbar (see [Attachments](#) for more information).



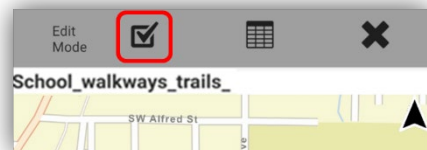
Add Attachment Button

- j. Tap the **Attribute View** button, from the **Edit Mode toolbar**, to pull up the feature's associated attribute table for editing. Filling in the attribute values right after creating a new feature is a good workflow to practice (see the [Edit Attribute Table](#) for more information).



Attribute Table View Button

- k. When finished with creating a new feature, filling out the feature attributes and adding attachments, then tap the **Submit Edit button** on the **Edit Mode toolbar** to save the geometry, attributes and attachments entered.



Submit Edit Button

Toggle between Streaming and GPS Averaging

It is possible to toggle data collection methods between GPS Streaming and GPS Averaging when collecting lines or polygons. An example workflow:

- a. Tap the **Collect Features** button and select a line or polygon layer.



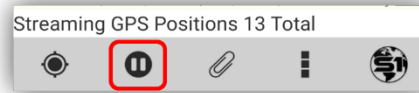
Create Feature Button

- b. Start streaming the line or polygon by tapping the **GPS Stream** button.



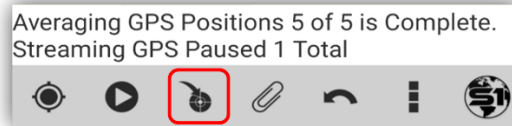
GPS Streaming Play Button

- c. To switch into GPS Averaging, tap the **Pause GPS Streaming** button, move locations to collect the next vertex.



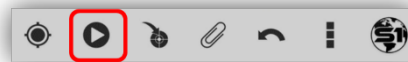
Pause GPS Streaming Button

- d. Tap **Average Vertex** button and collect position(s).



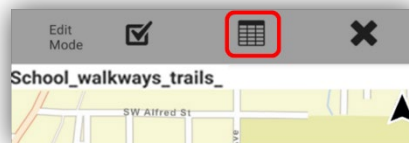
Average GPS Button

- e. To return to GPS Streaming, tap the **GPS Stream** button again.



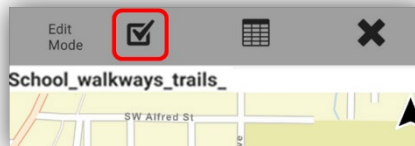
GPS Streaming Play Button

- f. Select the **Attribute View** button to edit the attributes for the feature.



Attribute Table View Button

- g. Tap **Submit Edit** button to save the feature.

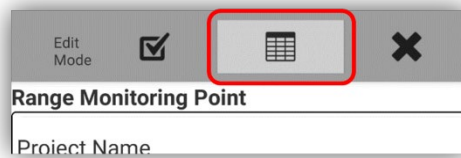


Submit Edit Button

Edit Attribute Table

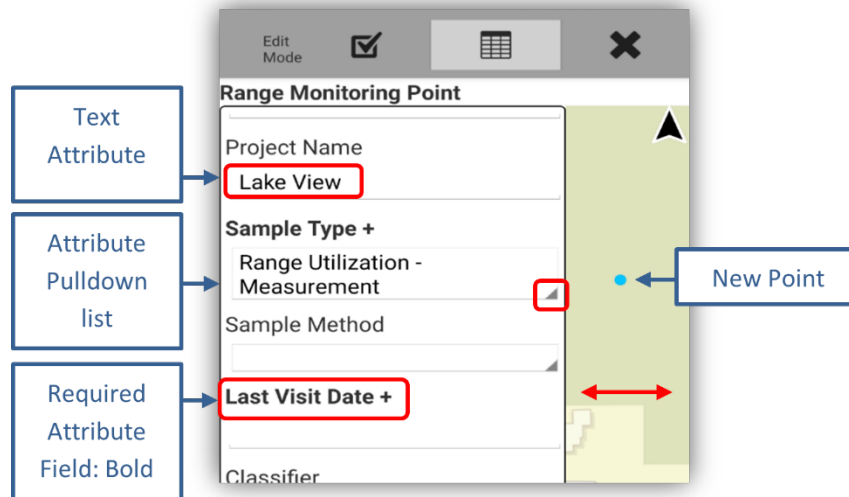
An Attribute table is a database or tabular file containing information about a set of geographic features. Each feature created is linked to a record in the associated attribute table. Filling in the feature attribute values right after creating a new feature is a good workflow to practice.

- a. When creating a new feature or editing a feature, you have the option to tap on the **Attribute View button** to add or edit the feature's attribute values. The Attribute View button is shown below in light grey active mode on the **Edit Mode toolbar**. (See [Creating Features](#) and [Editing Feature](#) sections).



Attribute Table View Button

- b. **The Attribute Table button allows the user to toggle back and forth between the map view and the attribute table.** When visible, users can adjust the size of the Attribute Table by pressing and dragging the right side of the table to resize it on both tablets or phones to reveal more or less of the map view.



Attribute Table View with Required Fields and Pull-down Lists

- Attribute field types are set by the Feature Dataset creator. There are many types of attribute values: short integer, long integer, float, double, text, date, and binary large object (BLOB). Attribute tables also contain predefined fields that hold data on geometry and the object ID.
- Attribute values can be set up as a pull-down list to choose from, a set range of values to add or type in the text or numerical value.
- If an attribute field name is in **Bold**, then it is a required field that needs to be filled out before a feature can be Synced or Submitted (see [Sync and Submit](#) section).

Repeat Attributes

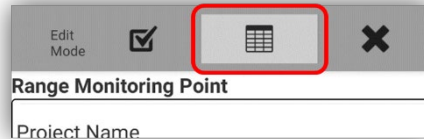
When collecting many features that share the same set of attribute values, it may be beneficial to enable the **Repeat Attributes** option. Once the **Repeat Attribute** box is checked in the attribute table for a feature layer, each subsequent feature created in that layer will have the attribute form populated with the same attributes as the previously created feature. **Repeat Attributes** will persist even after terminating an app session. To disable **Repeat Attributes**, create a feature, uncheck the Repeat Attributes box and save the feature. If the feature is not saved, Repeat Attributes will not change from disabled to enabled or vice versa. Repeat Attributes is turned off by default.

NOTE 1: Unique attribute value fields (primary keys, GUID values, editor tracking fields, S1 Auto populate fields, etc.) are never repeated.

NOTE 2: Some Map Data utilizing custom attribute forms (such as VMAP) may have additional restrictions set for which fields are repeated or how fields are repeated.

Turn On/Off Repeat Attributes (all fields)

- a. To turn Repeat Attributes on, create or edit a feature and tap the **Attribute Table View** button.



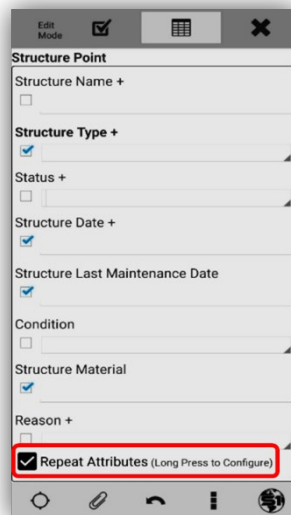
Attribute Table View Button

- b. **Scroll to the bottom of the attribute table** and tap the **checkbox** to enable **Repeat Attributes**. The feature must be saved with the Repeat Attributes box checked for the attributes to be remembered, if the feature is canceled, then the attributes will not be saved.
- c. To turn off Repeat Attributes, create a new feature in the same layer and tap to un-checked the Repeat Attributes **prior to saving the feature**.

Turn On/Off Repeat Attributes (Configurable)

Repeat attributes is configurable to allow only user specified fields to repeat. This can be particularly helpful for features that only need to repeat a few attributes.

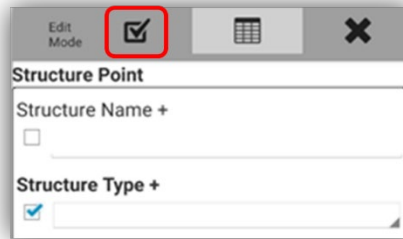
- d. To enable configurable repeat attributes, you need to **long press the checkbox** in the attribute form for the feature layer you want to repeat attributes for.
- e. By default, all available repeat attribute fields are checked on. Just remove the checks in the boxes from the fields not to be repeated and save the feature. **This setting is tied to the specific layer and subtype in a service and will persist until turned off by the user.**



Configurable Repeat Attributes

NOTE: As with standard repeat attributes, autogenerated fields will not show checkmarks available to repeat as they are populated from device sensors or other sources.

- f. To save your configured attribute settings, tap the **Submit Edit** button when done. This setting will persist until changed by the user.



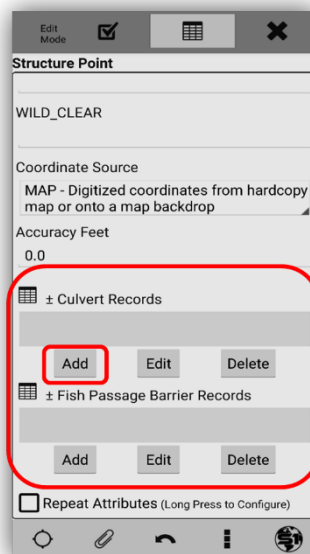
Submit Edit Button

Related Records Data Entry

The application supports the following related table relationship types: feature to feature (one-to-one) relationship, feature to table (one-to-many) relationship, and table to table (many-to-many) relationship. Relationships must be constructed using both a GLOBALID or GUID field as the primary key field type and a GUID field as the foreign key field.

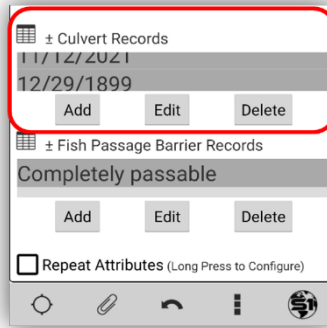
When a relationship exists, a list box(s) will **appear at the bottom** of the parent feature attribute form for each relationship class. The name of the relationship class appears as a title above the list box. Existing related records appear inside the list box.

- a. New related records may be created for the new (or selected) feature by tapping **Add** in the Attribute Table.



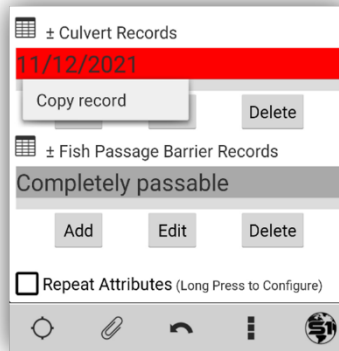
Creating New Related Records

- b. Existing related records can be reviewed, edited, or deleted by selecting the related record (selected record will turn red) and tapping Edit or Delete. See [Select Mode for Related Tables](#) on how to view the whole related attribute table.



List of Related Records

- c. If there is more than one record listed for a feature, you can scroll through the list in the records box to select one.
- d. Existing related records can be copied or duplicated by long tapping on the record to be duplicated and choosing **Copy record**. Selecting Copy record will create a duplicate record in the related table with the same attributes as the original. The attributes can then be modified from the original on the duplicated record prior to saving the new record.



List of Related Records

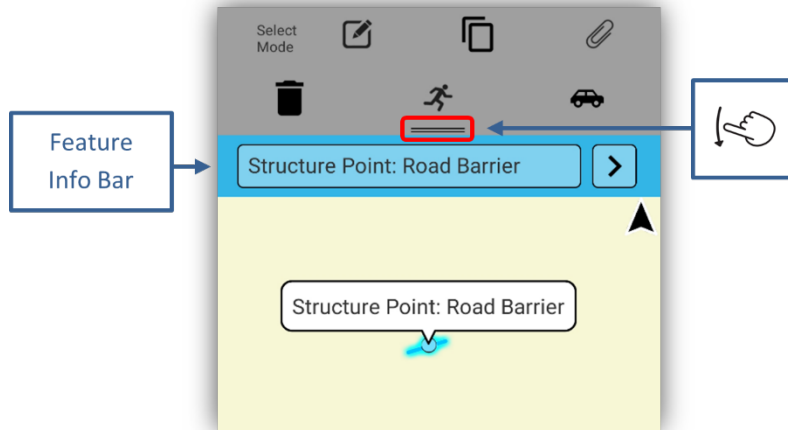
Select Mode Toolbar

The **Select Mode toolbar**, **Feature Info bar** and the **Feature Callout box** in the main map view will appear once a feature in the map view is selected. The toolbar includes a variety of tools, which are contextual, and the toolbar can be expanded and collapsed to reveal tools. Only tools that are applicable for the selected feature layer will display on the toolbar. Swipe down on the gray toolbar area to expand it and see more tools available.

Assumptions:

- Map Data has been downloaded to device covering desired data collection area.
- The right data layer is set as the current Map Data in Manage Map Layers.
- There are existing features in this Map Data.
- To **select a feature** in the map view, tap the feature symbol. When selected, it is **highlighted in blue in the map view**.

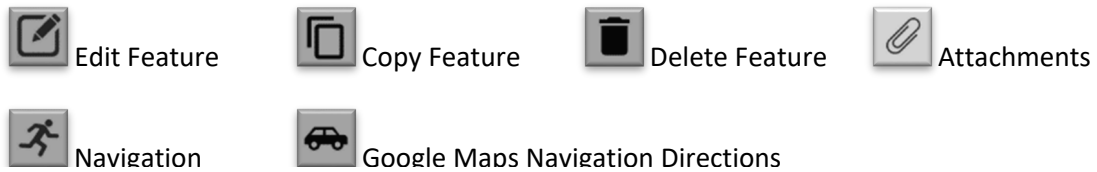
- a. When a feature is selected (tap a feature), the **Select Mode toolbar** appears, and a blue Feature Info bar will appear listing the name of the selected feature(s).



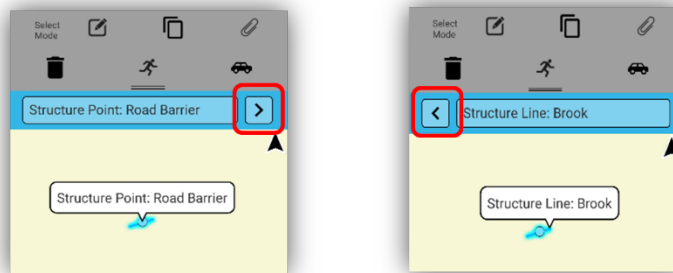
Selected Feature and Select Mode Toolbar

NOTE: To see all tools on Select Mode Toolbar swipe down as indicated by the double bar.

- b. The following tools are included on the **Select Mode** toolbar, however, the tools that are available (such as Edit Feature) appear depending upon the settings of the given feature layer.



- c. To just delete a feature, select a feature and check that it is the right feature listed in the blue **Feature Info Bar** above map view. Then tap **Delete Feature** on the Selection Toolbar.
- d. If multiple features are close in proximity or overlay one another, all will be selected. **Tap the arrow button on the blue feature bar** to scroll left or right until the desired feature is displayed.



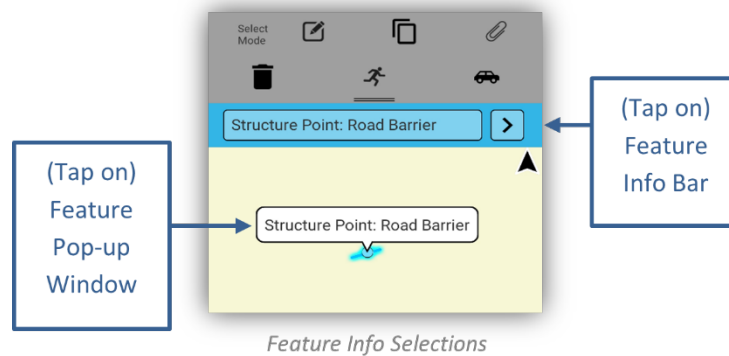
Select Feature List Arrow

- e. There are two ways to access the **Feature Info pop-up window**. One is by tapping the feature's name in the blue **Feature Info bar** and the other is to tap the **Feature Callout box** in the main map view.

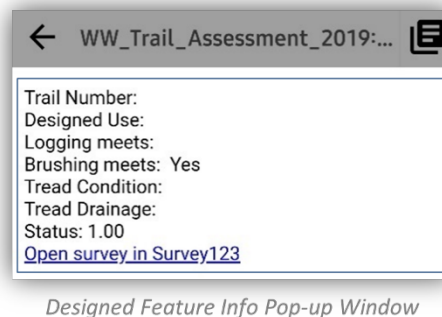
NOTE: The Feature Callout box in the main map view will also help define which feature is currently selected if the scroll arrows are used on the blue Feature Info bar.

- f. Tapping either the feature's name in the blue **Feature Info bar** or tapping the white **Feature Callout box** in the main map view, will take you to the **Feature Info Pop-up window**.
- g. The **Feature Info Pop-up window** provides two possible views. The default view that pops up first, honors the **pop-up settings** defined in the web map. Most web map pop-up settings should work in the app other than links to connected content in a disconnected environment. See examples below.

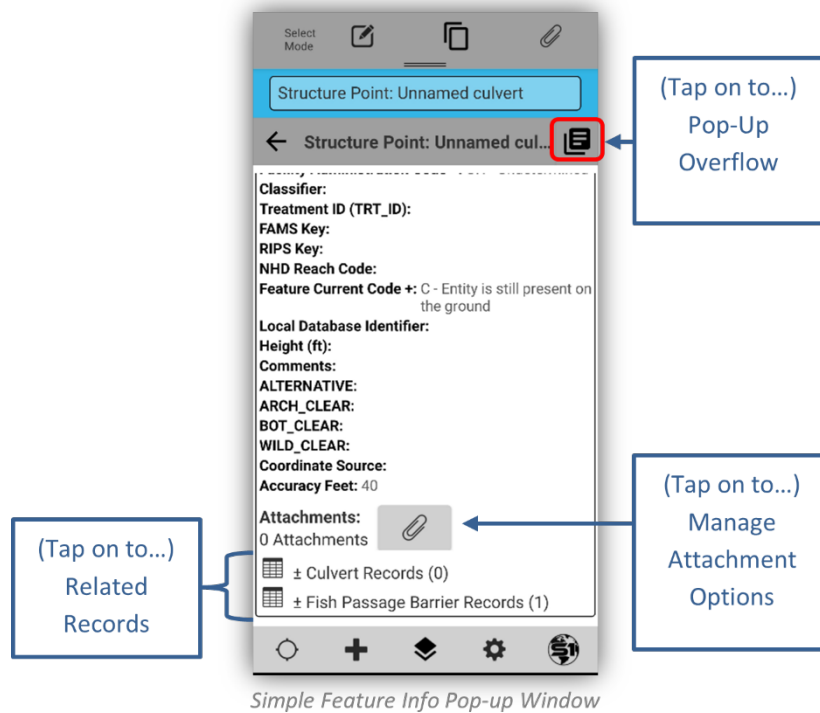
NOTE: Setting up a concise web map pop-up with only what the field user needs to see, like attachments or links, is the goal of this default view. While still allowing the user to access all of the attributes and feature level metadata in the secondary pop-up if needed. **Also of note**, if there is no web map pop-up configured, all unhidden attribute fields will show up in this default pop-up information.



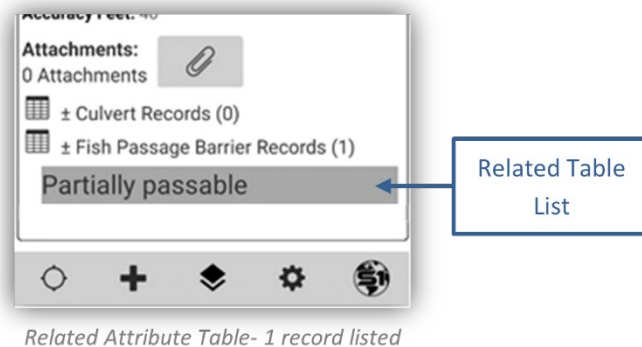
Example 1. Shows a pop-up designed with only a few select fields showing and a Survey123 link embedded.



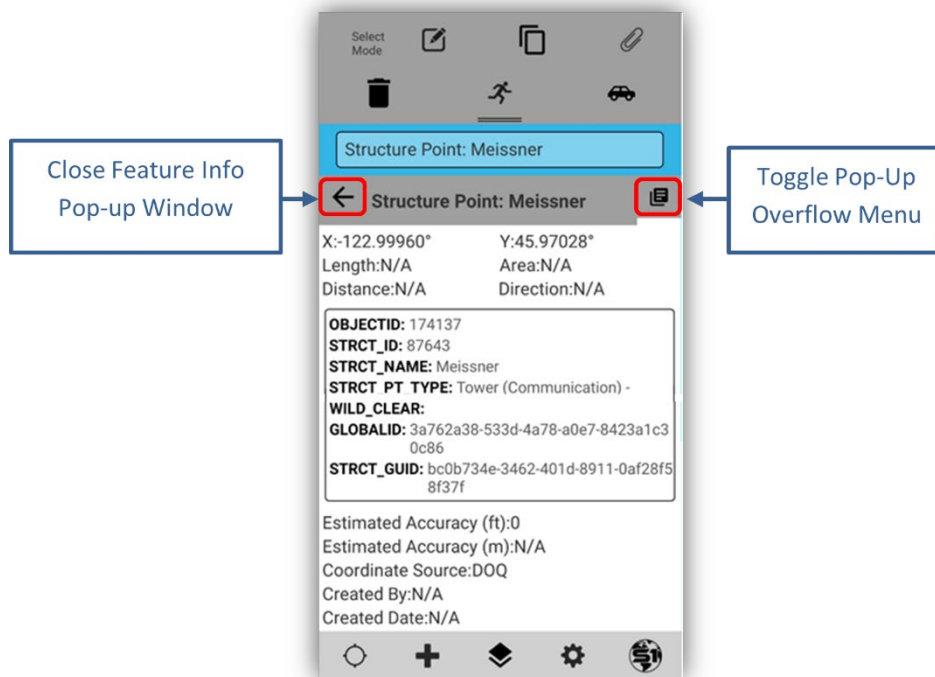
Example 2. Shows a simple Feature Info pop-up with feature attributes, enabled attachments and how many attachments, and it lists the related tables to this selected feature.



- h. Tapping on the **Attachment** paperclip will take the user to the [Manage Attachments options](#) (see Attachments).
- i. Tapping on the **Related Table** title (with 1+ count), will open the **Related Table List** and then tap a table in the list to view the attributes related to this selected feature. Attributes in the main table and in the related tables, can be edited in an edit session.



- j. To access the **Full Feature Level Metadata**, tap the **Pop-up Overflow Menu** icon in the upper right corner of the popup, which will open the secondary view in this popup. Tap again to toggle back to the default view.



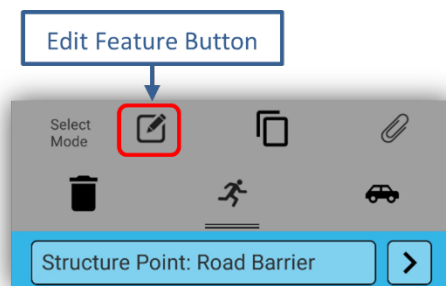
Full Feature Metadata Window

- k. The Feature Info Pop-up window can be closed using the back arrow at the top of the pop-up. The **Feature will remain selected** even after the pop-up is closed.

Edit Mode Toolbar

The Edit Mode toolbar is only accessible when a feature service has Update and Delete enabled.

- a. With a feature selected, tap the **Edit Feature** button on the **Select Mode Toolbar** to begin editing the feature and its attributes. The **Edit Mode toolbar** will appear in place of the Select Mode toolbar.

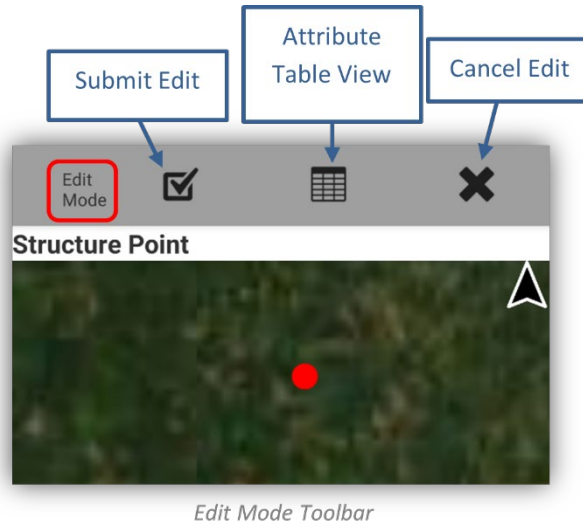


Edit Feature Button on the Select Mode Toolbar

Editing Feature Geometry

Geometry edits are made on a single selected feature at a time. All edits must be saved via **Submit Edit** button to be made permanent; prior to saving changes, edits can be rolled back using the **Cancel Edit** button.

The Edit Mode toolbar includes the following functions:

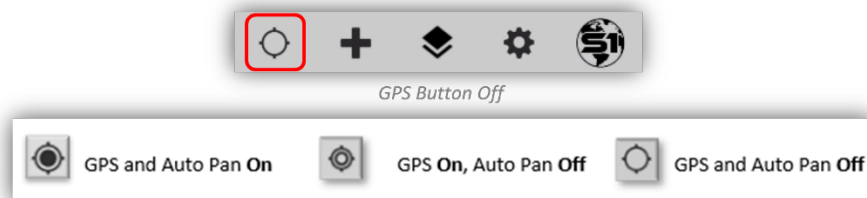


Editing Point Geometry

When a point feature has been selected and then the user taps the **Edit Feature** button, the point feature will be on the map view as a **red dot** while in Edit Mode.

Editing Via GPS

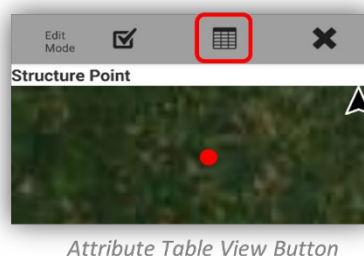
- a. With **GPS Off**, pan to and select the point feature you want to edit from its location to your GPS location. Then select the **Edit Feature** button, which will change the blue selected point feature to red.



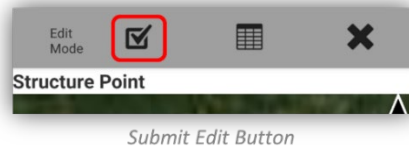
- b. Then tap the **GPS On** button. The red dot will move to your current GPS location **after averaging its position**.



- c. **To edit any attributes**, tap the **Attribute Table View** button and add or change attribute values.

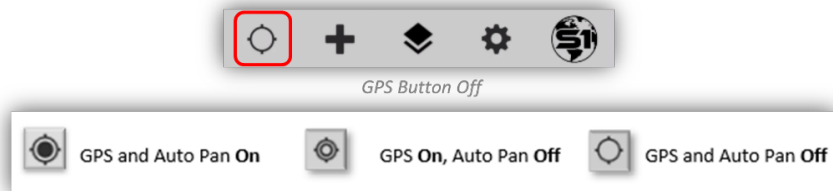


- d. To commit the change and stop editing the feature, tap the **Submit Edit** button.

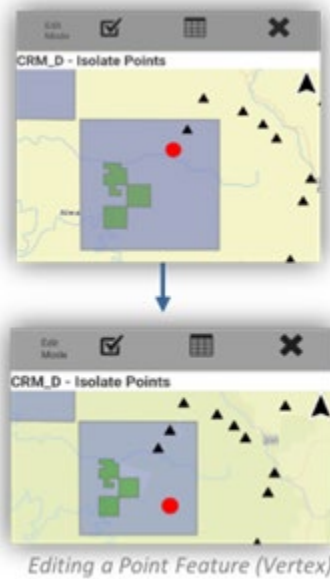


Editing Via Digitizing

- e. Turn **GPS Off**, if not already off.



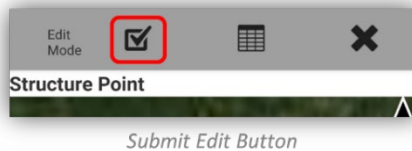
- f. Pan to and select the point feature you want to edit from its location to a new location. Then select the **Edit Feature** button, which will change the blue selected point feature to red.
- g. To move the feature's location, tap the desired location on the map view and the red dot will move to that location.



- h. To edit any attributes, tap the **Attribute Table View** button and add or change attribute values.



- i. To commit the change and stop editing the feature, tap the **Submit Edit** button.



Editing Line or Polygon Geometry

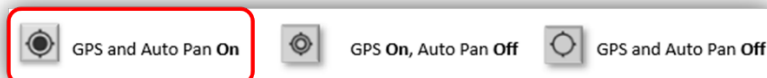
When a line or polygon feature has been selected and then the user taps the **Edit Feature** button, the individual vertices are displayed as large black dots. In edit mode, users can reshape the feature using GPS or screen digitize the feature by tapping the screen or dragging the vertices around the map.



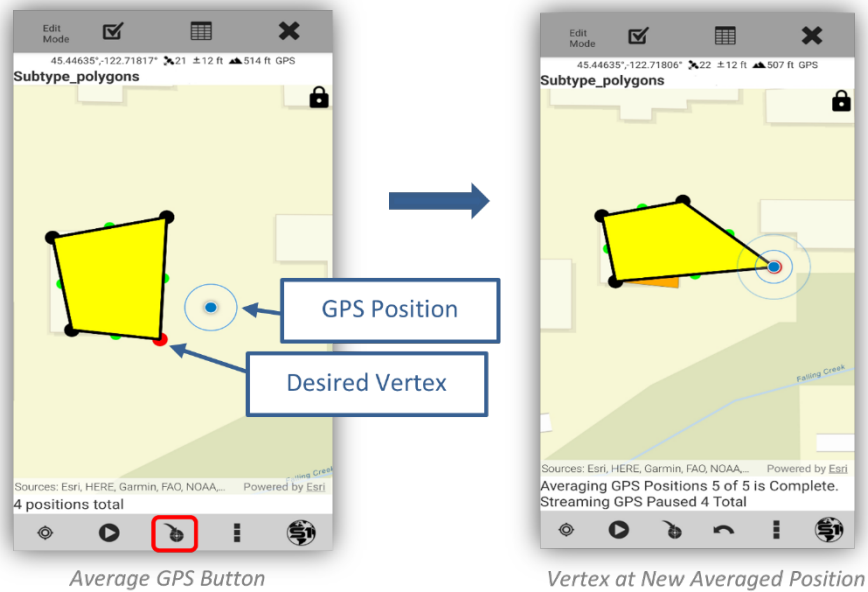
Polygon Feature in Edit Mode

Editing Via GPS

- a. If not already activated, turn **GPS On**.



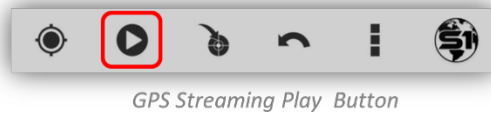
- b. To reshape the line or polygon feature using GPS, first tap the **desired vertex** where the reshaping is to be initiated from, a red dot will appear where editing will initiate.



- c. To use position averaging, tap the **Average GPS** button to move the selected vertex to the new averaged position. Continue averaging points until finished.
- d. If reshaping is occurring in the middle of a feature, the end of the reshape line will snap back to the next closest vertex in the feature being edited.

NOTE: Edits to lines or polygons can be accomplished using either position averaging or streaming.

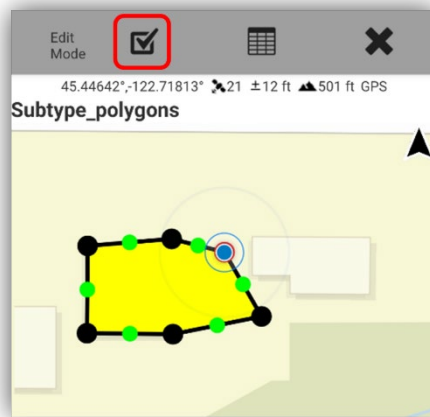
- e. To use **Streaming** to reshape the line or polygon, tap the **GPS Streaming** button to start recording updated GPS positions and start moving. As you move, the existing feature will adjust to match the updated GPS positions. See [S1 Options](#) for **Streaming Interval Distance** settings.



- f. Tap the **Pause GPS Streaming** button when finished collecting features via Streaming.



- g. Continue averaging vertices until finished or mix and match between position averaging and streaming. Also, see [Collect and Manage New Features](#) for more editing information.
- h. To end reshaping the feature and to commit the changes, tap the **Submit Edit** button.



Submit Edit Button

Editing Via Digitizing

- Pan to and select the line or polygon feature you want to edit. Then select the **Edit Feature** button, which will change the blue selected feature into large black dots, vertices, outlining the feature.
- To move a vertex, touch it to activate and it will turn red. Hold it to drag it to a new location on the map view.
- The feature will automatically reshape itself after you lift your finger.



Polygon Feature in Edit Mode



Moved Polygon Vertex

- The green vertices indicate the center point between two vertices. To insert additional vertices, tap and drag the green circle in between two existing vertices to a new location, a new red vertex will appear when you release your finger.

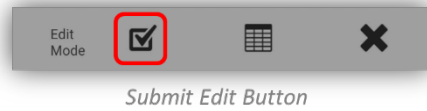


Polygon Feature in Edit Mode



Polygon Vertex Moved

- e. To commit the change and stop editing the feature, tap the **Submit Edit** button.



Editing Feature Attributes

Assumption:

- The feature to be edited has been selected and the **Edit Mode toolbar** is active at the top of the window in the S1 Mobile Mapper app.
- Tap on the **Attribute Table View** button on the **Edit Mode toolbar** to display the feature's attribute table.

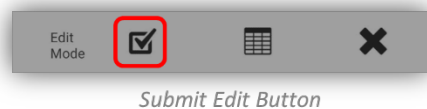


- Add or make changes to the attribute values associated with a feature when the **Attribute Table View** is open in **Edit Mode**.
- Adding or editing attributes can be made on any **Related Tables** listed on the Attribute Table View too, by selecting a Related Table in edit mode and adding or editing attribute values within the related table. **See more information on [Edit Attribute Table\(s\)](#) listed above.**



The Stages of Editing Attribute Values in a Related Table

- When done with editing a feature and its attributes, then tap the **Submit Edit** button to save the edits made.



- Tap **Cancel Edit** button to cancel any edits made.

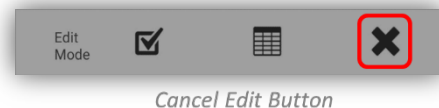
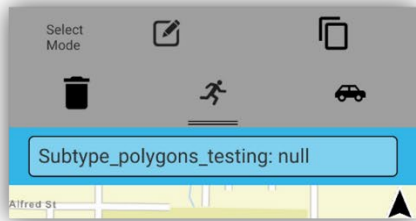


Photo Attachment for Enabled Feature(s)

A feature service must be created as **Attachment Enabled** to be able to attach a photo or video to a feature. **You will not see the paperclip icon for Attachments if your data is not Attachment enabled.**

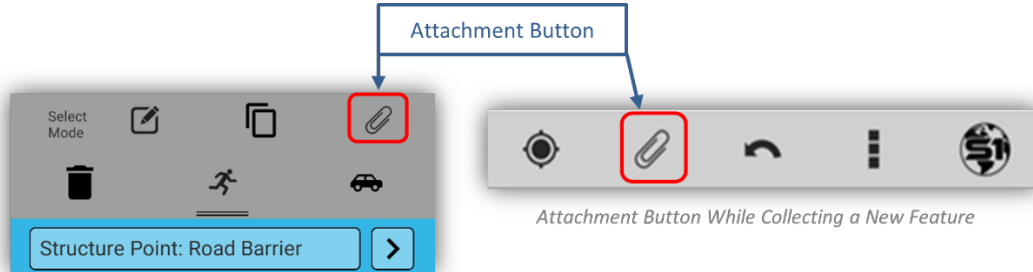


No Attachment Button on the Select Mode Toolbar



No Attachment Button While Collecting a New Feature

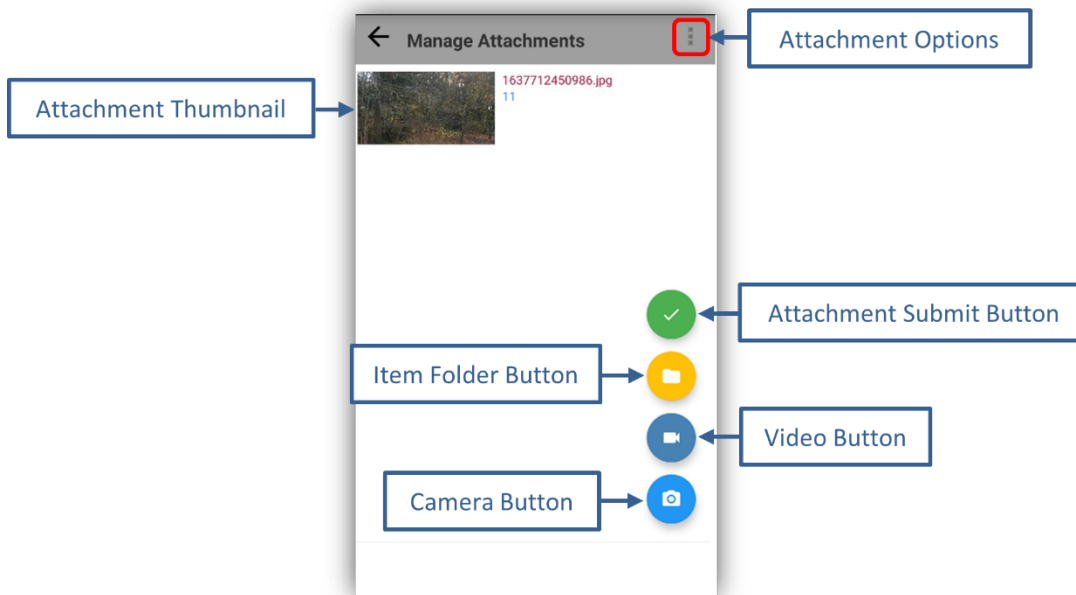
- a. To capture a **Photo** or **Video** attachment on attachment enabled features, tap on the **Attachment button** on the Selection toolbar for a **selected feature** or while collecting a **new feature**, tap the Attachment button on the bottom toolbar (paperclip icon).



Attachment Button on the Select Mode Toolbar

Attachment Button While Collecting a New Feature

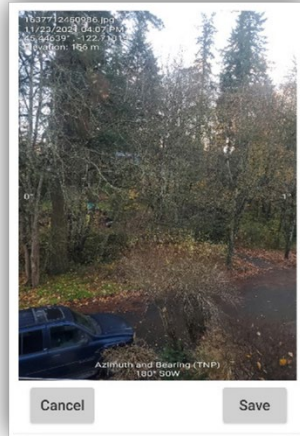
- b. The Attachment button opens the **Manage Attachments window**:



Manage Attachments Window

- c. Tap the blue **Camera** button to initiate the camera tool.

- d. With the Camera, frame the subject, tap the **Camera Button** to take a photo.
- e. Once the photo has been captured, tap the **Save** button or **cancel**.

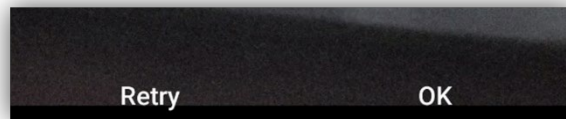


Camera Photo Save or Cancel Options

- f. Tap the dark blue **Video Button** to capture a new video attachment. This will open the native video camera on the device.
- g. Use the Native controls to capture video.

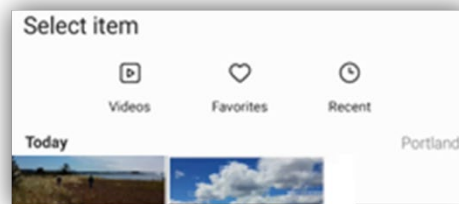
NOTE: You will see a 20 second time limit for new S1 Video attachments that shows in the upper part of the video screen. Also, S1 Video attachments have a 50mb limit if attached from an existing file.

- h. Once the video capture is complete there will be two options at the bottom of the screen, if you do not like the video, tap Retry and capture a new video, if you are happy with it, tap OK.



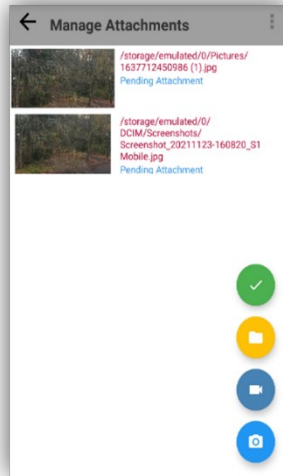
Video Capture Retry or OK Buttons

- i. Tap the yellow **Item Folder button** to search for existing images on the device to attach. If browsing the device, choose an image from the Image Gallery shown on the screen.



Select Items from the Device

- j. Repeat process to add as many photo attachments as required.
- k. Thumbnails of the associated photo attachments will display on the Manage Attachments screen.



Thumbnails of Photo Attachments Files

- I. Select the green **Attachment Submit button** to save pending photo attachments. The attachment icon will look like a paperclip on the point, center of a line or center of a polygon.



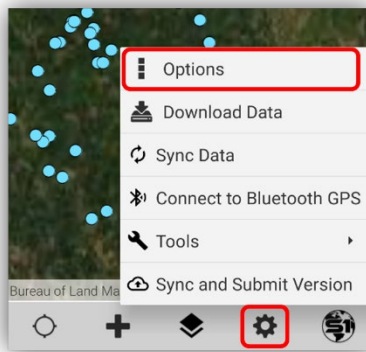
Attachment Icon linked to a Feature

NOTE: You must select the green Attachment Submit button after saving a photo attachment to attach the photo and see the paperclip icon with the feature on the map view.

Attachment Icon Toggle-On or Off

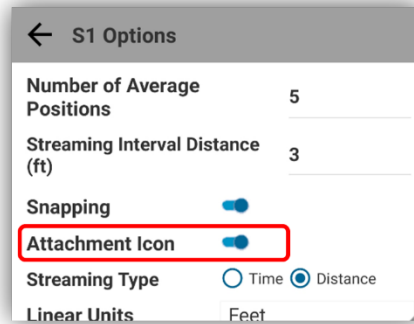
There is an ability to Toggle-On or Off the Attachment Icon linked to a feature in the map view. The Attachment Icon toggle is in the S1 Options settings. It may be useful to toggle off the Attachment Icon (paperclip) if it is obstructing a view of a feature, labels, or other items in the map view.

- a. Tap on **Tools/Options** button on the Application Toolbar. Select **Options**.



Tools/Options button on the Application Toolbar

- b. In the S1 Options window, go to **Attachment Icon** and tap the **toggle switch** on (blue) or off (grey).

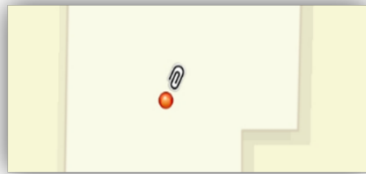


Attachment Toggle Switch in S1 Options Settings

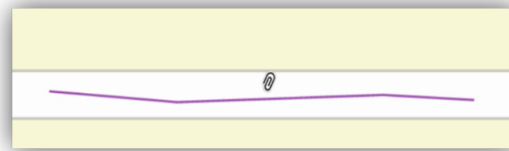
NOTE: To learn more about advanced settings within the camera view see the [Configuring S1 GeoTag Photos & Options](#).

Managing Existing Photo/Video Attachments

Features with existing attachments will show a paperclip icon in the map view either upper right of a point feature or the center point of a line or polygon symbology to indicate the feature has one or more attachments.

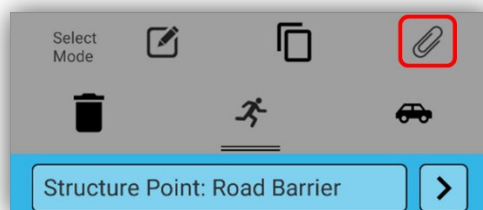


Attachment Icon Placement for a Point Feature



Attachment Icon Placement for a Line Feature

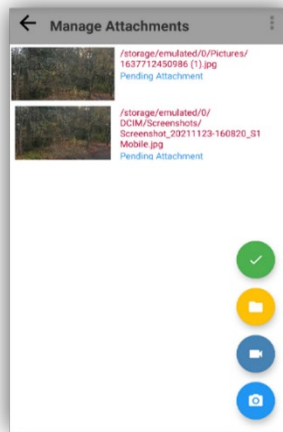
- a. To review the existing attachments of a feature, tap the feature to **Select** it.
- b. On the **Select Mode toolbar**, tap the **Attachment** button.



Attachment Button on the Select Mode Toolbar

- c. The **Manage Attachments** window opens and displays a list of all attachments currently associated with the feature.

NOTE: If there are many existing photo attachments, it may take several seconds for the existing photos to load onscreen when Manage Attachment form is first opened.



Thumbnails of Photo Attachments Files

- d. To view the photo or video attachment in full screen view, tap on the **Thumbnail**.
- e. To close the full view of the photo or video, tap the **Manage Attachments back arrow**. To close the Photo and the Manage Attachments window completely, tap the green **Submit** button.



Submit Button on Manage Attachments

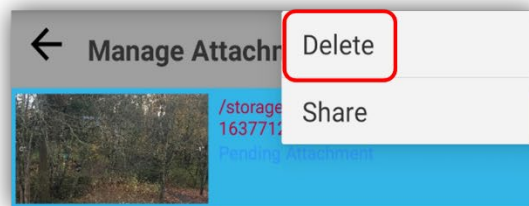
Delete Photo Attachment

- a. To delete an attachment, long press on the photo thumbnail.
- b. When the photo is highlighted in blue, tap the ellipsis in the upper right-hand corner to open a menu and tap **Delete**.

NOTE: You can delete multiple attachments by long pressing and highlighting multiple photos.



Manage Attachments Ellipsis Options

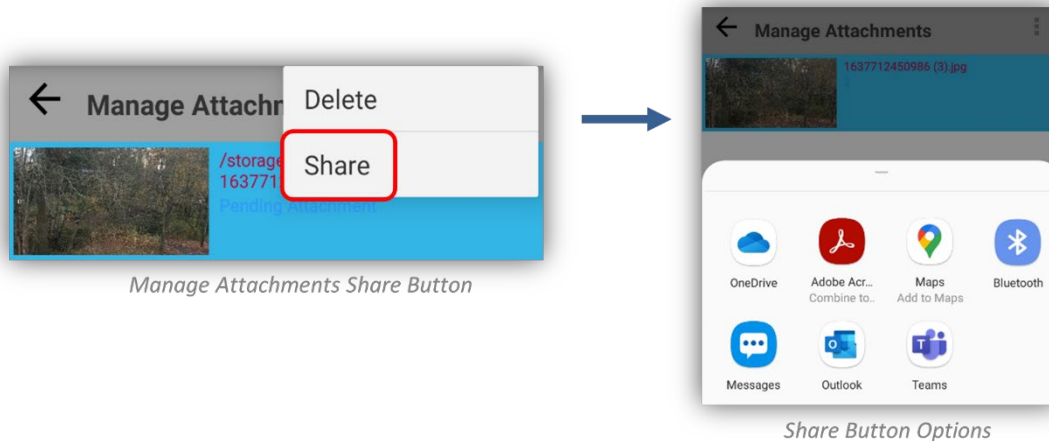


Manage Attachments Delete Button

- c. A message will appear to confirm deletion of the photo. Tap **Delete** to proceed.

Share Photo Attachment

- To Share an attachment, long press on the thumbnail.
- When the photo is highlighted in blue, tap the ellipsis in the upper right-hand corner to open a menu and tap **Share**.



NOTE: You can share multiple attachments by long pressing and highlighting multiple photos. To learn more about advanced settings within the camera view see [the Configuring S1 GeoTag Photos & Options](#).

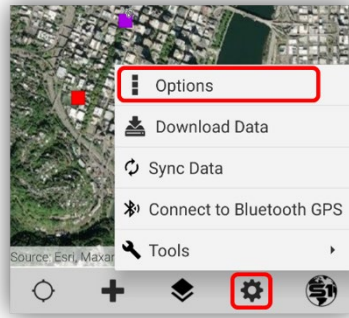
Sync Data Edits to Server

After features have been collected or modified, data should be synced back to the server when the device has network connectivity. Synchronization requires either a 4G or a WIFI connection; 3G or slower connections cannot support synchronization. It is strongly advised syncing to occur on a reliable WIFI connection whenever possible.

Syncing Data Settings

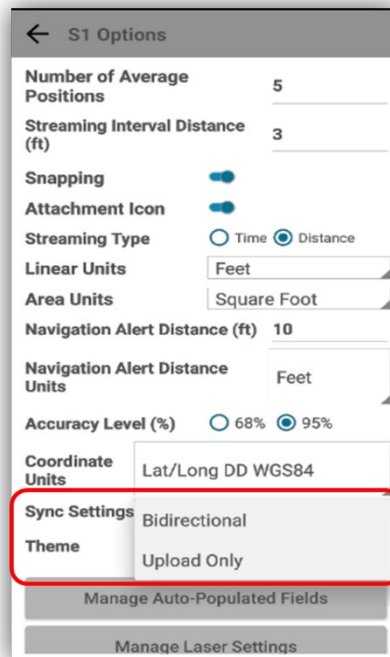
Using the **Sync Tool** allows the mobile user to sync the collected data back to the GDB service posted on ArcGIS Online for the organization. The Sync tool is different from the [Sync and Submit tool](#) listed below. Prior to syncing data, review the sync settings in the **S1 Options menu** (see the full list of [S1 Options](#) below). The Options menu has a setting that allows Sync to be Bidirectional or Upload Only. The **Bidirectional setting** will upload data from your device and download any new data within the geodatabase extent from other users. **Upload Only** will only sync the data on the device; no data will be downloaded from other users.

- By default, the Sync setting is set to Bidirectional. To change the Sync setting, tap the **Tools/Options** button on the Application toolbar.
- In the menu that opens, tap **Options**.



Tools/Options Button on the Application Toolbar

- c. Select the dropdown arrow next to **Sync Settings**, and set to preferred sync type, Bidirectional or Upload Only.

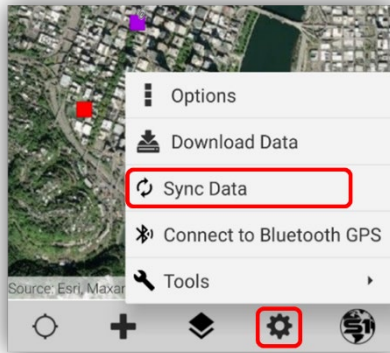


Sync Settings Options

- d. Changes to S1 options are automatically saved once selected, tap the back arrow to go back to the main map view.

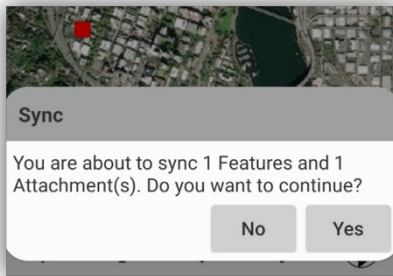
Sync Data and Attachments to Server

- a. To initiate Sync, tap the **Tools/Options** button.
- b. Tap **Sync Data**.



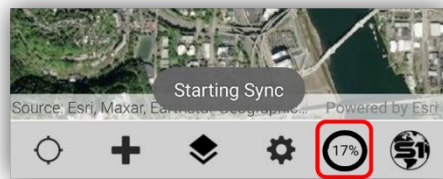
Sync Data on the Tools/Options Menu

- c. The duration of the sync process will be determined by network connectivity and the number of records that are being synchronized.
- d. To confirm your Sync, a message window will pop up to tell you how many Features and Attachments “will be Synced. Do you want to continue?”



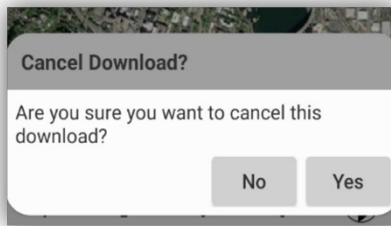
Confirm Sync Data

- e. A message will appear at the bottom of the map view letting you know the **sync** has started. While the synchronization process is underway, a **Progress Indicator** will display on the application toolbar.



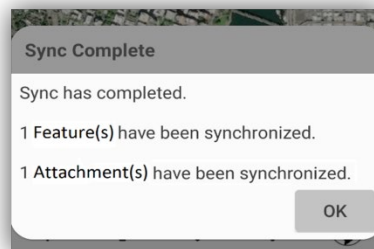
% Progress Indicator

- f. If you need to **cancel the Sync process**, tap on the Progress Indicator circle and a popup window will give you the option to cancel.



Cancel Sync Download

- g. When the Sync is complete, the progress spinner will disappear, and a message box appears indicating the number of Features and Attachments synchronized. Tap **OK** to return to the map view.



Sync Complete Message

Sync and Submit Version Edits to Server (BLM Only)

If a feature service has been configured to support the BLM Mobile Themes version tracking workflow, there is a second option to be used to sync data called **Sync and Submit (SnS)**. The first option, Sync, is described in the previous section. Sync and Submit associates the **Edit Geodatabase (GDB) replica** downloaded to the device with a version created from the corporate database. Once Sync and Submit is successful, the associated Edit GDB is deleted from the device. To collect more data, the user must download the Edit GDB again.

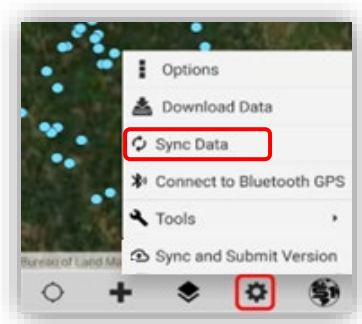
Sync Data can also be used with services utilizing Sync and Submit, for example, data will be collected over a longer period and there is no need to post the data to corporate quickly. **To ensure data is not lost and to reduce the amount of data submitted at Sync and Submit**, the user may sync data edits daily and once data collection is complete, the user selects the Sync and Submit Version function to submit the data into the corporate database.

NOTE: *Sync and Submit only appears in the Tools/Option menu if the feature service has been configured to support this workflow. Sync and Submit requires either a 4G or a Wi-Fi connection; 3G or slower connections cannot support synchronization. It is strongly advised that syncs occur while connected to a reliable and quick Wi-Fi network over 4G.*

Important: *Users should never download the same sync and submit service to multiple devices at the same time; this can orphan data and prevent it from syncing back correctly.*

To synchronize edits:

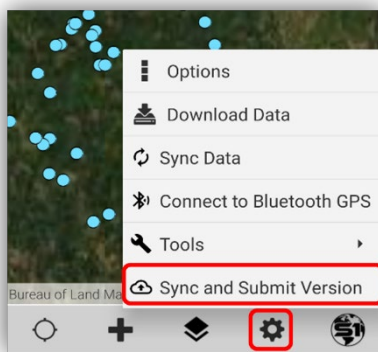
- a. Tap the **Tools/Options** button on the S1 Mobile Mapper application toolbar.
- b. Data collection over a period, use the Sync Data option for daily syncs.



Sync Data Tool for Daily Data Collections

- c. Once the data is all collected, use the **Sync and Submit Version** option to perform a final sync and then submit the data for **QA/QC**.

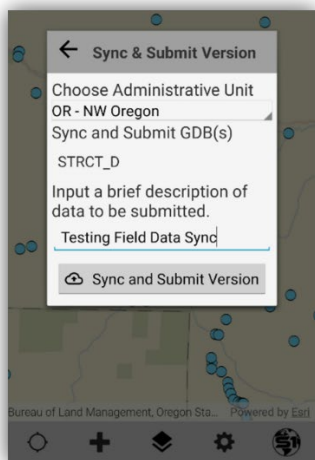
NOTE: *Sync and Submit Version* can be initiated without ever using the standard *Sync Data* option.



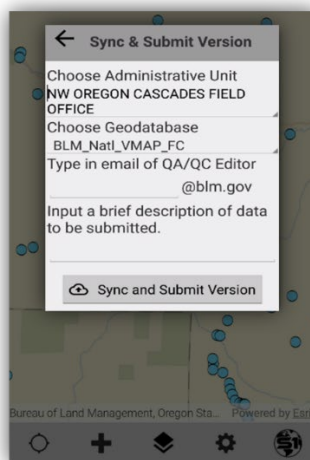
Sync and Submit Version Tool

- d. Depending on the **Sync and Submit Version** dataset, a menu will appear asking the user to fill out additional information related to the data being submitted. **All fields in the form are required to be filled out.**

Oregon/Washington Datasets:

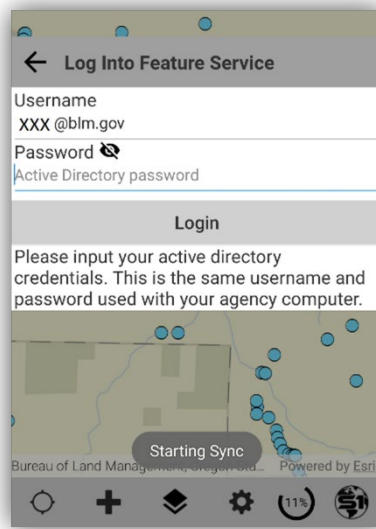


National Datasets:



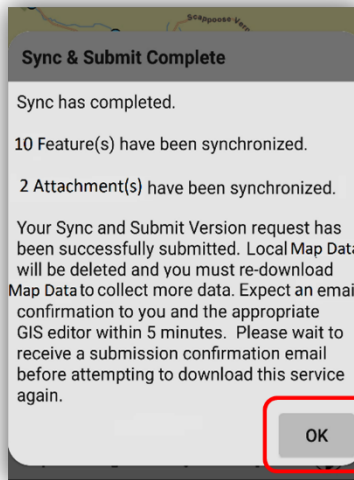
Sync and Submit Version Windows

- e. The **Administrative Unit** is the unit where the data was collected. The <Search> option can be utilized to type in the admin unit and pare down the list, tap the dropdown arrow to find <Search>.
- f. **Choose Geodatabase (GDB)** should automatically select the geodatabase, however, if there are more than one SDE versioned database downloaded to the device select the one you wish to submit.
- g. Type a **Brief Description** of the version being submitted to aid the GIS editor importing the data to identify what data is contained in the mobile version.
- h. Some datasets, particularly National datasets may ask for a **QA/QC Editor** Email address. This is the person that will review and submit the data. **Type only the username** (@blm.gov will be added automatically) of the BLM staff member that will review the data. **An email will be generated** to this user to notify them that data is available for review.
- i. Tap the **Sync and Submit Version** button.
- j. Log Into Feature Services: Username and Password → then Login.



Log Into Feature Services

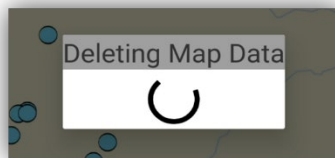
- k. A message will appear stating that the Sync and Submit Version process has begun, and a progress circle will appear in the Application toolbar.
- l. The progress circle will disappear when the Sync and Submit is complete and the following message will appear indicating a successful Sync and Submit. Tap **OK** to close out the message and initiate the deletion of the Sync and Submit service from the mobile device.



Sync and Submit Complete Window

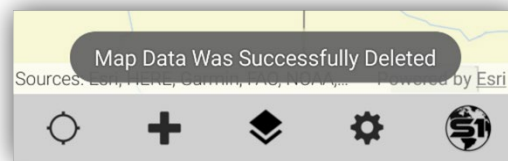
NOTE: Please follow instructions that state the user must **wait at least five minutes before attempting to download the same service again.**

- m. A message will appear indicating that the Map Data is being deleted from the mobile device.



Deleting Map Data after Sync and Submit

- n. A confirmation message appears once the Map Data has been successfully deleted from the device.



Deleted Map Data Successfully

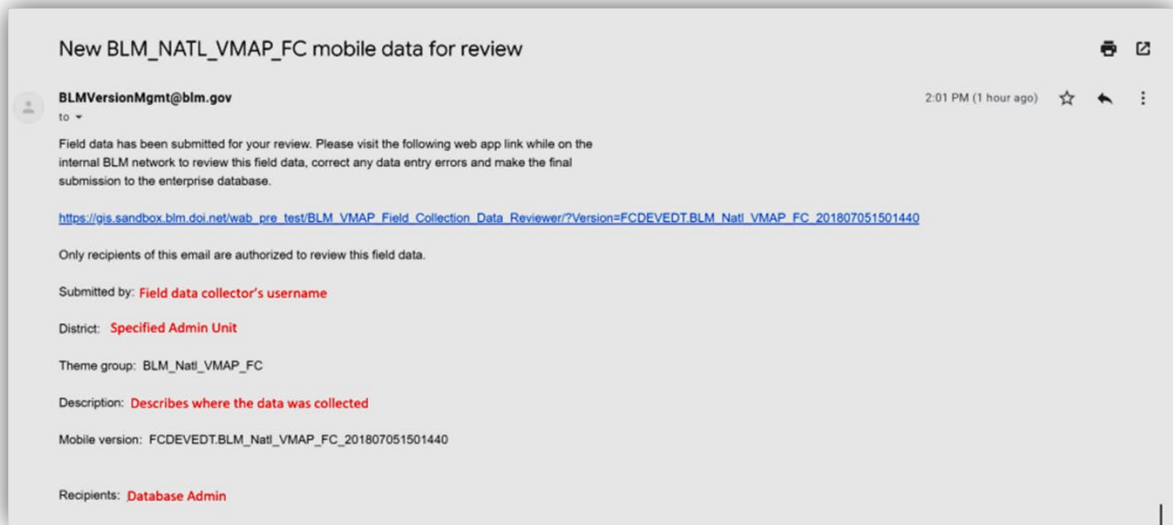
- o. Once the mobile version has been submitted successfully, the user and any editors in the user's administrative unit who have rights to edit the SDE feature classes will get an email notification from BLMVersionMgmt@blm.gov that there is a mobile version that needs to be reviewed.
- p. Editors in Oregon/Washington can follow instructions on Import BLM Mobile at this link: [ORWA SDE Edit Guide \(Internal BLM link\)](#).



Email Notification from BLM Version Management

National Datasets:

- a. Once the mobile version has been submitted successfully, **the QA/QC Editor** specified in the Sync and Submit Version form will get an email notification that there is a mobile version that needs to be reviewed. The QA/QC Editor should follow the link in the accompanying email to review the data in the appropriate web application.



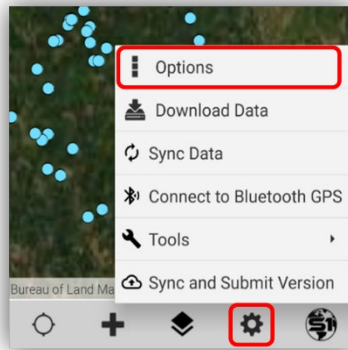
Email Notification for the QA/QC Editor – National Datasets

NOTE: To learn more about BLM Mobile Themes please see the FAQ at: <https://www.blm.gov/sites/blm.gov/files/s1-mobile-FAQs.pdf>.

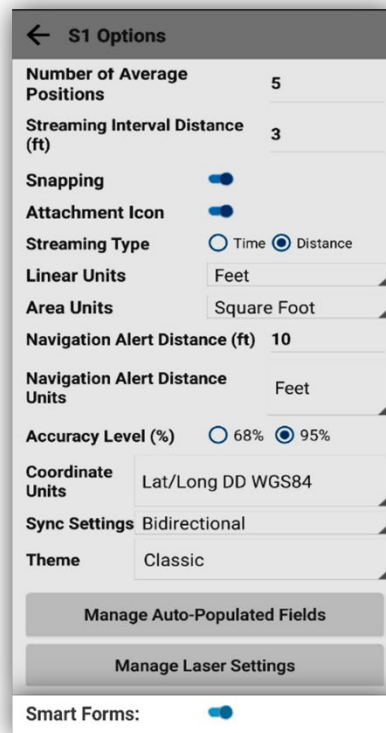
S1 Application Options

The S1 Options menu allows user to configure common settings across the application.

- a. Tap on **Tools/Options** button on the Application Toolbar. Select **Options**.



Tools/Options Button



S1 Options Setting Window

S1 Options setting window:

- **Number of Average Positions:** Sets the default number of GPS positions that are collected to create an averaged point feature or averaged vertex of a line or area feature when using the Average GPS button.

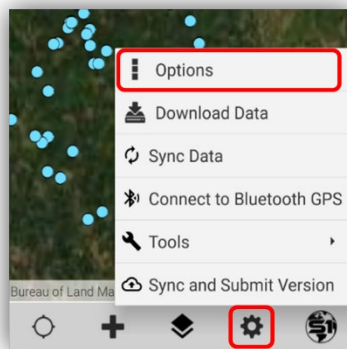
- **Streaming Interval:** This setting changes based on what the streaming type is set to. (**Distance or Time**) The value can be set to either several seconds or distance traveled and captures GPS vertices based on the set interval.
- **Snapping:** Toggle on and off option to snap features. Default snap tolerance is set to 10m. User cannot change this setting.
- **Attachment Icon:** Toggle on and off visibility of the paperclip icon showing with the features in the map view.
- **Streaming Type:** Specifies the value of the streaming interval as either Time or Distance. Set the display units of linear and area measurements throughout the app.
 - **Linear Units:**
 - Distance may be displayed in either kilometers, meters, feet, or miles.
 - **Area Units:**
 - Area may be displayed in acres, square feet, square meters, or hectares.
- **Navigation Alert Distance:** Threshold distance for alerting user that they are approaching a destination target. Units for the alert are set by **Navigation Alert Distance Units** option below.
- **Navigation Alert Distance Units:** The user can set a different unit of measure for navigation alerts than the Linear Units setting (described above).
- **Accuracy Level:** Value displayed for the estimated accuracy on the GPS Position Toolbar. Can display either 68% (default) or 95% confidence interval. While most GPS receivers and data collection software display estimated accuracy statements only to a 50-68% confidence interval, the [National Standard for Spatial Data Accuracy](#) (NSSDA) requirements state reporting of estimated accuracy to a 95% confidence interval. This setting only affects the display value and not the actual estimated accuracy.
- **Coordinate Units:** The coordinate system displayed by the application changes how the XY values are **displayed** on the **GPS Toolbar** as well as the XY information displayed in a **selected feature information menu**. It is only a visual effect in the application.
- **Sync Settings:** Allows the user to select whether to use a **Bidirectional** or **Upload Only** sync option. If **Bidirectional** is set; all new features and edits on the mobile device will sync up to the feature service and all new edits or features from other users in the user defined edit extent will download to the mobile device. When set to **Upload Only**, only the changes (new features, feature edits or deletes) on the mobile device will sync up to the service, new data from other users in the feature service will *not* be downloaded to the device.
- **Theme:** The theme option allows the user to choose what application theme they wish to enable. There are three themes available: Classic (default), BLM and Forest Service. See the [Application Theme](#) section below for more info.
- **Manage Auto-Populated Fields:** The S1 application can auto-populate a variety of categories of feature-level metadata attributes whenever features with the app are created or edited. These categories and attribute fields are managed via this option. For more information on managing feature-level metadata fields, see section on [Managing Auto-Populate Field Categories](#).

- **Manage laser settings:** This is where the user manages the settings for collecting information using the TruPulse laser. See the section in this guide for further information on [managing the laser settings](#) and capturing data with the laser.
- **Smart Forms:** There is a toggle switch to turn on or off the Smart Form functionality for features that use Smart Forms as their attribute table setting. Smart Forms support the use of basic Arcade Expression operators and profiles like conditional visibility. Smart Forms are created in AGOL. [How to create smart Forms in five minutes](#) – Not just for Field Maps, for S1 Mobile Mapper too.

Application Themes

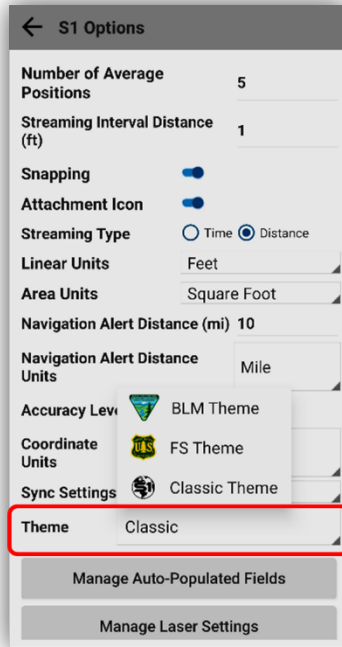
The Themes settings allows users to select from two agency specific themes (BLM or Forest Service) and the Classic View. The agency themes will apply a custom agency theme, applying different colors throughout the application. The classic view maintains the standard grey scale color theme.

- Tap on the **Tools/Options** button on the Application Toolbar. Select **Options** from the list.

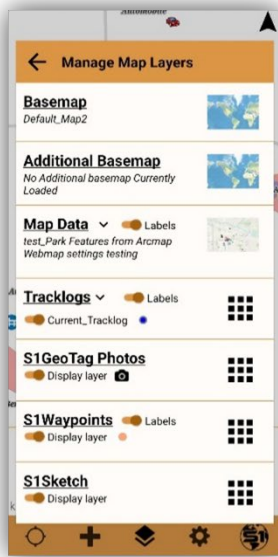


Tools/Options Button

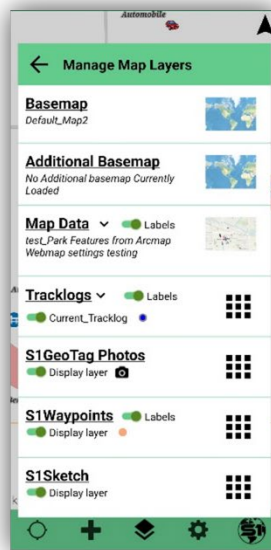
- In the **S1 Options**, select the desired **Theme**.



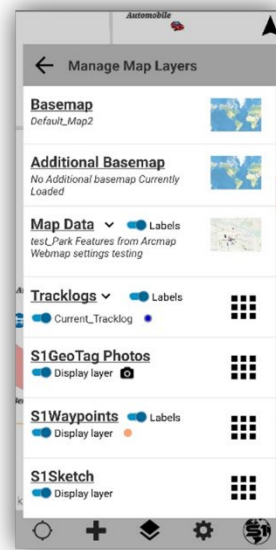
S1 Options Window- Theme List



BLM Theme

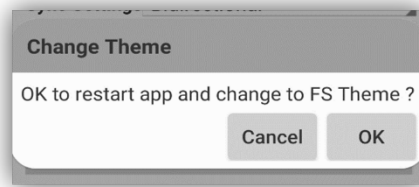


FS Theme



Classic Theme

- c. Applying a new theme requires the app to restart, once the user selects a theme above, they will be prompted with a pop-up asking permission to restart app. Tap **OK**.



Forest Service Theme Change

S1 GeoTag Photos

The **S1 GeoTag** Photo layer allows users to capture a photo with the location coordinates embedded into the photo's metadata (EXIF) header. Captured S1 GeoTag Photos are displayed as a camera icon in the map view. The photo may be watermarked with azimuth/bearing, pitch/roll, XY location, elevation, date/time, brand icon, and a configurable file name. Placement of these watermark elements in the camera view may be changed to where the user feels appropriate. Watermark settings are configured in the **S1 GeoTag Photo Settings** menu.

The location the S1 GeoTag Photo is being captured may be shared using the **Share Location tool**. This tool allows the user to share their location via the mobile device's mail app or text. If email is used to share the location, the recipient is provided with the information watermarked in the photo as well as links to maps available on the web.

The graphic below provides an overview of the tools and options available while taking S1 GeoTag photos.

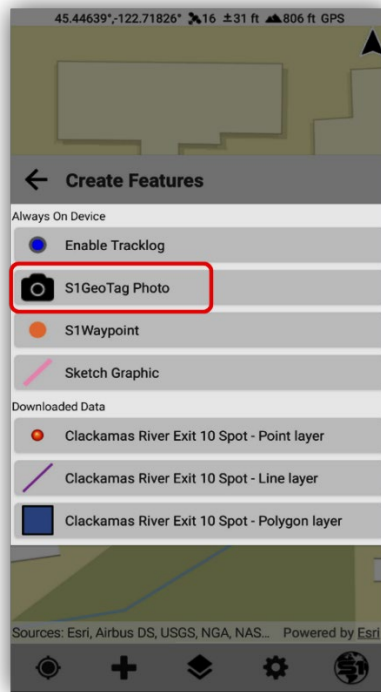


Collecting S1 GeoTag Photos

S1 GeoTag photos are an option that is available always by default in the S1 Mobile Mapper app. The S1 GeoTag photos will collect your GPS location, date & time, and elevation when you take a photo and then add a camera icon onto the map.

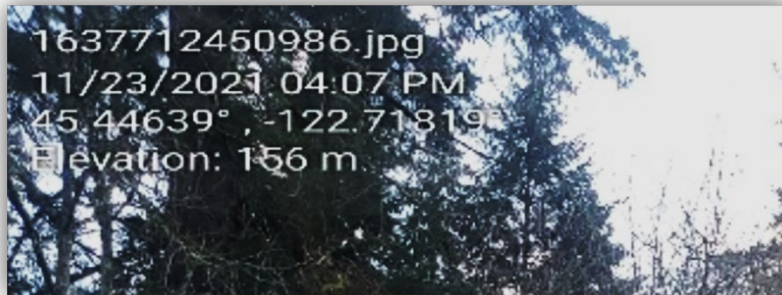
- a. Tap **Create Features** button on the Application toolbar. Then tap the **S1 GeoTag Photo** option.





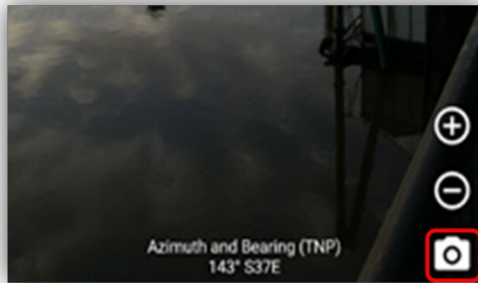
Create Features – S1GeoTag Photo

- b. The **camera view opens**, and the **GPS is activated** if it was not already on.
- c. The **XY Coordinates, date & time**, and **Elevation display** in the upper left corner once the GPS has a position.



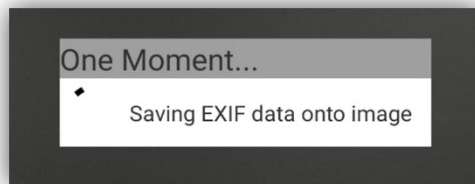
S1 GeoTag Photo Display of XY Coordinates, Date & time, and Elevation

- d. Tap **Zoom-In** or **Zoom-Out** buttons, on the bottom right, to bring the subject of the photo in view or **pinch to zoom**.
- e. Tap **Capture S1 GeoTag Photo** button to take a GeoTagged photo at your GPS location.



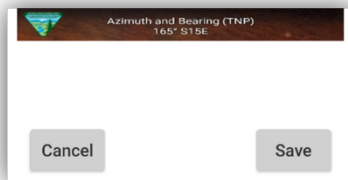
Zoom and Capture Buttons for S1 GeoTag Photo

- f. A message box appears showing the progress of capturing and then saving the photo.



Process of Saving an S1 GeoTag Photo

- g. Tap **Cancel** if you are not satisfied with the photo or **Save** to keep it.



Cancel or Save S1 GeoTag Photo

- h. When you tap **Save**, it will commit the GeoTag photo to the S1 Photos folder on the device. Photos will be stored in the S1 Photos folder on the device's internal memory if no SD Card is present, see more details in the [Accessing and Viewing S1 GeoTag Photos](#) section below.
- i. A S1 GeoTag Photo icon is displayed in the map view at the location of where the photo was captured.



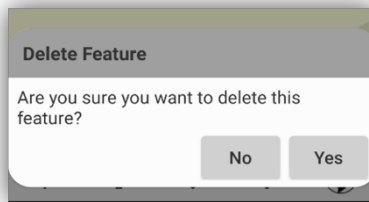
S1 GeoTag Photo Icon on the Map View

- j. To delete a single, geotag photo, first tap on the **S1 GeoTag Photo icon** to **select** it on the map.
- k. Tap the **Delete Feature** button to delete the selected photo icon on the map.



Selected S1 GeoTag Photo Icon on the Map

- I. Tap **No** if you do not wish to delete the photo.



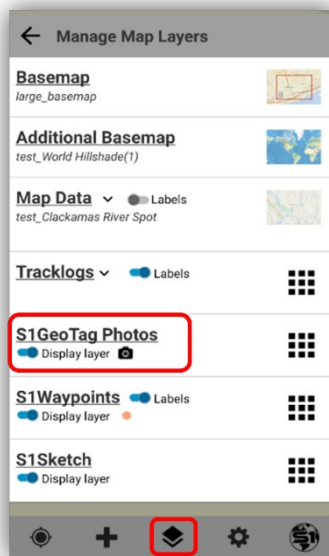
Delete Feature Pop-up Window

- m. Tap **Yes** if you wish to delete the photo from the map view and remove thumbnail from Manage Map Layer (*photo is completely deleted from device*).

S1 GeoTag Photo Layer Visibility

Visibility of S1 GeoTag Photos in the map view may be toggled ON or OFF in the Manage Map Layers.

- a. Tap the **Manage Map Layers** button on the application toolbar. **Toggle** the S1 GeoTag Photo layer visibility ON or OFF.



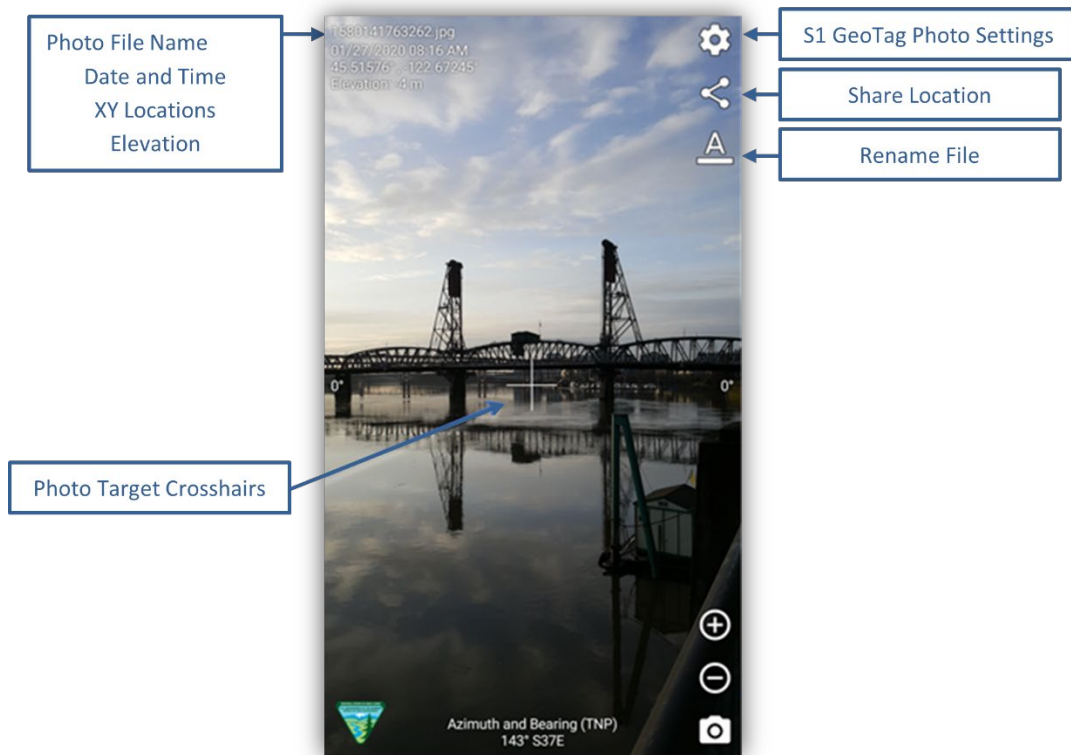
S1 GeoTag Photo Toggle Switch

NOTE: You can use the **Navigation Capabilities** to navigate to a selected S1 GeoTag photo, just like how you can navigate to a selected feature. See the [Navigation Capabilities](#) below.

Configuring S1 GeoTag Photos & Photo Attachments Options

S1 GeoTag Photos and photo attachments are highly configurable. There are several settings and options available to the user. **Settings are configured before a photo is captured.** See the [GeoTag Options](#) section for more details.

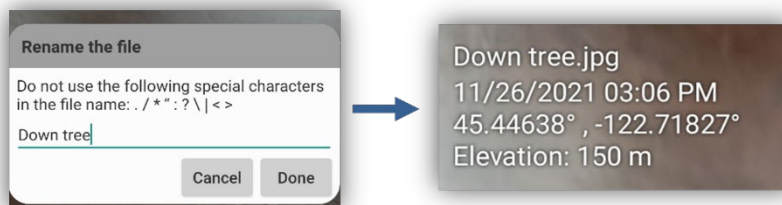
- a. When capturing S1 GeoTag Photos via add data button or by adding a Photo Attachment via the paperclip tool either in feature select mode or adding a new feature; that's when you have access to the photo settings.



Configure Photo Option Tools

Configure Photo File Name

- b. To **configure the file Name**, tap the **Rename File** button. This allows the photo to be given a unique name that will be watermarked on the photo when it is stored.



Renaming Photo File

Share Location

The **Share Location** button allows users to share their location using various methods such as email, Google Maps, memo apps, and Bluetooth.

- c. Sharing your location by email provides the recipient with web links to Google Maps.



Sharing a Photo Location by Email

- d. Each web link provides a map at the location of where the photo was captured.

Photo Options

- e. From within the Photo viewfinder, tap the **Photo Settings** button to view the entire available photo setting options.



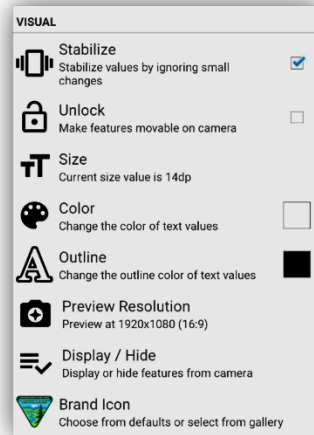
Cog Icon for Photo Settings

Full List of Photo Options

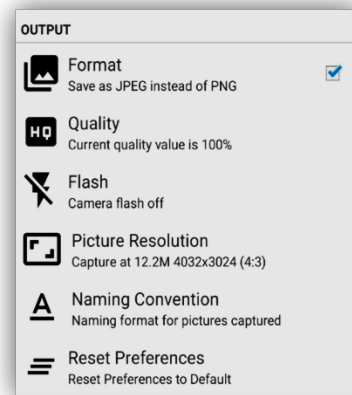
This section lists the options that allow the user to configure units of measure, visual interface, and output format of a photo.



Geotag Settings - Units



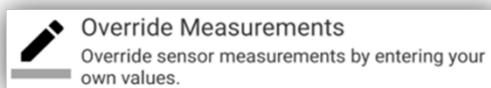
Geotag Settings - Visuals



Geotag Settings - Output

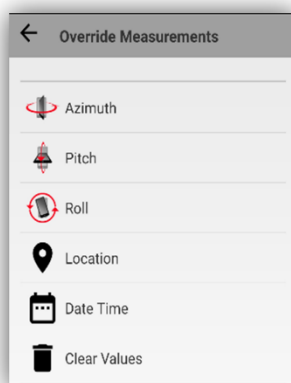
Override Measurements

- a. If the device does not have the necessary hardware sensors to calculate azimuth, bearing, pitch, roll, or if you wish to override sensor measurements, they can be manually entered by tapping the **Override Measurements** button; fourth option down in the **Units** section of the S1 GeoTag Settings.



Geotag Settings – Override Measurements

- b. Below is the menu for the **Sensor Measurements** that can be overridden as well as the option to clear values that have been entered. **Tap an option** from the list to open the values input window.

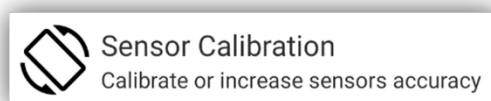


Override Measurements Options

- c. Check boxes that apply and tap **OK** to clear some or all the **Override Measurement values**.

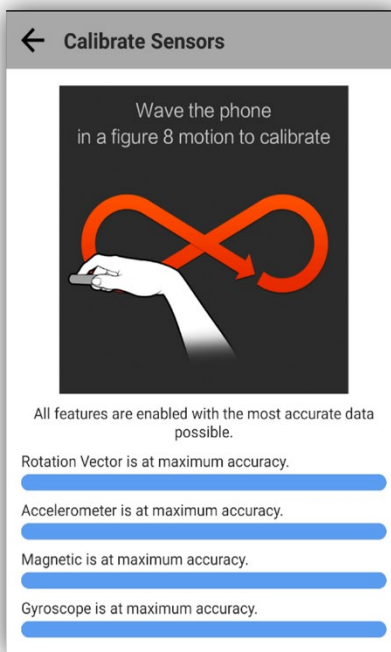
How to Calibrate Device Sensors

Sensors can be calibrated from **S1 GeoTag Settings** by tapping the **Sensor Calibration** button.



Sensor Calibration Tool

- a. **Wave the phone in a figure eight motion** as indicated by the graphic until all sensors are reporting full calibration; indicated by a blue bar. Sensors that need calibration will appear with red bars; however, devices without certain sensors will always appear red no matter how many figure eights you complete.



Sensor Calibration Report Window

Managing S1 GeoTag Photos

There are several options for accessing and viewing collected S1 GeoTag Photos. This next section describes how to access, and view S1 GeoTag Photos captured with the S1 Mobile Mapper app.

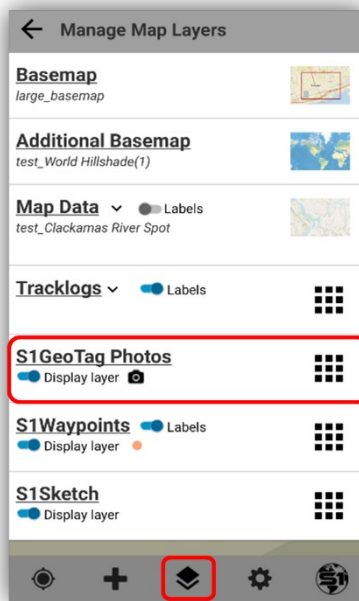
Assumptions:

- The user has collected at least one S1 GeoTag Photo with the S1 Mobile Mapper app. Capture of a S1 GeoTag Photo initiates creation of the **Manage GeoTag Photo folder** described below.

Access S1 GeoTag Photos in Manage Map Layers

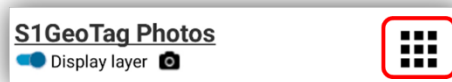
The **Manage GeoTag Photo menu** provides access to geotagged photos that have been captured with the S1 Mobile Mapper app. A user can sort photos based on name and date. Photos can also be deleted from the S1 Mobile Mapper app and device.

- a. Tap **Manage Map Layers** button from the Application toolbar to **access S1 GeoTag Photos**.



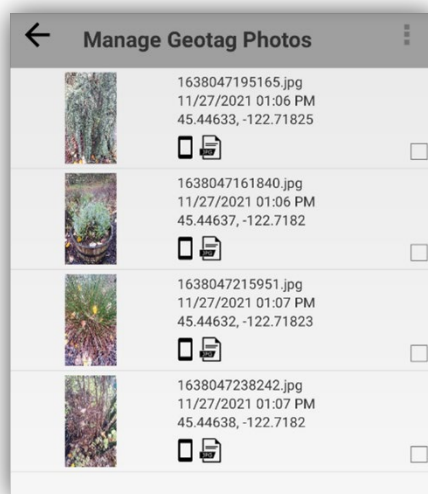
Manage Map Layers - S1 GeoTag Photos

- b. Tap the **Action button** to display Manage S1 GeoTag Photos menu.



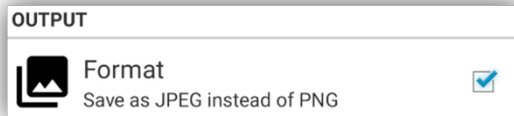
S1 GeoTag Photos Action Button

- c. The Manage S1 GeoTag Photos menu is displayed.



Manage Geotag Photos Menu

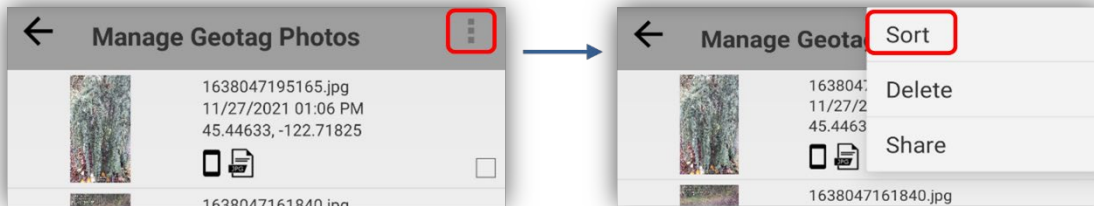
NOTE: A JPG or PNG icon is displayed next to the thumbnail depending on the photo format set in the S1 GeoTag Photo Settings menu.



Change Photo Format in S1 GeoTag Photo Settings

Sort GeoTag Photos:

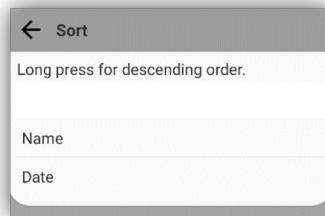
- d. Tap Manage S1 GeoTag Photos Options button and select Sort.



Manage GeoTag Photos Option Button

GeoTag Photos Option Sort Button

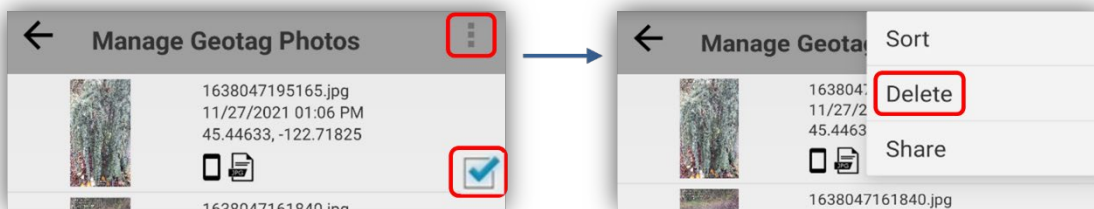
- e. Tap Name or Date to order photos.



S1 GeoTag Photos Sort Menu

Delete GeoTag Photos:

- f. Tap the box to add a Checkmark next to the photo thumbnail(s) to be deleted it.
- g. Tap Manage S1 GeoTag Photos Options button and select Delete.



Manage S1 GeoTag Photos Option Button

S1 GeoTag Photos Option Delete Button

- h. Select Delete to delete the S1 GeoTag photo(s) or Cancel to not delete the photo(s).



Delete or Cancel Delete Window

- i. Manage S1 GeoTag Photos menu opens again after photos are deleted.

NOTE: Deleted S1 GeoTag photos using this method in S1 are “**Not**” completely removed from the device only from the S1 Mobile Mapper app interface. They will still be available in the S1 Mobile Mapper album in the devices Native photo gallery app.

Access Photos in My Files Application

Below is the folder location where S1 GeoTag photos are stored on the device. Photos are stored on the device’s SD Card if the external storage card exists, if not, photos will be stored on the device’s internal memory.

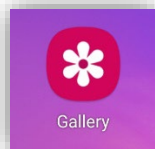
- **SD Card:** [Device Name]\Card\Android\data\gov.s1.s1mobile\Manage Geotag Photos
- **No SD Card:** [Device Name]\Internal storage\Android\data\gov.s1.s1mobile\Manage Geotag Photos
- The above file locations may be accessed on the mobile device via the **My Files** app. Tap the icon to open the **My Files app** and navigate to the appropriate location to find the S1 Mobile Mapper folder.
- **No SD Card, Android Mobile 10:** My Files\Internal storage\Pictures\S1 Mobile Mapper

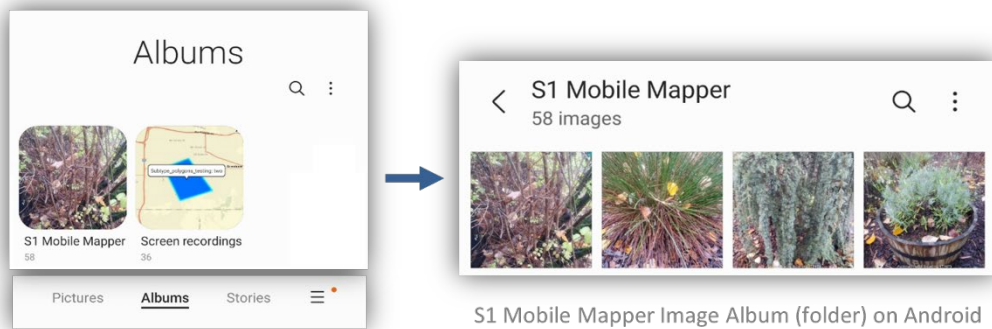
NOTE: Android may not have the file locations available for access; version dependent.

Access Photos in Mobile Device Gallery

Photos created via S1 Mobile Mapper app are also saved in the device’s Photo Gallery or a default photo-viewing app, depending on the device manufacturer.

- a. On the Home screen, tap the **Gallery** button. Tap **Albums**, then **S1 Mobile Mapper album** to access the S1 derived photos.
- b. Tap on the **Photo Thumbnail** to open the photo.





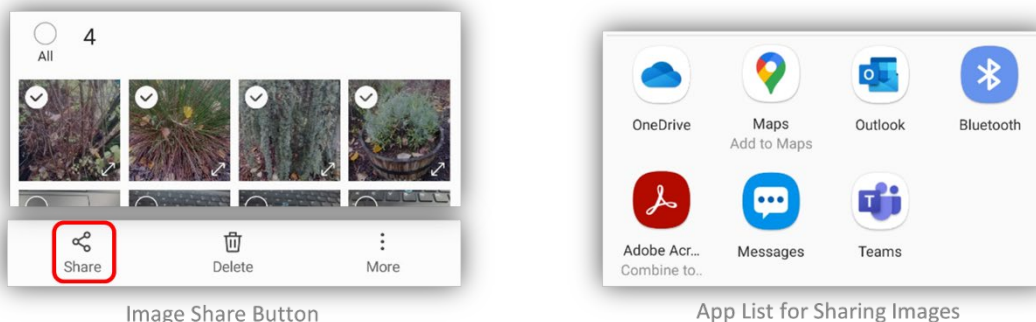
Copy GeoTag Photos from device to desktop computer

As shown in the above section, *Access Photos in the Mobile Device Gallery*, you can then copy those photos to the desktop computer.

- c. Tap the **Gallery app** on the Android device, tap the **Albums option on the bottom of the window** and then select the S1 Mobile Mapper folder to list the S1 GeoTag Photos stored on the device.
- d. Tap the ellipsis in the upper right corner for the **image options list**. Then select **Edit**.

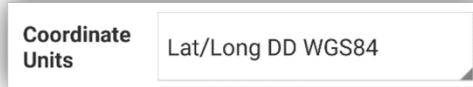
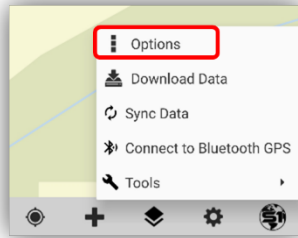


- e. Select the images you want to copy with a checkmark, then tap the **Share option** on the bottom left of the window. Choose which method to share the images. Once the images have been shared, they can then be saved to a file on the desktop computer.



- f. The image's info is stamped on the upper right corner and more on the bottom of the image.

NOTE: The coordinate system printed on the image is based on the Coordinate Units settings set in the **S1 Options** from the Application toolbar.



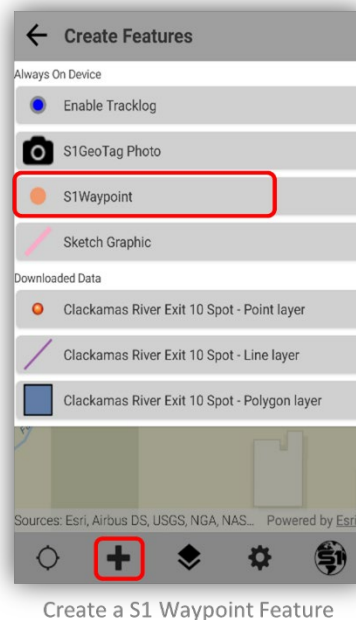
Coordinate Units Settings in S1 Options

S1 Waypoints

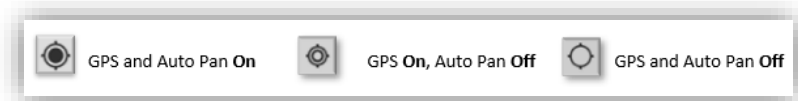
The S1 Mobile Mapper application allows users to capture simple point locations on the device using a layer called **S1 Waypoints**. **The app will store the spatial location of the S1 Waypoint** when the point is created. The user can add a **Name** and a **basic Description** to the provided fields in the attribute table. While there is no substitute for collecting point features via feature service and downloaded map data, it is an easy way to capture a feature on the map. The S1 Waypoints use the **WGS 1984 Web Mercator Auxiliary Sphere coordinate system**.

Collecting S1 Waypoints

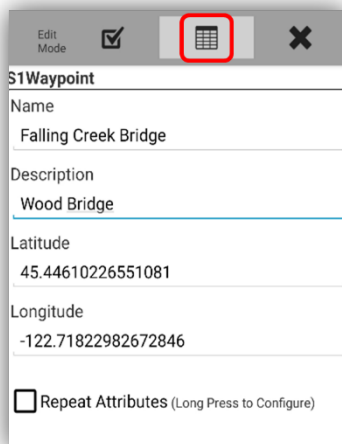
- a. To collect an S1 Waypoint, tap the **Collect Features** button. Choose **S1 Waypoints** from the list.



- b. A Waypoint location can be captured by digitizing (drawing) on the screen with **GPS Off** or using the **Average GPS function, with GPS On**, in the same manner as collecting a point feature. See [Collect and Manage New Features](#).



- c. Select the **Attribute Table View** button to edit the attributes for the S1 Waypoint feature after adding the S1 Waypoint to the map.
- d. The Name and Description fields are default fields for manual input values by the user.
- e. The Coordinate fields are automatically filled in values based on the placement of the S1 Waypoint on the map. **The S1 Waypoint uses the WGS 1984 Web Mercator Auxiliary Sphere coordinate system.**



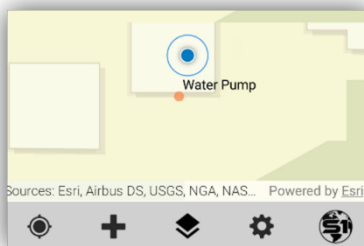
Attribute Table View of a S1 Waypoint

- f. Tap the **Submit Edit** button on the **Edit Mode toolbar** to save the geometry and attributes entered for the S1 Waypoint.



Submit Edit Button

- g. The S1 Waypoint location is recorded on the map as a salmon-colored dot. The S1 Waypoint can be selected, edited, or deleted.



S1 Waypoint with GPS On

Managing S1 Waypoint Data

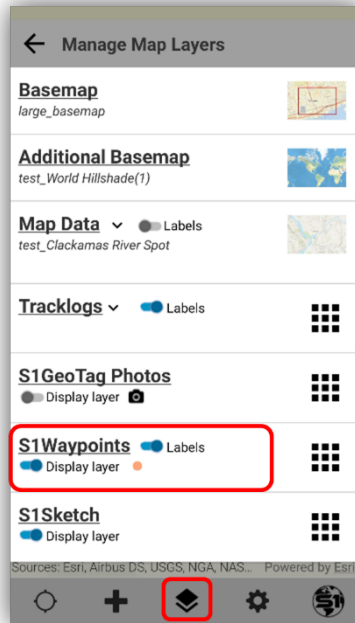
The S1 Waypoint information is stored in a GeoJSON file on the device and can be imported into a GIS or to other file formats. The GeoJSON file making up the S1 Waypoint may be shared via email, text, etc. To import into desktop GIS software, the file must be shared onto a PC. A GeoJSON file can also be added as an item to ArcGIS Online. See [SideLoading section](#).

NOTE: See more information about “What can you add to ArcGIS Online” <https://doc.arcgis.com/en/arcgis-online/reference/supported-items.htm>

NOTE: Most use cases with S1 Waypoints involve bringing the S1 waypoint file into ArcMap Desktop or ArcPro and converting it to a feature class for use in the desktop application. Please visit the S1 FAQ document for the converting process: <https://www.blm.gov/sites/blm.gov/files/s1-mobile-FAQs.pdf>

Assumptions:

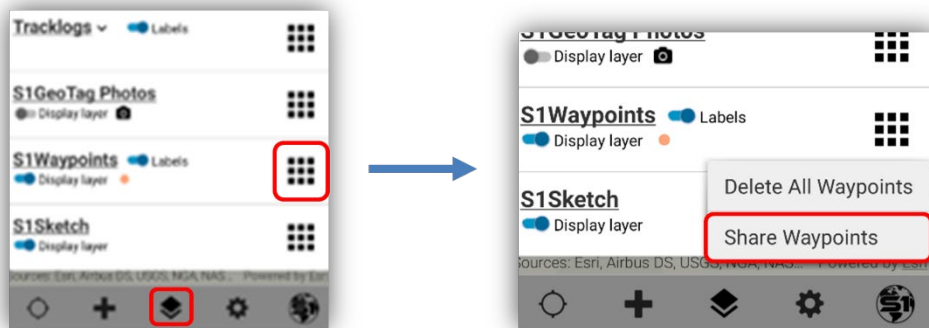
- Mobile device has either 4G or higher or a Wi-Fi data connection and accessibility to ArcGIS 10.2 or later.
- a. Visibility of the S1 Waypoints layer, like all other layers in the map view, is controlled via **Manage Map Layers**. You can toggle on or off the **S1 Waypoints Display Layer and Labels**.



S1 Waypoints in Manage Map Layers

Share S1 Waypoints

- b. Tap **Manage Map Layers** button to access content.
- c. Tap **S1 Waypoints** action button. Tap **Share Waypoints** in the pop-up.



S1 Waypoints Action Button in Manage Map

Share Waypoints Button Pop-up

- d. Tap the **app** to be used to **share** the S1 Waypoints. For example, share Waypoints via email or upload the GeoJSON file to OneDrive.

NOTE: The list of apps available to share the S1 Waypoint file with will depend on the apps installed on the mobile device.

- e. The other action on the **S1 Waypoint action button, listed above**, will give you the option to **Delete All S1 Waypoints**. This will remove all existing waypoints from the map and delete them from the device.

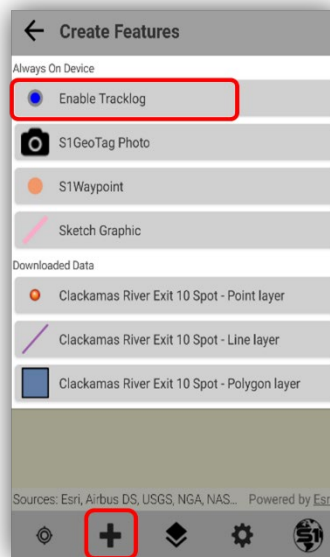
GPS Tracklog

A Tracklog includes a series of points that are logged automatically every 5 meters traveled. The Tracklog travel is logged continuously in the background for as long as the Tracklog feature is enabled. The same Tracklog can be visually turned on and off as needed, Tracklog labels can be toggled on or off and Tracklogs can be saved and archived to create a new separate Tracklog. Tracklog positions are stored as GeoJSON files in the **coordinate system WGS 1984 Web Mercator Auxiliary Sphere**. Tracklog files can be exported and shared as GeoJSON format, a more common format that can be viewed using multiple GIS platforms (S1 Mobile Mapper v5.3).

NOTE: GPS tracklogs are visible at all scales.

Enabling GPS Tracklog

- a. To enable GPS Tracklogs, tap the **Create Features** button. Choose **Enable Tracklog** from the list.



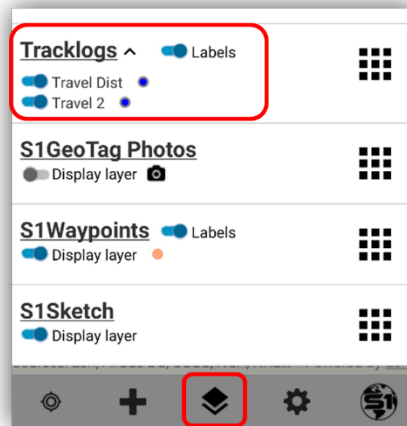
Enable Tracklogs on the Create Features Menu

- b. The **Tracklog** will begin logging once the device has a GPS position and will then start displaying on the map as you move. When enabled, the tracklog will create a vertex every 5m. This is the default interval, and this setting is not accessible to change. The Tracklog appears as a series of blue dots.



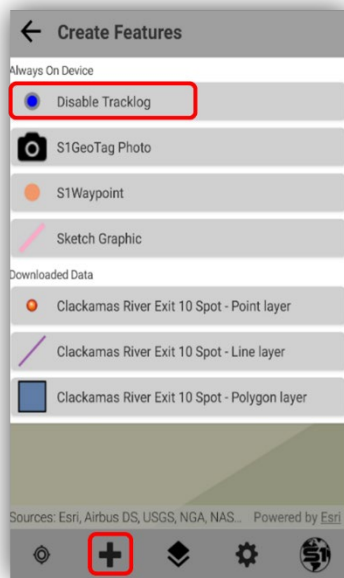
GPS Tracklog Displays on the Map View

- c. **Visibility of the Tracklog** in the map view can be toggled on and off just like S1 Waypoints, S1 GeoTagged photos, and S1 Sketches. **Tracklog labels** can also be toggled on and off just like Map Data and S1 Waypoints. By tapping on the chevron next to the Tracklog name in **Manage Map Layers**, it will list the tracklogs collected and archived. Each with their own toggle on and off switch.



GPS Tracklog Toggle Controls in Manage Map Layers

- d. Tap the toggle slider so it is no longer blue to **turn off Tracklog visibility** in the main map view. If Tracklog is still enabled, it will continue to collect location information even if visibility is toggled off and will show up once Tracklog visibility is turned back on.
- e. **To suspend capture of a Tracklog**, tap on the **Create Features** button and select **Disable Tracklog**.



Disable Tracklog on the Create Feature Menu

Archive & Manage GPS Tracklogs

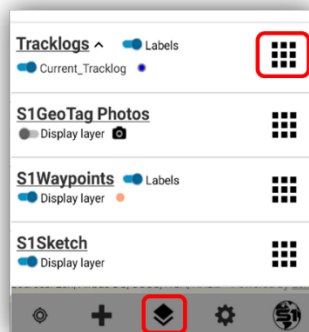
The **Current Tracklog** may be archived anytime, at which point the archived file is saved and given a unique name. Once a Tracklog has been archived, it can be renamed, exported from the device as GeoJSON File into a GIS application and/or deleted. A GeoJSON file can also be added as an item to ArcGIS Online. See the [Sideload section](#).

NOTE: See more information about “What can you add to ArcGIS Online” <https://doc.arcgis.com/en/arcgis-online/reference/supported-items.htm>

NOTE: Please visit the FAQ document for this process: <https://www.blm.gov/sites/blm.gov/files/s1-mobile-FAQs.pdf>

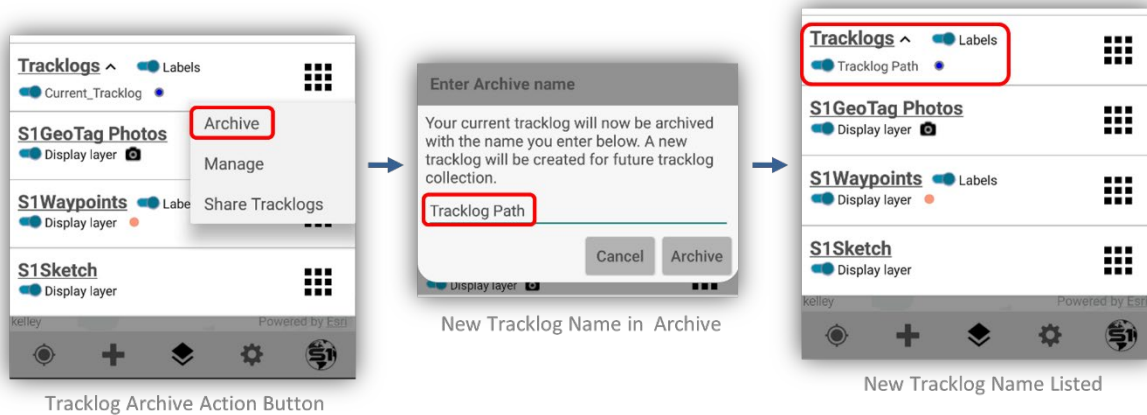
Archive Current Tracklog

- a. Click on the **Manage Map Layers** button and tap the **Action** button on the right-hand side of the Tracklog section.



Tracklog Action Button in Manage Map Layers

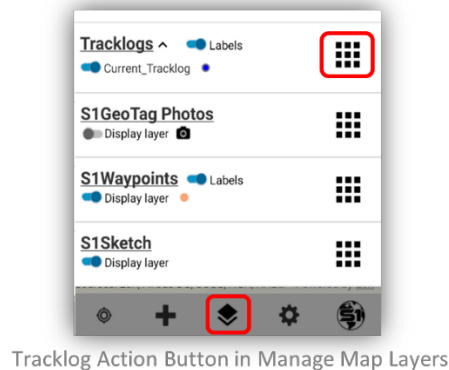
- b. Choose **Archive** from the list of actions, give the file a descriptive name and then tap the Archive button.



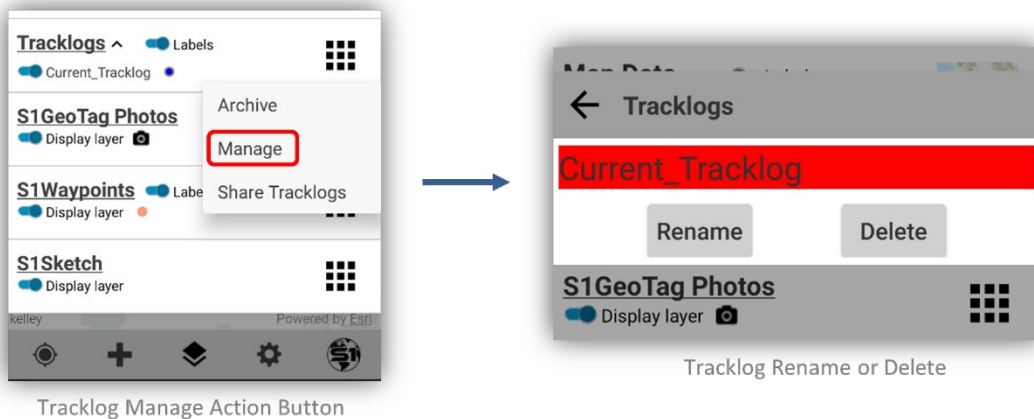
- c. The Tracklog is now archived on the device. It will be listed in Manage Map Layers, where its visibility can be toggled on or off like any other Map Data layer loaded on the map. Both the Current Tracklog and any other archived Tracklog(s) may be displayed in the map view at the same time, however, only the current track can log new positions.

Rename and Delete Archived Tracklogs

- a. Click on the **Manage Map Layers** button and tap the **Action** button on the right-hand side of the Tracklog section.



- b. Choose **Manage** from the list of available actions.
- c. Tap the Tracklog to select it, and then choose either **Rename** or **Delete**.

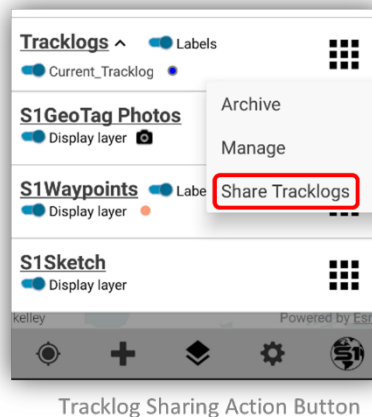


- d. A new Current_Tracklog will be generated when the Tracklog capability is enabled again.

Share GPS Tracklogs

All tracklogs are stored in a GeoJSON file on the device and can be imported into a GIS application. Prior to importing to ArcGIS, the Tracklog file must be shared via the Share Tracklog option within the S1 Mobile Mapper app.

- a. Click on the **Manage Map Layers** button and tap the **Action** button on the right-hand side of the Tracklog section.
- b. Tap **Share Tracklogs**.



- c. Tap the **app** to be used to **share** the Tracklogs. For example, share Tracklogs via email or upload the GeoJSON file to OneDrive.

NOTE: The list of apps available to share the Tracklog file with will depend on the apps installed on the mobile device. **Assumed:** The mobile device has a 4G or Wi-Fi data connection and ArcGIS 10.2 or later installed on a PC or Citrix to share Tracklogs.

NOTE: For Tracklog conversion and use; all tracklogs on the mobile device are stored in the same GeoJSON file, so while the user can separate out naming and visibility of archived tracklogs on the device, if the GeoJSON file is shared and converted to a feature, the resulting feature is (1) continuous line. This means it essentially connects the dots of all exported tracklog features even if the user did not have tracklogs enabled. **The trick to this is** if you need a standalone tracklog file you know you

will need to convert to a feature only collect that one tracklog you need, and archive and share it before you enable tracklogs again.

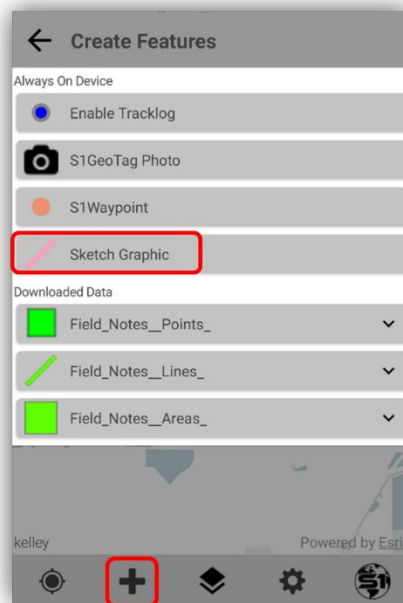
S1 Sketch

The S1 Sketch layer can create mark-ups on the map view. Sketches are drawn with a finger, or tablet stylus, by selecting the Sketch graphic from the Create Features menu and then drawing on the map view. Sketches are the topmost layer; they will draw on top of basemaps and feature layers. A Sketch can be saved, deleted, loaded, and shared.

NOTE: Once the finger, or tablet stylus, has lifted from the mobile screen while sketching, that sketch is complete. To create more sketches, tap the Create Features button again to create another sketch.

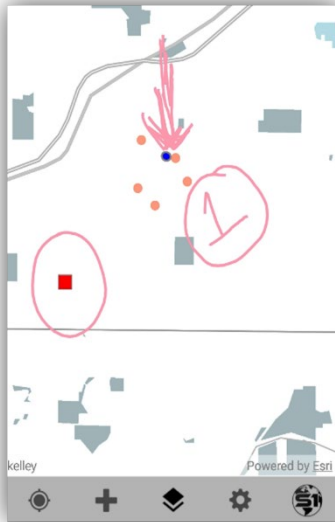
Creating an S1 Sketch

- a. To enable S1 Sketch, tap the **Create Features** button. Choose **Sketch Graphic** from the list.



Selecting Sketch Graphic

- b. Hold finger down, or tablet stylus, on the map view screen to draw a sketch. Once the finger has lifted, the sketch is complete for that part.
- c. **If the screen starts to move**, the sketch has ended. You can add to your sketch by tapping the Sketch graphic again from the Create Features list.
- d. The S1 Sketch will draw as a light pink salmon color only. There are no other color options for the S1 Sketch currently. Below is an example of four added Sketches drawn over the map layers:



Four S1 Sketches Drawn Over Map Layers

Managing S1 Sketches

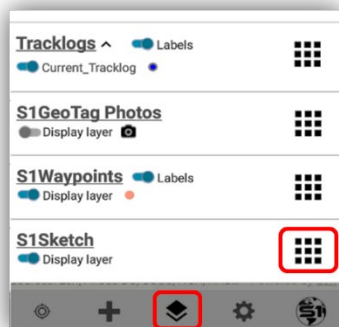
The S1 Sketch information is stored in a GeoJSON file on the device and can be imported into GIS or to other file formats. The GeoJSON file making up the S1 Sketch may be shared via email, text, etc. To import into desktop GIS software, the file must be shared onto a PC. A GeoJSON file can also be added as an item to ArcGIS Online. See the [Sideload](#) Section.

NOTE: See more information about “What can you add to ArcGIS Online” <https://doc.arcgis.com/en/arcgis-online/reference/supported-items.htm>

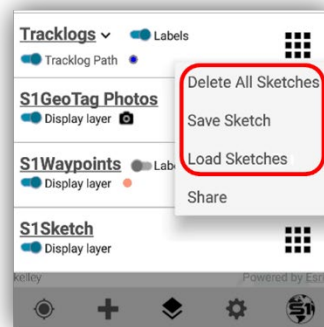
NOTE: Please visit the FAQ document for this process: <https://www.blm.gov/sites/blm.gov/files/s1-mobile-FAQs.pdf>

Save, Load & Delete S1 Sketches

Sketches are stored in a temporary memory storage and will disappear when you close the app unless you save them. If you save a single sketch or multiple Sketches, they will all be stored in a single GeoJSON file that can then be loaded up again when you want them. When you load a Sketch, it will load all the saved S1 Sketches at once. The **Delete All Sketches** will delete all S1 Sketches on the map view and in the single GeoJSON save folder.



S1 Sketch Action Button in Manage Map Layers

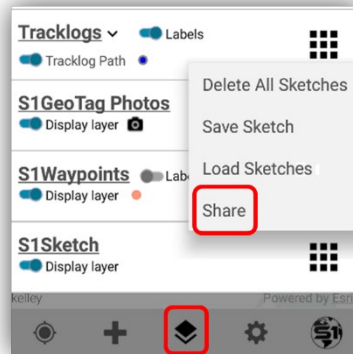


S1 Sketch Save, Load & Delete Options

Sharing S1 Sketches

All S1 Sketches are stored in a GeoJSON file on the device and can be imported into a GIS application. Prior to importing to ArcGIS, the Sketch file must be shared via the Share Sketch option within the S1 Mobile Mapper app.

- a. Click on the **Manage Map Layers** button and tap the **Action** button on the right-hand side of the S1 Sketch section. Tap **Share**.



S1 Sketch Share Option

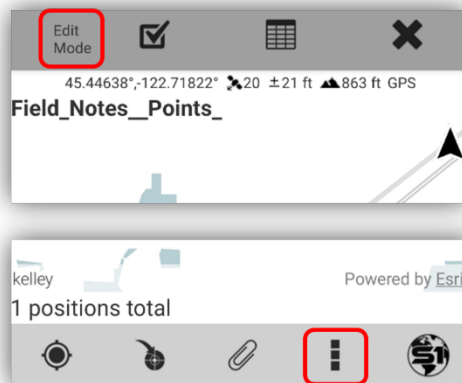
- b. Tap the **app** to be used to **share** the S1 Sketches. For example, share S1 Sketches via email or upload the GeoJSON file to OneDrive.

NOTE: The list of apps available to share the S1 Sketch file with will depend on the apps installed on the mobile device. **Assumed:** The mobile device has a 4G or Wi-Fi data connection and ArcGIS 10.2 or later installed on a PC or Citrix to share S1 Sketches.

Advanced Data Collection Tools

To access the advanced data collection tools, you must first Create or Edit a feature. **Depending on the feature type being created**, you will be presented with several advanced data collection options.

- a. **Once in Edit Mode**, tap the **Edit Options** button on the lower Application toolbar to get to the **Advanced Data Collection Options**.



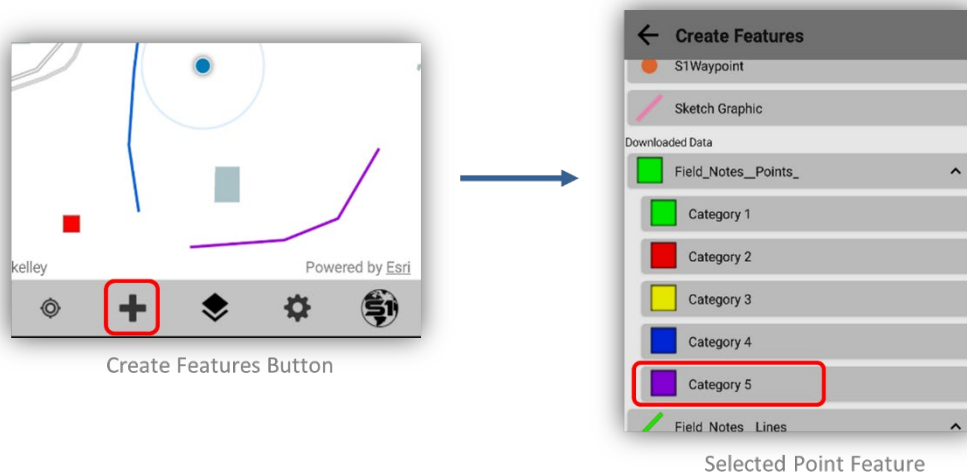
Options Tools in Edit Mode

Offset

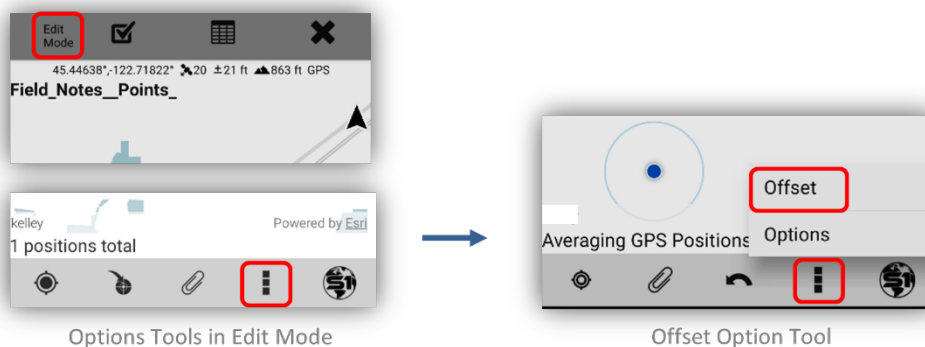
Feature offsets can be an effective way to capture a point location that you cannot physically reach or if standing near the feature would degrade GPS signal significantly. Offset involves capturing a location either via GPS or via digitizing on screen, then providing the application with a slope distance, direction (azimuth), and inclination from that reference point to the target location. The measurement values can be obtained using the mobile device's internal sensors (when available) or by manual entry by the user. The app will calculate the spatial location of the target feature using the values calculated or provided and will place a point on the map accordingly. **Currently, only point features can utilize the Offset option.**

Assumptions: Map Data that contains a point feature is downloaded to the mobile device.

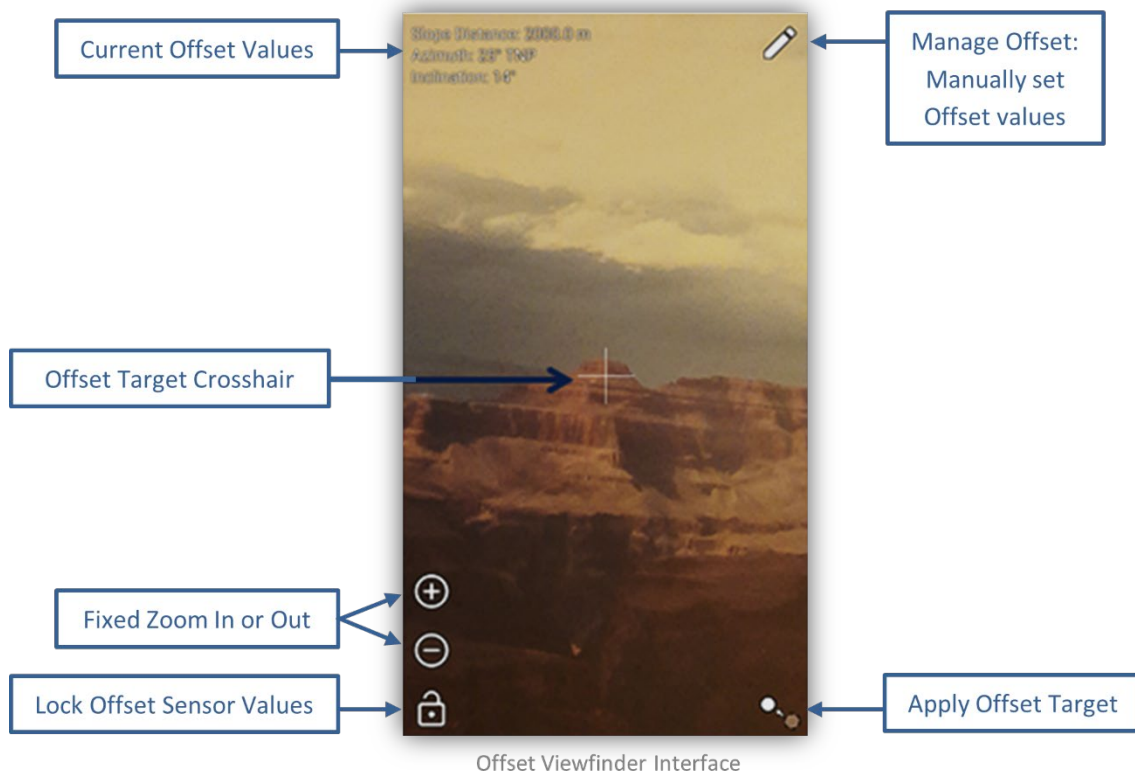
- a. Tap the **Create Features** button, from the Application toolbar, and **select a point feature**.



- b. Capture the feature point location of the Offset point via **GPS Average** (GPS on) or by **Digitizing** (GPS off). GPS Average will collect the point where you are standing. The offset will occur after collection and the Offset tool.
- c. After creating a point feature and before submitting the feature for saving, tap the **Edit Options** button on the **Edit Toolbar**. Choose the **Offset** option.



- d. The **Offset Viewfinder interface** will open with a camera view type interface and a crosshair for lining up with the Offset target.

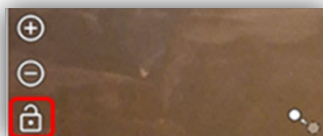


NOTE: On phones, the **Offset Viewfinder interface** will fill the entire screen, while on tablets it will appear as a pane to the left of the map.

Obtaining Offset Measurements via Hardware Sensors

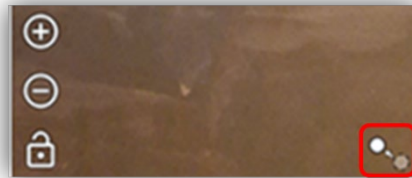
If the device has the necessary hardware sensors, the azimuth and slope inclination from the current location to the Offset target, it will display in the upper left-hand corner of the **Offset Viewfinder interface**. The user will align the viewfinder crosshair with the target and lock in the sensor values; calibrating hardware sensors if needed.

- a. Pinch the screen to zoom or use the +/- buttons in the Offset Viewfinder to place the offset target in the crosshair. See below how to [calibrate the hardware sensors](#).
- b. Align the Offset Viewfinder so that the offset target is directly in the center of the **Offset Target Crosshair**. The offset measurements will update in real time in the upper left-hand corner of the interface as the device moves. The hardware sensors will capture the Offset target as the new feature is placed in focus.
- c. When target is aligned in the **Crosshair**, press the **Lock Offset Sensor** button, being careful to maintain the target in the crosshair.



Lock Offset Sensor

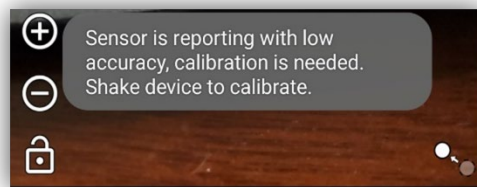
- d. Once the Lock Offset Sensor button is pressed, the offset values will no longer update from hardware sensor reading unless the Lock Offset Sensor button is tapped again to unlock it.
- e. **To commit the offset measurements**, tap the **Apply Offset Target** button, this will close the Offset Interface and then return to map view.



Apply Offset Target Button

Calibrate Device in Offset Viewfinder

- a. If sensors are providing unreliable measurements or you get a pop-up window message saying, "Sensor is reporting with low accuracy, ...", then the device needs to be calibrated.



Sensor Warning to Calibrate Device

- b. Calibrate the device from the Offset Viewfinder interface by **shaking the device** for several seconds to bring up the **Calibrate Sensors** tool.
- c. To calibrate, follow the directions as indicated on screen to wave device around until all sensors are fully calibrated and reflecting maximum accuracy.



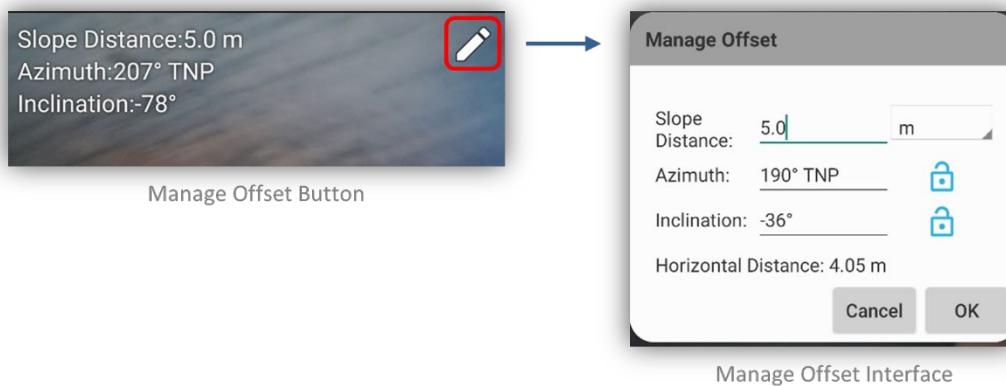
Calibrate Sensors Tool

Manually Entering Offset Values or Overriding Sensor Values

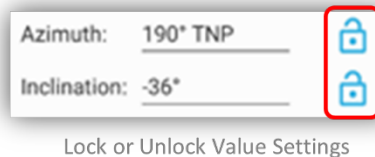
If the device does not have the necessary sensors to calculate azimuth or slope inclination, no offset values will be automatically populated on screen; the user will have to manually enter all offset values. No Lock Offset Sensor button will appear on the interface. Locked in sensor values can also be overridden with user supplied values via the **Manage Offset interface**.

Slope distance values from the current location to the offset target can also be entered manually via the **Manage Offset interface**.

- a. **Set slope distance and slope distance units** from your current location to the Offset Target by tapping on the **Manage Offset** button in the upper right-hand corner of the Offset interface and then enter the values.



- b. The application will convert from slope distance to horizontal map distance using the supplied inclination value and will display this value onscreen. This is the value ultimately used to determine the offset location.
- c. If sensor values for azimuth and inclination were not populated by the hardware sensors, they can be entered manually.
- d. If any sensor values are manually overridden, the application will continue to use those manual settings on all future offsets until the override is cleared. **To clear manual overrides** and return to using sensor measurements, tap the **Unlock** button next to each value.



- e. To close the Manage Offset interface and return to offset viewfinder interface, tap **OK** button.
- f. To commit the offset measurements, tap the **Apply Offset** button, this will close the Offset interface and then it will return to map view.



Apply Offset Target Button

- g. Location of the point feature will be adjusted on the map to reflect the offset measurements from the initial captured location.

NOTE: These offset values can also be harvested from a connected Bluetooth laser rangefinder if applicable. See [Laser rangefinder section](#) for more details.

Nesting a Feature while Collecting another Feature

While collecting a line or polygon (area) feature, it may be desirable to nest another feature contained in the map data or an “Always on Device layer” like an S1 Waypoint or an S1 GeoTag Photo. Nesting will pause the data collection of the current feature to allow the capture of another feature type. This way the user does not have to save prematurely. Instead, a user can pause the current feature, capture a different new feature that they have encountered, save that new feature, and then resume the editing of the original feature.

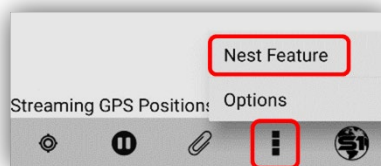
Assumptions: Map Data that contains a line and/or polygon feature is downloaded to the mobile device.

- a. If using GPS Stream mode to capture a line or polygon feature, tap the **Pause GPS Stream** button.



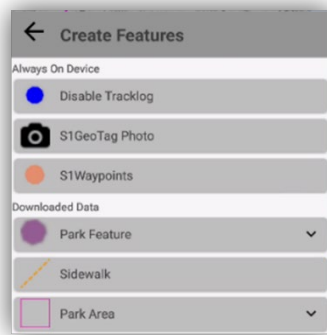
Pause GPS Streaming Button

- b. Tap the **Edit Options** button. Choose **Nest Feature**.



Nest Feature Button from The Edit

- c. You will be presented with the Create Features menu. Select the **feature type** you would like to nest.



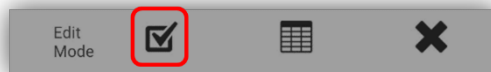
Create Features Menu

- d. Capture the geometry of the nested feature using **GPS or Digitize** (turn off GPS to digitize) and populate the attributes.



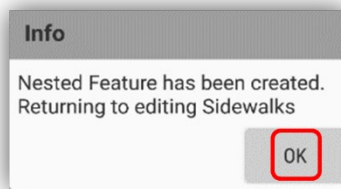
Attribute Table View Button

- e. Tap **Submit Edit** button to save the nested feature.



Submit Edit Button

- f. A message box will appear to notify you that you are saving the Nested Feature and returning to editing the previous feature. Tap **Ok**.



Info Window About Nested Feature Creation

- g. Resume capturing the original line or polygon (area) feature by tapping either **GPS Stream** or the **Average Vertex** button.



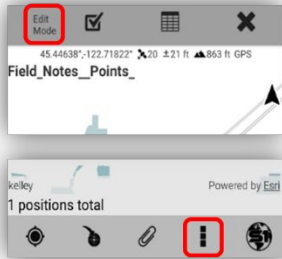
GPS Stream and the Average Vertex Button

- h. Repeat the process as necessary to capture additional “nested” features before saving the geometry and attributes of the original line or polygon feature.

Data Collection Settings

Selecting the Edit Options menu opens the S1 Options form, where users can change some S1 settings related to data capture including the number of positions averaged and Vertex Interval settings.

- a. While capturing a new feature, tap the **Edit Options** button on the lower Toolbar. Select **Options** from the menu.



Options Tools in Edit Mode



Options Menu with Point Features



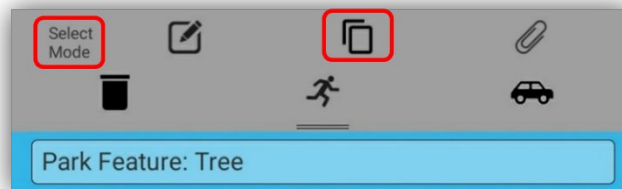
Options Menu with Line & Polygon Features

- b. There is the option to adjust the **Number of Average Positions**, **Streaming Interval Distance**, and **Streaming Type**. To learn more about S1 Application Options, see the section on [Application Options](#).

Copy Geometry

Selecting **Copy Geometry** allows the user to copy the geometry and attributes of a selected feature into a new, separate record within the same layer or into a different layer within the same map data.

- a. Tap to select the feature to be copied.
- b. The **Select Mode Toolbar** will appear. Tap the **Copy Geometry** button.



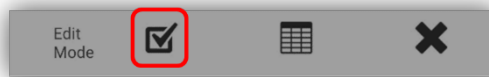
Copy Geometry Tool on the Select Mode Toolbar

- c. The **Create Feature** menu will open. Select the layer the record is to be copied to.
- d. Select the **Attribute View** button to review and/or edit the attributes for the new feature.



Attribute Table View Button

- e. Wherever the attributes fields match between the copied feature and the new target layer, the existing attribute values will also be copied to the new feature.
- f. Tap the **Submit Edit** button.



Submit Edit Button

NOTE: When you use Copy Geometry, only reference geometry is copied; **not solid features**. For example, if you copy a point and then select a line feature to create, then the matching attribute fields will copy over, and the line feature will start at the point's location on the map.

Auto-Populate Feature-Level Metadata Fields

The S1 Mobile Mapper application can auto-populate several categories of common feature-level metadata field attributes when data is collected via GPS, including Estimated Accuracy ft/m, Coordinate Source, XY Coordinates, GIS Miles, GIS Acres, Date, and Number of Satellites. With the laser functionality, users can also use the laser to auto populate fields for Slope distance, Horizontal distance, Vertical distance, Azimuth, Inclination, Height & Percent Slope. The app supports several default attribute field values in most categories. Users can also add their own attribute fields to each category or further manage the feature-level metadata categories via [S1 Options](#), see example below.

If one or more of the auto-populate attribute fields exist in a layer's schema, each time a new feature is collected or an existing feature is updated, the value in the field will be automatically populated by the application. See the table below to review all the categories that auto-populate, the default field names, and a brief description of the category.

NOTE to OR/WA BLM users: There is an ArcGIS Pro tool available in the ORTools toolbox that makes it easy to add S1 Auto-populate fields to a dataset. Run the tool prior to publishing the service.

Category	Field Name (Default)	Requirements: (Field Type) Description
Estimated Accuracy (ft)	Accuracy_FT, Acc_FT, Accuracy_Feet	(Double) Field calculates estimated GPS accuracy (in feet) to the 95% confidence interval to meet the National Standard for Spatial Data Accuracy (NSSDA) requirements.
Estimated Accuracy (m)	Accuracy_M, Acc_M, Accuracy_Meters	(Double) Field calculates estimated GPS accuracy (in feet) to the 95% confidence interval to meet the National Standard for Spatial Data Accuracy (NSSDA) requirements.
Coordinate Source	COORD_SRC, COORDINATE_SOURCE, COORD_SOURCE	(Text, field length 7) Field captures the quality of the GPS coordinate source used: MAP, UNK, GPS, DPGS, RTK
Point X	POINT_X, X, LONG, LONGITUDE, ESRIGNSS_LONGITUDE	(Double) Field captures the longitude value of a point feature.

Category	Field Name (Default)	Requirements: (Field Type) Description
Point Y	POINT_Y, Y, LAT, LATITUDE, ESRIGNSS_LATITUDE	(Double) Field captures the Latitude value of a point feature.
GIS Miles	GIS_Miles, Miles	(Double) Field is calculated when linear features are created or updated, calculation is made using Contiguous USA Albers Equal Area Projection.
GIS Acres	GIS_Acres, Acres	(Double) Field is calculated when area features are created or updated, calculation is made using Contiguous USA Albers Equal Area Projection.
Date	Date_	(Date) Field displays a pre-defined date.
ESRI number of satellites	ESRIGNSS_NUMSATS	(Short, Range 0-99) Number of satellites connected when feature is created.

Laser Auto Populate Fields

Category	Field Name (Default)	Requirement (Field type) Description
Slope distance	SLOPE_DISTANCE	(Double) Field populates with the distance calculated along the slope of the laser shot to the target.
Horizontal distance	HORIZONTAL_DISTANCE	(Double) Field populates with the horizontal distance calculated from the observer to the target.
Vertical distance	VERTICAL_DISTANCE	(Double) Field populates with the calculated vertical distance from the observer to the target.
Azimuth	AZIMUTH	(Double) populates with the calculated azimuth based on the internal compass in the laser based on the direction the laser shot is taken. The angle is typically measured from 0° to 360° going clockwise. With 0° being North. <i>(The laser may require calibration to keep this value relatively accurate, see laser documentation on how to calibrate)</i>
Inclination	INCLINATION	(Double) Field populates with the calculated inclination value from the laser shot. This value ranges from +90° to -90° based on whether the laser is above or below “level”

Height	HEIGHT	(Double) Field populates with the calculated height of an object. This measurement requires 2 laser shots starting with the Top of the feature and a second laser shot to the bottom of the feature.
Percent Slope	SLOPE_PERCENT	(Double) Field populates with the % slope value from the laser. This value is usually associated with percent slope in GIS and forestry applications. It is calculated from the angle of a slope where a 45° angle is equal to 100% slope. This value can range from 0 – infinity.

NOTE: The estimated Accuracy Measure and Coordinate Source capture metadata level is accuracy data about the feature being collected. When GPS is employed during data capture, the stored estimated accuracy will reflect the average accuracy of the total number of positions. These are read-only attribute fields and cannot be directly edited by the user on the device.



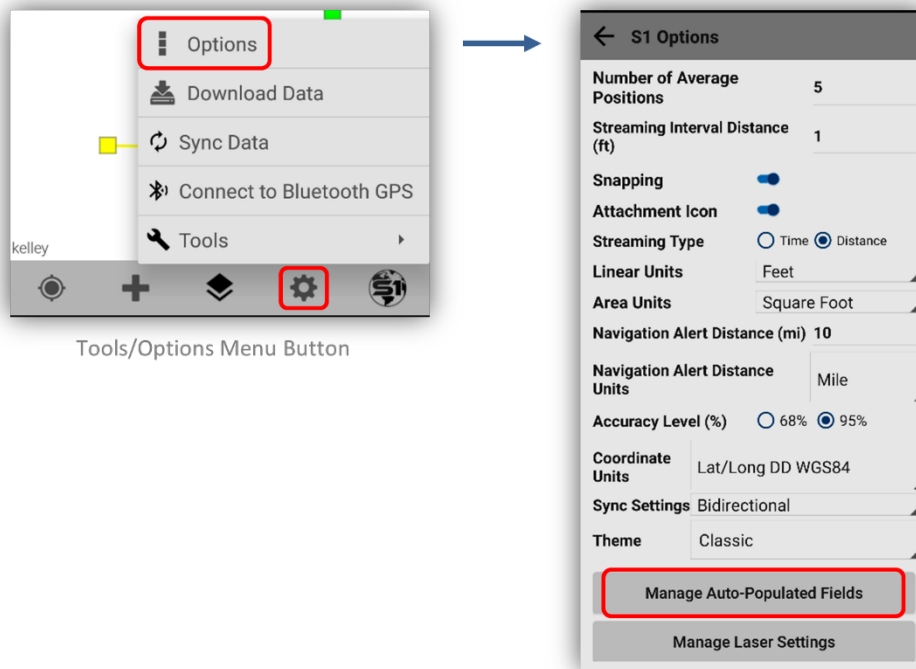
Read-Only Attribute Fields

If a feature is being updated via GPS, the following rules apply to accuracy field updates:

- a. If a point and geometry are updated, the stored accuracy and coordinate source attributes are replaced with current values.
- b. If a line or area and geometry are updated, the accuracy attribute is updated with a combination of the stored accuracy and the current accuracy, using a weighted average of the total number of old and new vertices.
- c. If a line or area and geometry are updated, the coordinate source attribute is updated with the lowest source level obtained (UNK < MAP < GPS < DGPS < RTK).

Accessing Auto-Populated Fields Management Window

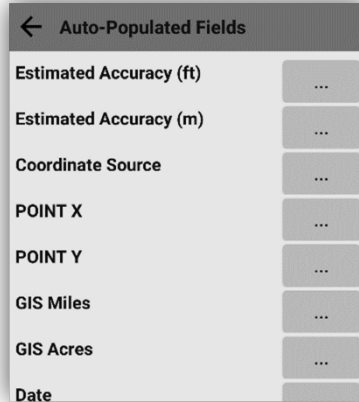
- a. Tap the **Tools/Options Menu** button on the Application toolbar.
- b. Tap **Options** and select the **Manage Auto-Populated Fields** button.



Tools/Options Menu Button

Manage Auto-Populated Fields Button

- c. The **Auto-populated Fields Configuration Window** opens with a list of supported categories.



Auto-Populated Fields Config Window

Managing Auto-Populated Field Categories

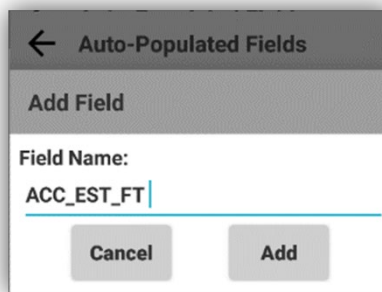
- d. To configure an **Auto-Populate Field category**, tap the button with three dots next to that category.
- e. A window opens with a list of auto-populate fields. All the fields listed are selected to auto-populate by default.



- f. To turn off one of the default Auto-Populate Field values, simply uncheck the box to the left of the field name and select the **Back Arrow** to save changes.
- g. **To completely disable this category** from auto-populating, uncheck all the values in this category.

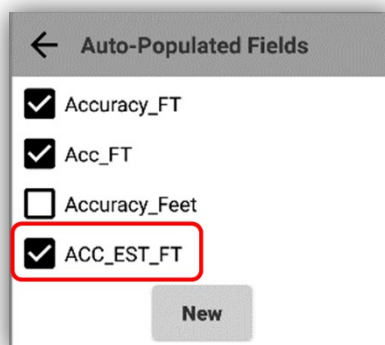
Remap Auto-Populate Values to an Existing Field in the Map Data

- h. To add a new attribute field name to a category in the Auto-Populated Fields; tap **New**.
- i. Type a field name into the window and select **Add**.



Adding a New Field in Auto-Populated Fields

- j. The new field name will be added to the existing list. Select the **Back Arrow** to save changes.
- k. Select the **Back Arrow** at the top of the Auto-Populate Fields windows and S1 Options window to return to the map view.



New Field added in Auto-Populated Fields

- I. Any attribute field name can be added to a category if the underlying data types and parameters match those outlined in the description field.

NOTE: If the new field does not match, the field will not auto-populate when creating or updating a feature. For example, if you're attempting to add Estimated Accuracy category, field type Double, to a field that used a field type of Date, the field will not auto-populate as there is a field type mismatch.

Navigation Capabilities

When the GPS has a position fix, users can set a navigation target at a designated location in the map or a selected feature. While in navigation mode, the application provides updated distance, direction and bearing information to the user (depending on device capabilities) and alerts the user when arriving near target destination.

Navigate to a Map Location

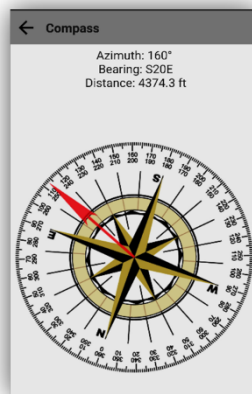
- a. **Long tap** on the map to set a **Navigation Target** (GPS will automatically activate if it is not already enabled).
- b. A **Blue Icon** is placed at the location of the Navigation Target.



- c. The **Navigation Pane** displays at the top of the map view. This pane provides the **Distance** and **Azimuth** (reference direction) to the Navigation Target and a **Compass Rosette** with an arrow pointing to the Navigation Target (if the device hardware supports the compass).
 - The Azimuth (reference direction) to the target is displayed in degrees.
 - The Distance value to the target is displayed in **user defined units that are setup in the [S1 Options](#) settings under Navigation Alert Distance and Navigation Alert Distance Units.**
- d. Distance and Azimuth values change as the GPS position moves in relation to the Navigation Target.
 - Distance value decreases when moving towards the target.
 - Distance value increases when moving away from the target.
 - Azimuth degree value changes as the GPS position moves.
- e. The application displays a message pop-up at the bottom of the screen as the user approaches the navigation target. As the user reaches the alert threshold, the device will also ring or vibrate.



- f. Tap the **Back Button** to clear the Navigation Target.
- g. **Long tap** on the map to set a different Navigation Target.
- h. To view a full screen compass while navigating, **tap the Compass Rosette** on the **Navigation Pane**. A full screen window with the compass will appear.
- i. The **red arrow points** toward the direction of the navigation target relative to the orientation of the device.
- j. Tap the **Back Button** to return to the map view.



Navigation Target Compass

Navigate to a Selected Map Feature

Features on the map that can be selected and navigated to, include: A Point, Line, Polygon (area), Tracklog, S1 Waypoint or an S1 GeoTag Photo.

- a. **Tap** on an existing feature in the map. The selected feature will highlight in **Blue**, and the **Select Mode Toolbar** will appear.
- b. Tap the **Navigate** button at the top of the screen (running man icon).



Navigate Button for a Selected Feature

- c. For a Point, S1 Waypoint or S1 GeoTag Photo – A blue pushpin will appear on top of the point. The **Navigation Pane** will appear at the top of the map view displaying the **Azimuth**, reference direction in degrees, and **Distance** to the selected feature.
- d. For a Line or Tracklog Feature – A blue pushpin will appear at the starting vertex of the line. The **Navigation Pane** will appear at the top of the map view displaying the **Azimuth**, reference direction in degrees, and **Distance** to the selected feature.



Navigating to Location of a Line Feature

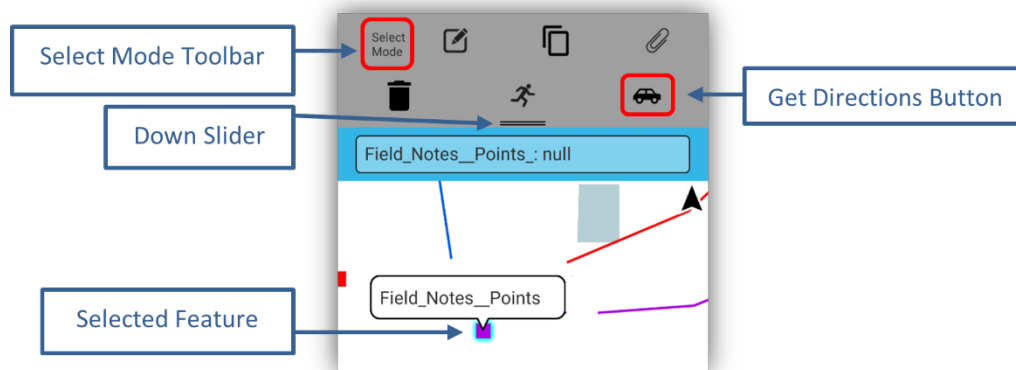
- e. **Tap** the Back Button to clear the Navigation Target.

Get Directions

Users can get **directions to a selected feature or an X, Y location** via the **Enter Coordinates tool** using the **Get Directions function**. Users can launch the application and select a **Map Routing application**, like Google Maps, to get directions to the desired location. Users will need to initiate this function while they have a Wireless or 4G connection. See the [Enter Coordinates section](#) below on getting directions via the Enter Coordinates tool.

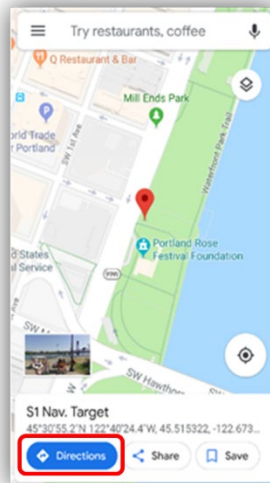
Get Directions to a selected location

- Tap on an existing feature in the map. The selected feature is highlighted in **Blue**, and the **Select Mode Toolbar** appears.
- On the Select Mode Toolbar, use the **down slider** to access the **Get Directions button**.



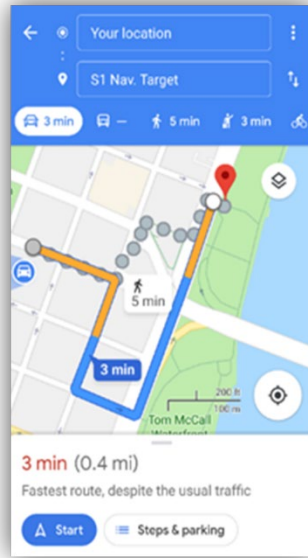
Get Directions Button to Selected Feature

- Google Maps** will open and load the selected location **displaying** the locations X, Y coordinates as a **red location pin** in the map.



Google Maps with Location Pin and Directions

- Select **Directions** at the bottom of the screen to get a street route from your current location or a specific location to the selected feature.



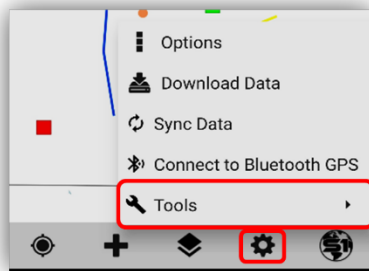
Google Maps Driving or Walking Map Route

NOTE: If going to areas where there are no data connections, the google map can be cached to the mobile device to allow turn-by-turn navigation when offline. User must first cache the map area they need by following the instructions here:

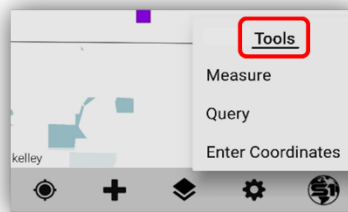
<https://support.google.com/maps/answer/6291838?co=GENIE.Platform%3DAndroid&hl=en>

Tools

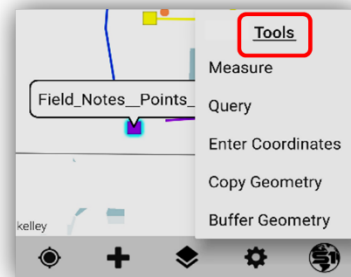
General application tools can be accessed via the **S1 Tools/Options** button. The list of Tools depends on if a feature is selected or not on the map view.



Tools Option on the Tools/Options



Tools List Without a Feature Selected



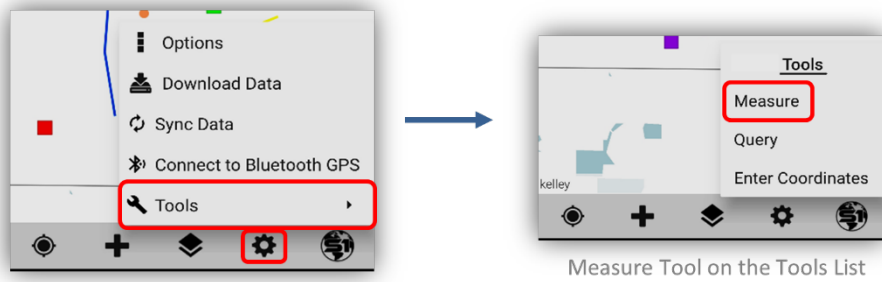
Tools List with a Feature Selected

Measure Tool

The measure tool provides the capability to measure Distance or Area by sketching on the Map View or by selecting an existing line or area feature.

Measure Distance or Area in Map View

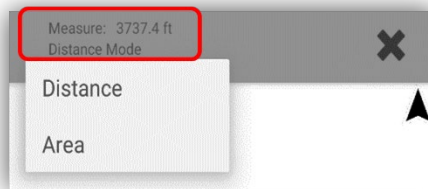
- a. To measure a distance or area in the Map View tap on **Tools/Options** button on the Application Toolbar.
- b. Select **Tools** from the list. Select **Measure** to open tool.



Tools Option on the Tools/Options Button

Measure Tool on the Tools List

- c. **Tap** on the screen where the measurement will begin (*like digitizing a line or polygon*).
- d. Continue to **tap** on the screen until satisfied with the measurement. The length or distance measurement is reported at the top of screen on the **Measure Toolbar**.

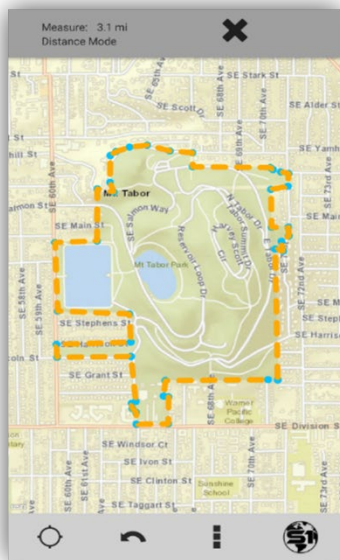


Measure Tool Units

- e. **Tap** on the **Undo Vertex** button to remove the last vertex in the sketch measurement.

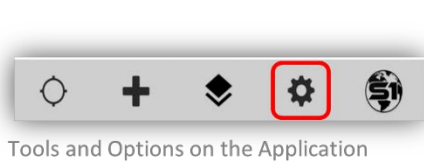
Distance Mode:

Area Mode:

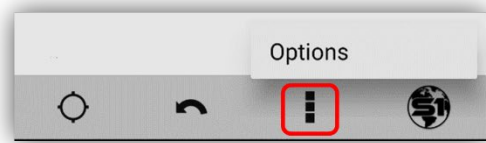


Measure Tool Used in Distance Mode and Area Mode

- f. Display units can be changed based on user preference in the [S1 Options](#) menu.



Tools and Options on the Application



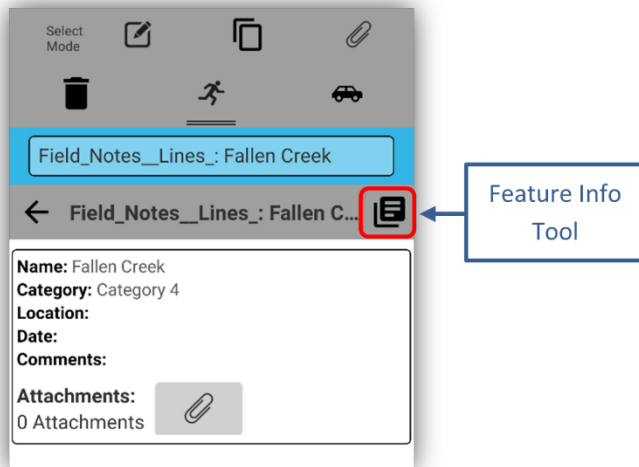
Options Button When Using the Measure Tool

- **For the Linear units options:**
 - Distance is displayed in either kilometers, meters, feet, or miles.
- **For the Area units include:**
 - Area is displayed in acres, square feet, square meters, or hectares.
- **Tap** on the **Cancel button** to exit the Measure Tool, the X at the top on the Measure Toolbar.

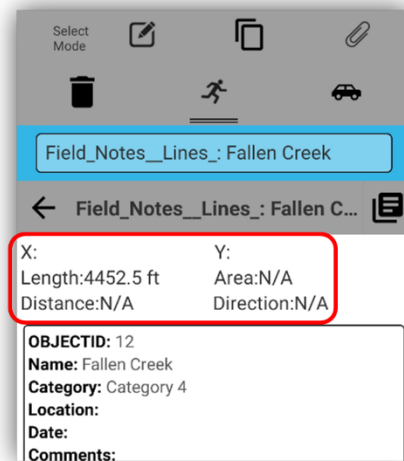
Determine Length or Area of a Selected Feature

If a point or an S1 Waypoint is selected on the map, its X Y coordinates are reported in the **Feature Info Window**. If a line or polygon feature is currently selected on the map, its length and area are reported in the Feature Info Window.

- a. Tap to select a feature. In the blue **Select Features Bar**, tap the feature name to open the feature's attribute info.
- b. Tap on the Feature Info Window tool in the upper right-hand corner of the window to see the location and measurement attributes recorded.

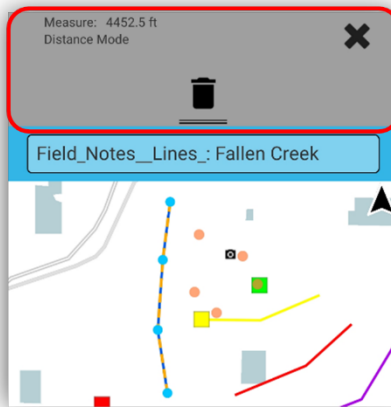


Attribute pop-up for a Selected Line



Feature Info Window for a Selected Line Feature

- c. If you just want the measurements of a selected feature by using the Measure Tool, then select the feature and tap on the Tools/Options tool on the Application Toolbar.
- d. Select Tools and then select the Measure Tool. The Measure Toolbar will display measurements.

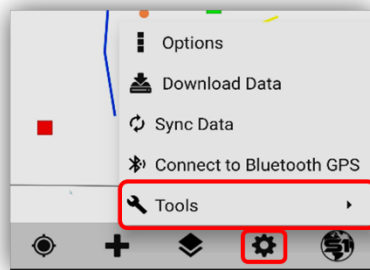


Measurement Toolbar

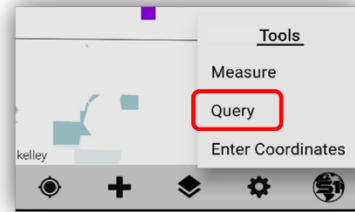
Query Attributes Tool

The S1 Mobile Mapper application allows users to find and return a subset of map data features that meet a defined set of attribute filters, known as a **query**. Once a query is applied, the users can toggle between the selected features, view a feature’s detailed attribute information, and zoom to its location in the map.

- a. To start an attribute query, tap **Tools/Options** button.
- b. Tap **Tools** and select **Query**.

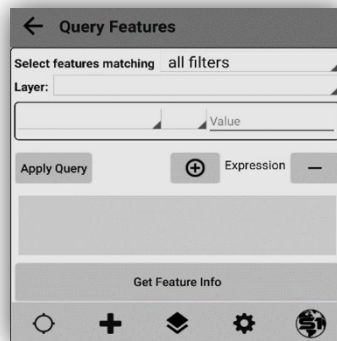


Tools Option on the Tools/Options Button



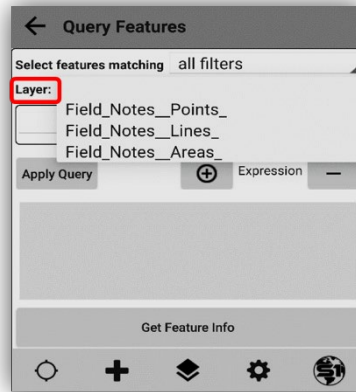
Query Tool on the Tools List

- c. The **Query Features** pane will open on the screen.
- d. A query can be created with no attribute filter, a single attribute filter or several attribute filters.



Query Feature Pane

- e. Set the desired query target **Layer** from the list of map data currently loaded in the map, if there is only one map data layer in the map it will be pre-chosen by default.
- f. Set the query target **Layer** using the available dropdown list.



Query Layer Dropdown List

Creating a Query - No Filter

A **No Filter Query** is an easy way to return a list of all records in a single map data layer.

- a. To execute a **No Filter Query**, select a map data layer and then tap the **Apply Query** button with no specified filter.
- b. All records from the chosen layer will be listed in the bottom of the query window.

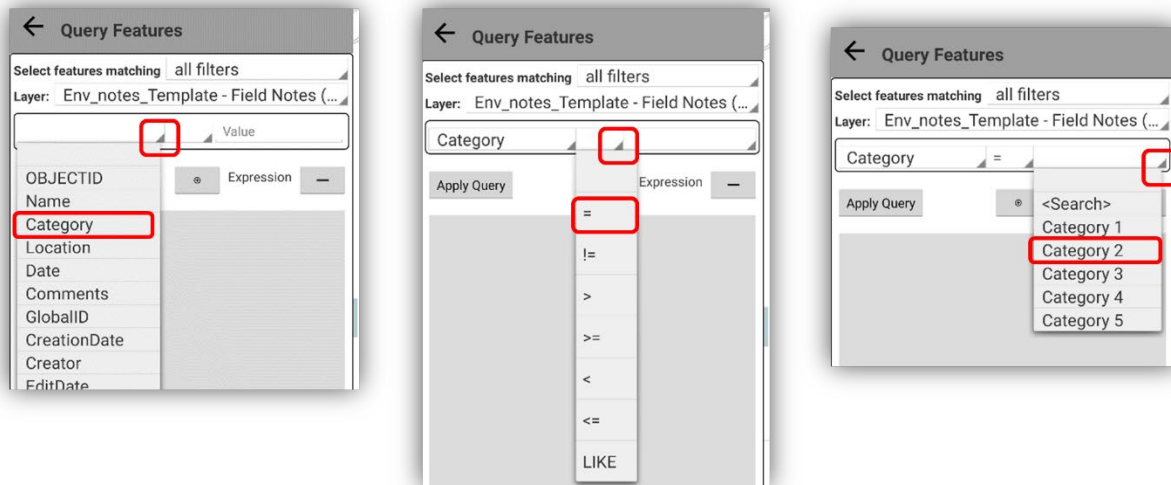
Creating a Simple Query – Single Attribute Field Filter

A **Single Attribute Query** is constructed using the following format:

<Attribute Field Name> + <Query Operator> + <Pick List Value, Attribute Field, or Unique Value>

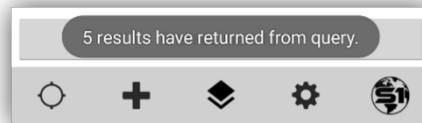
Example: **Feature Type = Category 2**

- a. Tap the layer field box, select the map data layer you want to query, then tap the drop down on the left side of the screen to select the query layer's **Attribute Field** name.
- b. Tap the next drop down to select from a list of **Query Operators**.
- c. Finally, tap the last box to select from a picklist of values; if the field has a defined coded value domain picklist or manually enter a **Value**.



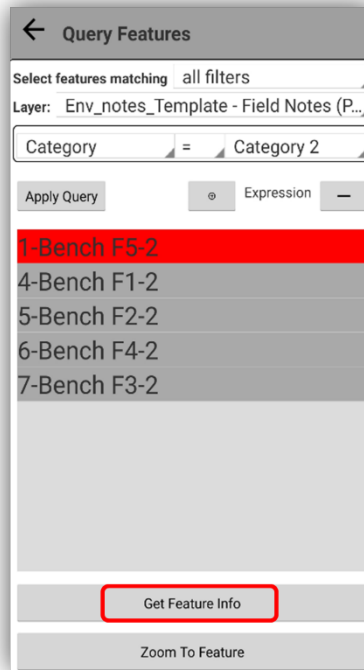
Single Layer Query Statement

- d. Tap the **Apply Query** button to initiate the query. A message will appear at the bottom of the screen telling you how many records were selected.



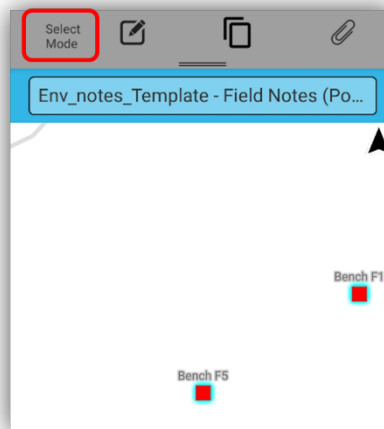
Query Selected Feature Total

- e. Features for which the **filter = true** are selected and listed individually at the bottom of the pane in a scrollable list. Each feature is described by its **Object ID**, **Layer Display Field**, and **Queried Attribute Value**.
- f. Tap a record in the list to select it. The selected record will **display in red**.
- g. Tap the **Get more Info** button with one of the records selected (highlighted in red) to see the attribute information for the selected feature while staying in the query mode.



Get More Info from Selected Feature

- h. Tap the device **back button** to remove the feature info window and return to the query window.
- i. With the record still selected, tap **Zoom to feature** to zoom to this feature in the map. Selecting this function will put the app into **Select Mode** with options to **Edit**, **Add/View Attachments**, **navigate to the feature**, or **Delete it**.

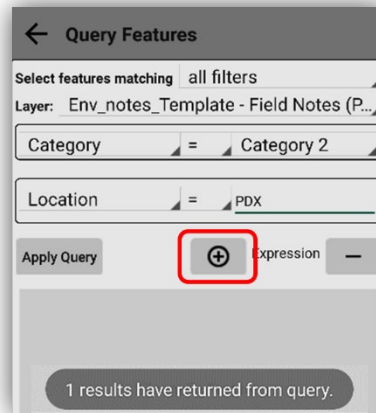


Zoom to Feature - Select Mode

Creating a Complex Query – Multiple Attribute Field Filters

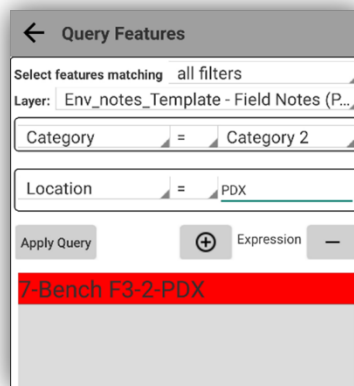
A complex query involves more than one query definition filter being applied to a given feature. When there are multiple query filters to be applied, you can either specify **All Filters** be applied or **Any Filters** be applied. **All Filters** requires that each of the query filters are true for a feature to be selected (this AND that), while **Any Filters** requires that only one filter must be true for the feature to be selected (this OR that). The default setting is set to **All Filters**.

- a. To add additional query filters, tap the **Add Query Filter** button.



Complex Query

- b. Choose a second attribute field name, operator and field or Value to select the desired features and click **Apply Query**. A new message appears at the bottom of the screen with the total number of selected records.
- c. Features for which the filter is true are selected and individually listed at the bottom of the pane in a scrollable list, each described by its **Object ID, Layer Display Field, and Queried Attribute Value**. When **selecting** a feature from the list, it will turn red.



Complex Query -Selected Feature

- d. Use the device's back button to close the query pane and return to the full map view.

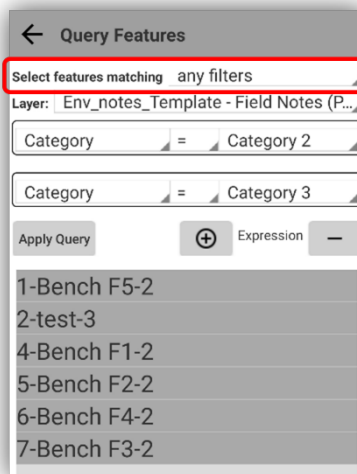
Query Tips

Multiple Values from Same Attribute Field

Complex queries can be built using **Any Filters** to return a list of values from any one attribute field, for example:

Filter 1: Category = Category 2

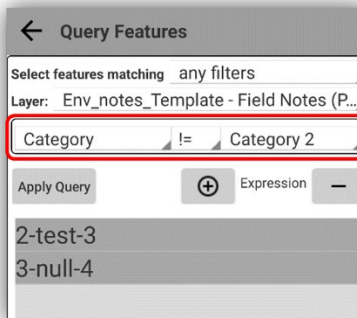
Filter 2: Category = Category 3



Complex Query -Multiple Values

- e. A similar query can be executed using **Not Equals** operator, which will return all values from the layer except the Value supplied, for example:

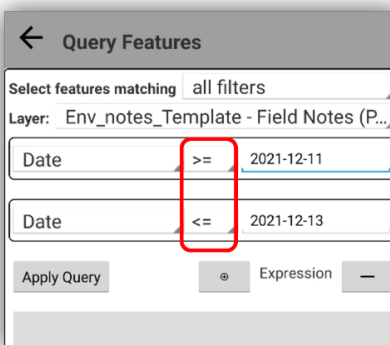
Filter 1: Category != Category 2



Not Equals Operator in Query

Filtering a Range of Date Values

Complex queries can be built using **All Filters** to filter numeric or date records to a particular range, for example: **Filter 1: Date >= 12/11/2021 & Filter 2: Date <= 12/13/2021**



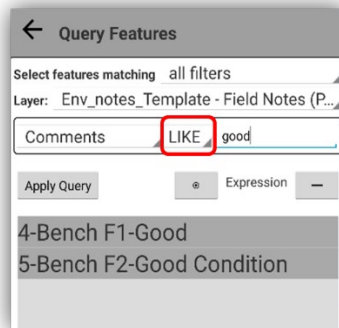
Date Range Query

Filtering Using the LIKE Operator

When querying attribute values in text fields that are not controlled by a domain, the case of the query **Value** must be an exact match to the text string in the map data layer record when using the **Equals** operator. If the records are not an exact match, no records will be returned. For example:

Filter: Comments = Good Condition

This query would return any record that had a value in the Comments field with “Good Condition”. It would not however, return records if you just typed “Good” to get all of the values that start with the word “Good”. To capture all cases of a text string in a query, consider using the **Like** operator rather than **Equals**.

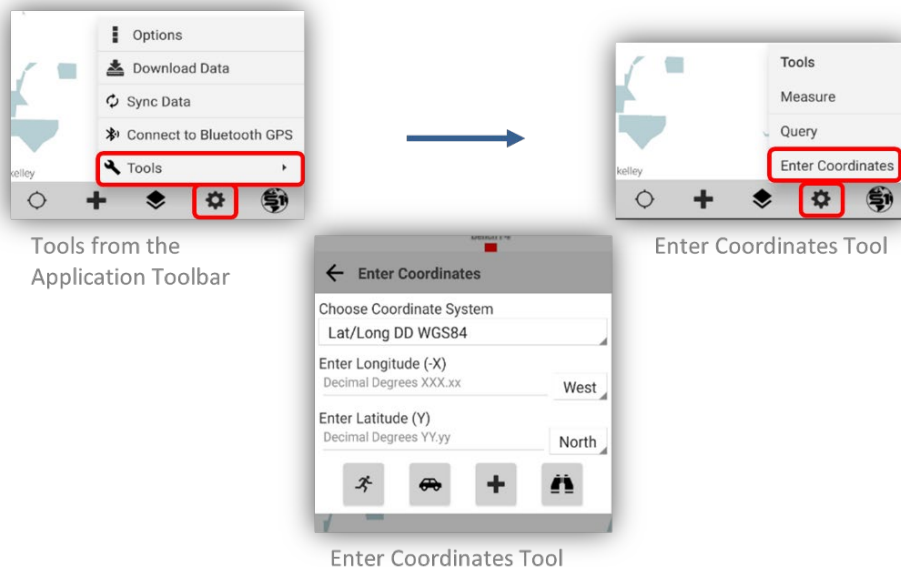


LIKE Operator Query

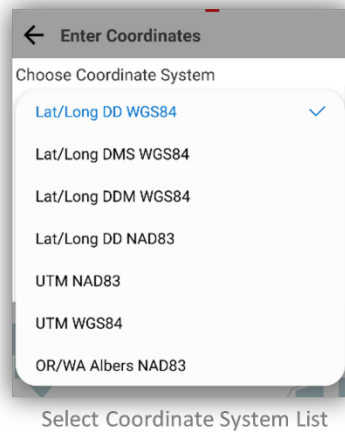
Enter Coordinates Tool

The Enter Coordinates tool allows coordinates to be specified and used as a Navigation Target, to Create a Feature, or Find Existing Features at the location specified. The user may specify which Coordinate System is used by the tool.

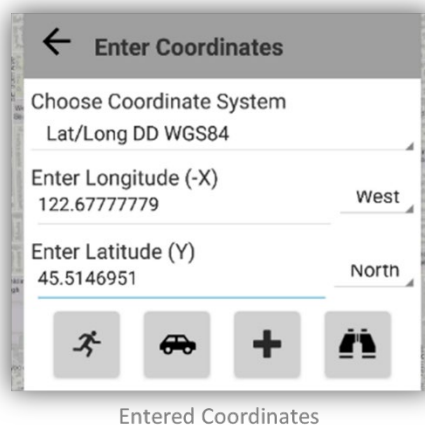
- a. Tap the **Tools/Options** button. Select **Tools** from the list.
- b. Select **Enter Coordinates** to open tool.



- c. If necessary, modify the **Coordinate System** via the drop-down list.



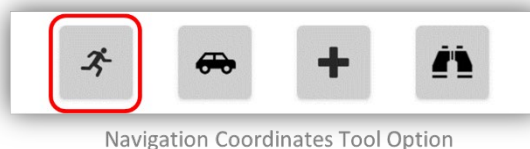
- d. Enter the Longitude (-X) and Latitude (Y) coordinates and select the direction in the appropriate text box and pulldown List.



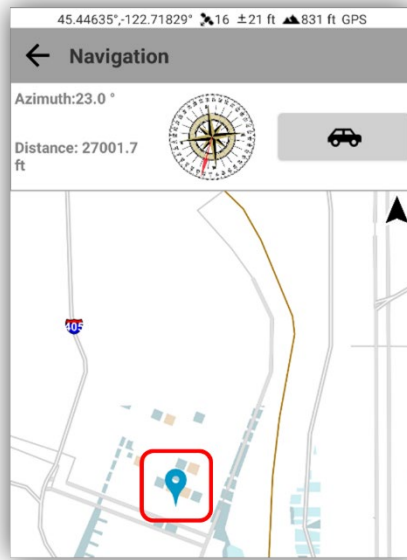
- e. Once the location has been specified, there are four options for using the coordinates; **Navigate**, **Get Directions**, **Create feature**, and **Find nearby features**.

Navigate to Entered Coordinates

- a. Tap the **Navigation** icon once coordinates are entered.



- b. A navigation target at the desired location is set and the compass rose, bearing and distance information is displayed. See the [Navigation](#) section above for more information on feature navigation.

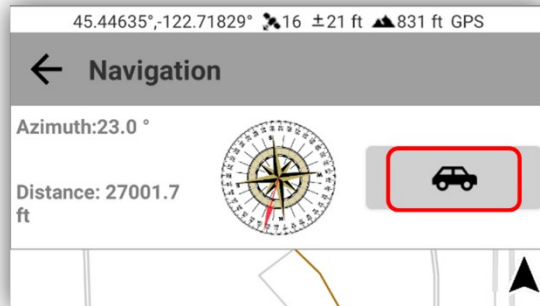


Coordinate Target and Navigation Tool

- c. Tap the **back** button to remove the target and exit navigation mode.

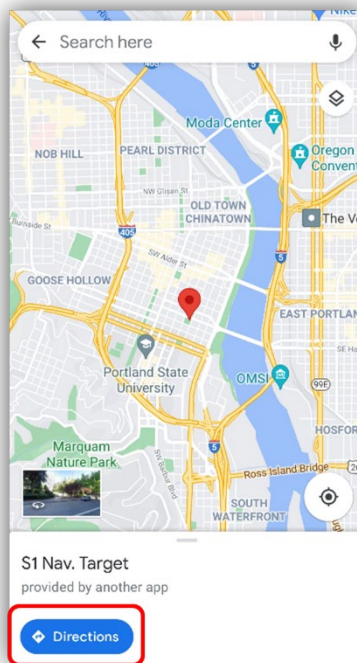
Get Directions to Entered Coordinates

- a. Tap the **Get Directions** icon once coordinates are entered.



Get Directions Tool

- b. The Google Maps app will open and drop a pin at the location specified.
- c. Select **Directions** at the bottom of the screen to get a street route to the map pin from your current location or another specified location.

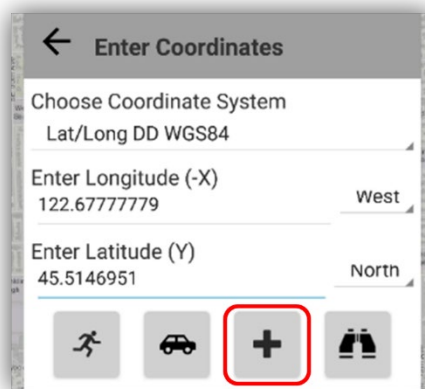


Location Target on Google Maps

- d. Tap the **back button** on the device to return to the S1 Mobile Mapper application.
- e. To exit the Enter Coordinates tool, tap the device back button.

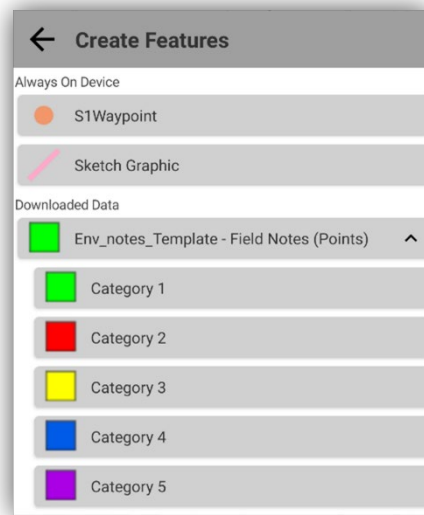
Create Feature Using Entered Coordinates

- a. After specifying coordinates, tap the **Create Feature** button.



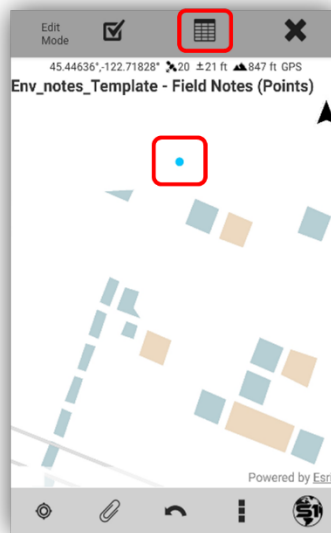
Create Feature Button

- b. In the Create Features menu, tap the layer that you want to create. Options are limited to S1Waypoints and any point feature currently active in map view.



Create Point Feature from Target Location

- c. The feature selected will be created and displayed on the map as a **blue dot** using the specified coordinates.
- d. Select the **Attribute Table View** button to edit the attributes for the feature.



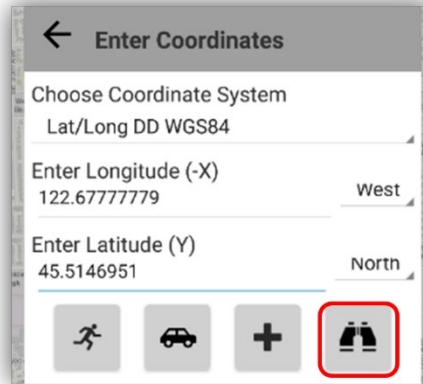
Create Feature via Enter Coordinate Tool

- e. Tap **Submit Edit** button on Edit Toolbar to save the geometry and attributes entered.
- f. To exit without saving a feature created from coordinates, tap the **Back** button, or tap the screen outside of the active window.

Find Nearby Existing Edit Features

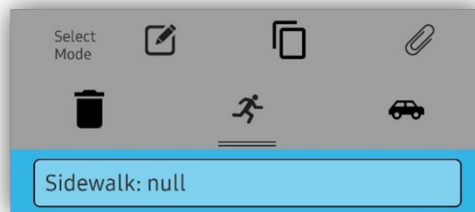
The **Find Nearby Features** tool will search for any existing features currently loaded in the map that are nearby the coordinates specified and within the current map zoom level. If the map is zoomed in, the search radius will be small; if the map is zoomed out, the search radius is larger.

- a. Specify coordinates in the Enter Coordinates menu.
- b. Tap the **Find Nearby Features** button.



Find Nearby Features via Enter Coordinate Tool

- c. If existing features are found, the **Select Mode toolbar** will pop up and you can **edit or view** the feature as usual with the [Select Mode toolbar](#).

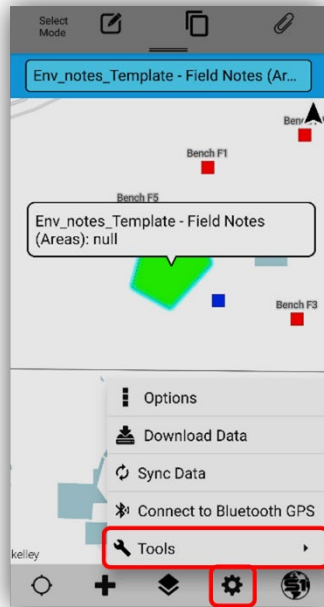


Select Mode Toolbar from Find Nearby Features Tool

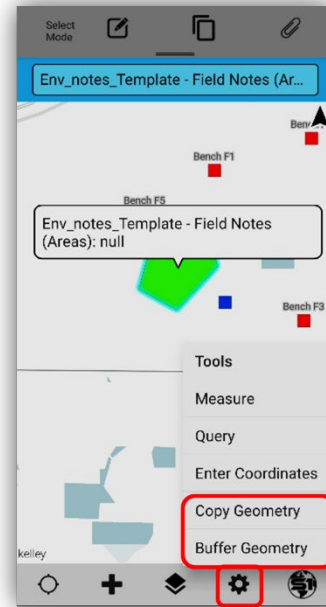
- d. To exit this option, tap the device's **back button** or within the **map window area** to close the select mode toolbar.

Tools available when feature is selected

There are two tools that show up only when a feature is selected; they are **Copy Geometry**, and the **Buffer Geometry** tools.



Tool/Options Button



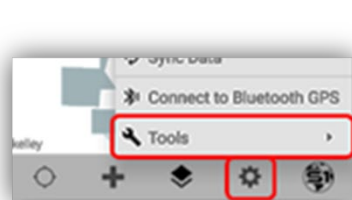
Copy and Buffer Geometry Tools

Copy Geometry

The **Copy Geometry Tool** uses the currently selected feature and copies the feature's geometry and attributes (if they have the same fields and field types) into a new feature. This tool works on points, lines, and polygons.

NOTE: *If copying geometry to a different feature type, like a line feature to a polygon feature it will use the line geometry and will autocomplete the polygon feature.*

- Once the desired feature is selected in the map, tap the **Tools/Option button** on the application toolbar.
- Select the **Tools option**. Then tap the **Copy Geometry tool**.

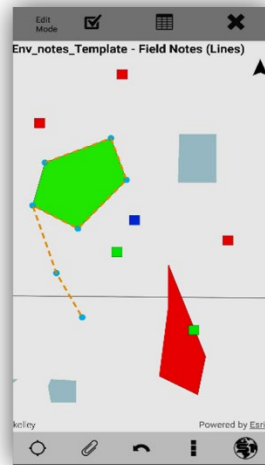


Copy Geometry Tool



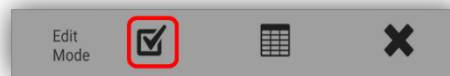
- Once copy geometry is selected, the user is presented with the **Create features menu** for the currently loaded map data layers. Tap the feature edit template you would like to copy the geometry to and proceed just as you would for [creating a new feature](#) normally. Fill out the attributes in the attributes table and make any geometry modification that may be needed.

- d. At this point the vertices of the new feature are all shown in blue dots with orange dash lines and can be selected and modified either by digitizing or by using your GPS location prior to saving the new feature. *The example below is a copy geometry of a polygon to a line feature.*



Copy Polygon Geometry to a Line Feature

- e. Once the attributes are filled out and the user is satisfied with the geometry; tap the Submit button to save the new feature.



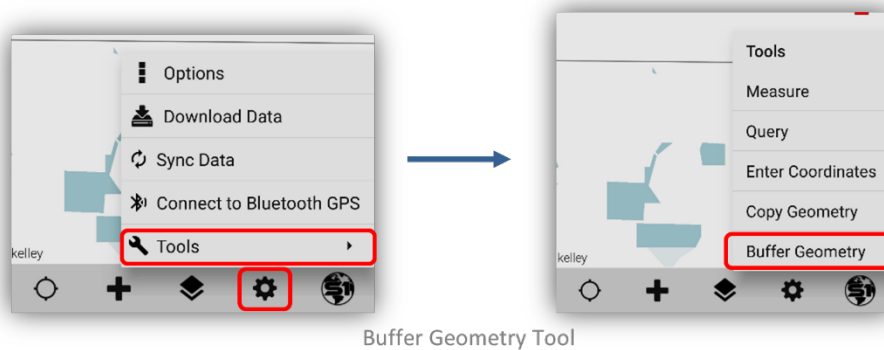
Edit Mode Submit Button

Buffer Geometry

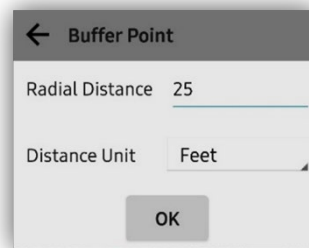
The Buffer Feature tool has two options for use. The first allows the user to select an existing feature, point, line or polygon and buffer that feature by a distance they choose. **This is the preferred method.** The second option only works based on the user's GPS location when selecting a polygon feature to create a point buffer. This option does not allow the user to average the point first though, so it is prone to not being quite as accurate as a selected existing feature that was captured using GPS averaging. In either option the user can define what this buffer distance is in feet, miles, meters, or kilometers.

Buffer Geometry Via Selected Feature

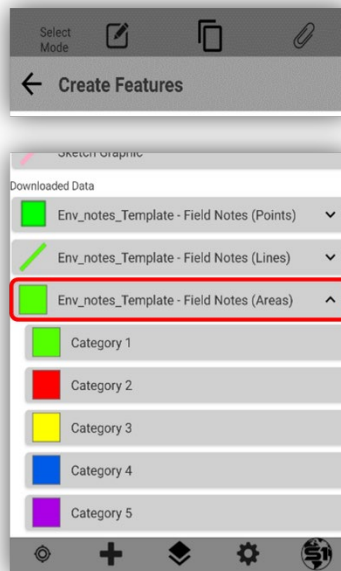
- Using the selected feature option for buffering a point, line, or poly, **first select the feature.** Once the desired feature is selected in the main map, tap the **Tools/Option** button on the Application toolbar.
- Select **Tools**, then select the **Buffer Geometry tool.**



- c. Once **Buffer Geometry** is selected, the user is presented with a pop-up to define the distance to buffer the feature by.

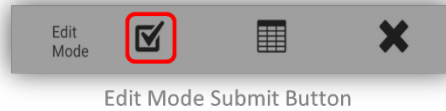


- d. Tap **OK** once the **Radial Distance and Units** have been entered and then **Create Features** menu for the currently loaded map data layers will pop up.



- e. Tap the **polygon feature template** you would like to create the new buffered polygon in (**can only choose polygon features to create new buffers**) and proceed just as you would for [creating a new feature](#) normally.

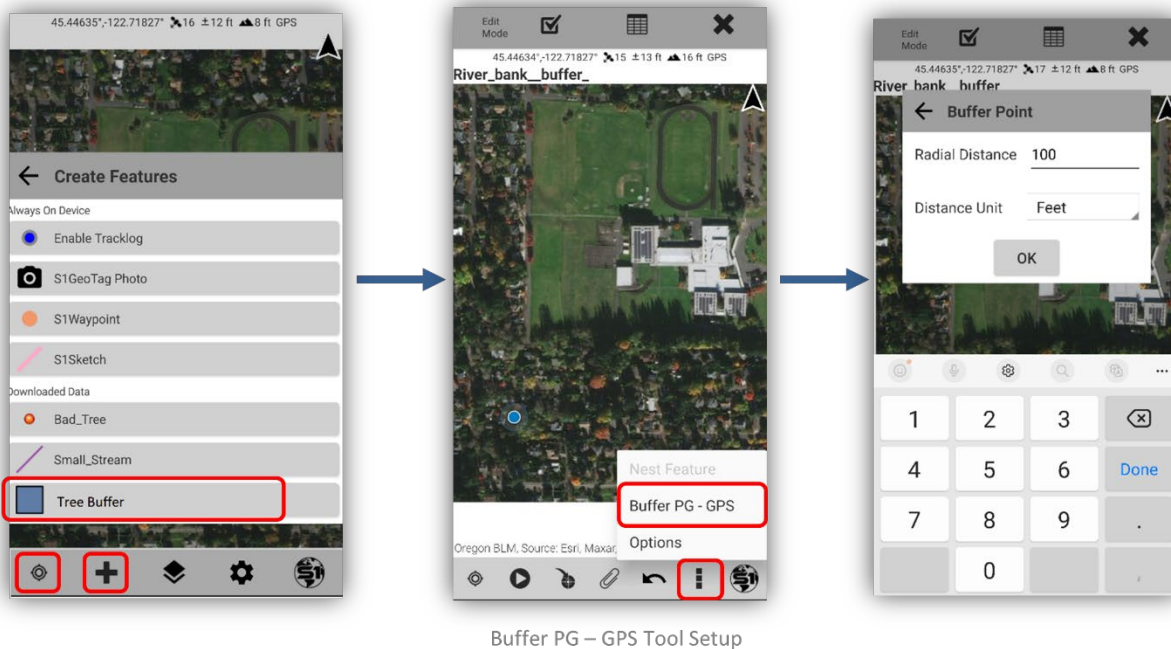
- f. Fill out the attributes in the attributes table, make any geometry modification that may be needed. At this point the vertices of the new feature are all shown in blue and can be selected and modified either by digitizing or using GPS location prior to saving the new feature.
- g. Once the attributes are filled out and the user is satisfied with the geometry, tap the Submit button to save the new buffer feature.



Buffer PG-GPS Tool

The Buffer PG-GPS Tool is based on your GPS location, not on an already created feature like the Buffer Geometry tool above. Buffer PG-GPS Tool builds a buffer circle around your GPS location.

NOTE: To use the option of buffering the current GPS location into a new buffered feature, the user must be creating a **polygon feature type** as the current feature template and have the GPS turned on for the **option** to show up in the more options menu.



- a. Select to create a **Polygon feature type** with the **GPS On**.
- b. Select the **Options** tool on the Application toolbar at the bottom.
- c. Select the **Buffer-PG – GPS** tool and then fill out the buffer parameters to build a point buffer at your GPS location.
- d. Fill out the **attribute table** for the new buffer polygon and then **save** the newly created feature.

External Bluetooth GPS Receiver Support

The S1 Mobile Mapper application can feed GPS measurements from supported external GPS receivers via Bluetooth to provide high accuracy location information to the application's map view and GPS metadata stored for collected features. This may be desirable if the estimated accuracy of the device's internal GPS does not meet data accuracy requirements or if the Android device does not possess its own internal GPS receiver.

Generally, to use external receivers with Android devices, the following steps must be performed:

1. Turn on Bluetooth on Android device and on external receiver.
2. Pair external receiver with device via native Android Bluetooth settings.
3. Activate external GPS within the S1 Mobile Mapper application.

Fully supported external GPS receivers include:

- Trimble R1 Bluetooth receiver
- Juniper Systems Geode Bluetooth receiver

Other models should also function with the application but steps to pair and use may be different than what is described below.

Enable Developer Options and Mock Locations (Not required in 5.2 & Higher)

Version 5.2 & higher of S1 Mobile Mapper no longer requires developer options or the mock locations setting to be on as S1 Mobile Mapper version 5.1 and older do. If you had previously set this up in version 5.1 it should be fine to leave it enabled. The external receiver should still function properly in 5.2 & higher even though these settings are no longer required.

Pairing Trimble R1 Receiver

The Trimble R1 Receiver is a GNSS receiver that can improve a paired device GPS accuracy to sub-meter (in open canopy). It is capable of tracking GPS and GLONASS satellites and receiving WAAS and RTK corrections.

Trimble R1 documentation: <http://www.trimble.com/globalTRL.asp?nav=Collection-109386>

- a. **Activate GPS** should be turned off in the S1 Mobile Mapper application.
- b. Turn on power to Trimble R1.

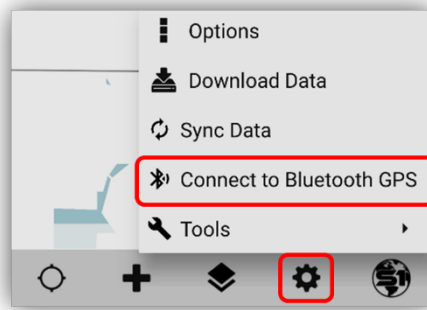
Preparing the Device the First Time

Beginning with firmware 5.08, the device is discoverable over Bluetooth whenever it is switched on. Firmware version 5.04 and earlier requires the user to press and hold the power button until a rapidly flashing blue light appears indicating device is visible to other devices for pairing for about 60 seconds.

To download the latest R1 firmware, visit the website here:

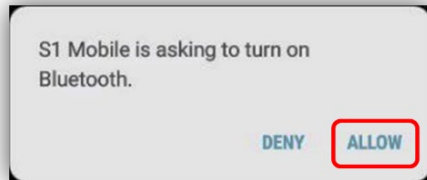
<https://www.trimble.com/globalTRL.asp?nav=Collection-109385>

- a. In the S1 Mobile Mapper app, tap the **Tools/Options** button on the Application toolbar.
- b. Tap **Connect to Bluetooth GPS**.



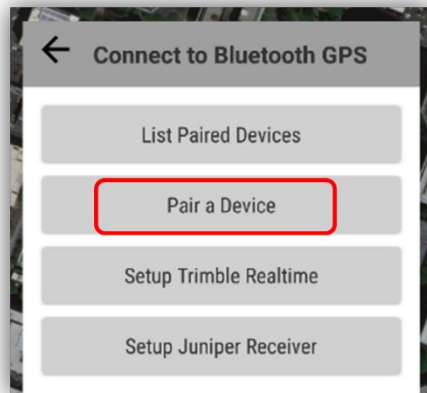
Connect to Bluetooth GPS Tool

- c. If Android Bluetooth is off, respond **Yes** to turn on Bluetooth.
- d. Tap the **Tools/Options** button and **Connect to Bluetooth GPS** to continue. Tap **Allow**.



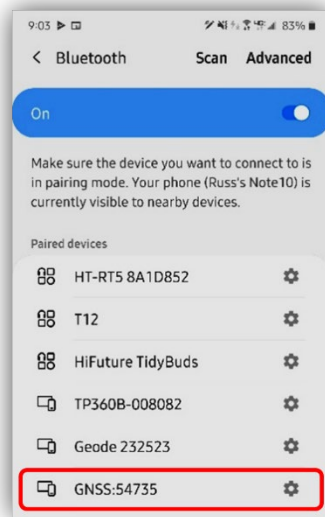
Turn On Bluetooth Window

- e. Tap **Pair a Device**.



Pair a Device with Bluetooth

- f. In the Android Bluetooth Settings menu, tap **Scan** if device is not listed under **Available Devices**. If the device is not visible after scanning, hold the power button down on the receiver for several seconds until blue light flashes rapidly, which indicates the device is discoverable for 60 seconds. You will then need to re-initiate the scan for the device.
- g. The default name of Trimble R1 receivers is **GNSS:<last5digitsofserial#>** (ex – **GNSS:54735**).



Default Trimble R1 Name

- h. If the device is listed under **Available Devices**, tap it to pair with the Android device.
- i. When pairing is successful, the device name will be listed under Paired Devices. Tap the device's back button to return to the S1 Mobile Mapper application.

Enable Real-time Correction (WAAS/RTK) Settings

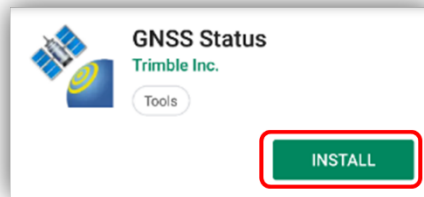
By default, the R1 is set to only use autonomous, uncorrected GPS positions to obtain a position fix. It may be desirable however to enable the device's ability to use Real Time Corrections in the position fix. These corrections could come from WAAS (free) or RTK (paid subscription) signals. The device is configured using a separate application, called **GNSS Status** and a companion app called **GNSS Direct**.

- a. In the S1 Mobile Mapper app, tap the **Setup Trimble Realtime**.



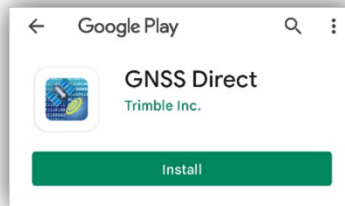
Setup Trimble Realtime Option

- b. Google Play Store Opens, if the app is not already installed, tap **Install** to install the app on the mobile device, otherwise tap **Open**.



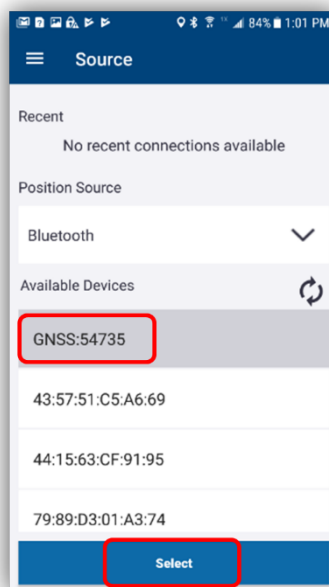
Install App from Google Play Store

- c. The **Trimble GNSS Direct** companion app must also be installed to connect to the R1. The user will be prompted to install this app when trying to connect to the R1 if it is not already installed.



Install App from Google Play Store

- d. Once both are installed, open the GNSS Status app and select **Location services**.
- e. Tap **Position Source** and select **Bluetooth**. Choose the **R1 from the list** (ex – GNSS:54735), then tap **Select**.



Bluetooth Position Source

- f. Once the app connects to the device, tap **Menu** in upper left corner, then choose **Corrections**.
- g. Select **SBAS**, this is WAAS in the United States. **Exit** the GNSS Status app.

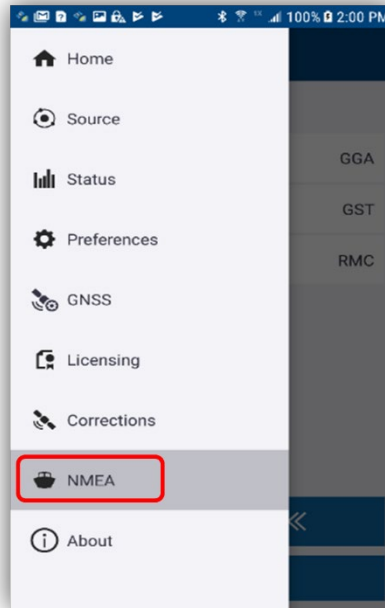
Enable NMEA Output Settings

By default, the R1 does not output the necessary NMEA strings required for other applications to receive estimated accuracy values from the receiver. These NMEA strings can be enabled via the GNSS Status

application. To enable NMEA output on the R1 receiver, the receiver must have firmware version 5.03 or higher and GNSS Status app must be version 2.0.7 or higher.

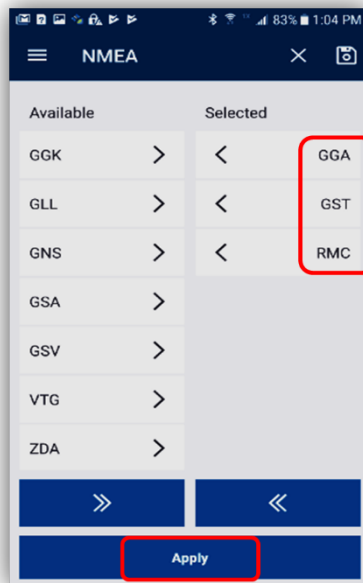
It is assumed this application is still open from the previous step and that the receiver is paired with the device, if not, launch the application and pair the device as shown in previous section.

- h. Tap **Menu** in upper left corner, then choose **NMEA**.



Enable NMEA Output Settings

- i. Under Available, tap **GGA, GST & RMC** to send them to the selected side of the screen, no other strings should be enabled. Tap **Apply**.



Enable NMEA Output Settings

- j. Under Select Port, tap **Bluetooth SPP1**. Tap **Save**.
- k. Close GNSS Status application.
- l. **Restart** the device to clear connection with GNSS Status app and allow S1 to be the mock locations application.

Pairing Juniper Geode Bluetooth Receiver

The Juniper Geode is a sub-meter (in open canopy) receiver, capable of tracking GPS and GLONASS satellites, and able to receive WAAS and RTK corrections.

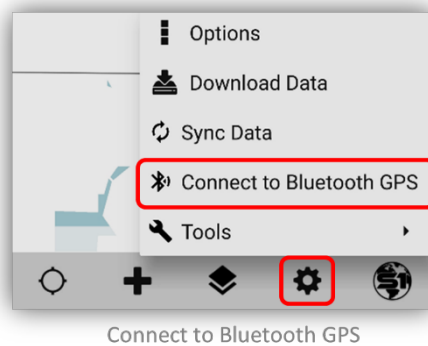
Juniper Systems Geode documentation: <http://www.junipersys.com/Juniper-Systems-Rugged-Handheld-Computers/products/Geode-Sub-Meter-GPS-Receiver>

- a. **Activate GPS** should be turned “**OFF**” in S1 Mobile Mapper.
- b. Turn on power to Juniper Systems Geode receiver.

Pairing Device for the First Time

After powering Geode on, device becomes visible to other devices for 60 seconds for pairing. (If you do not get it paired in time just turn the Geode off and back on again to enter pairing mode).

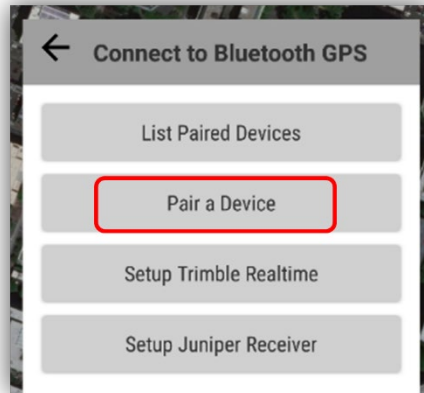
- c. In the S1 Mobile Mapper app, tap the **Tools/Options** button on the Application toolbar.
- d. Tap **Connect to Bluetooth GPS**.



- e. If Bluetooth is off on the mobile device, respond **Yes** to turn on Bluetooth, then return to **Tools/Options** button and tap **Connect to Bluetooth GPS** to continue.

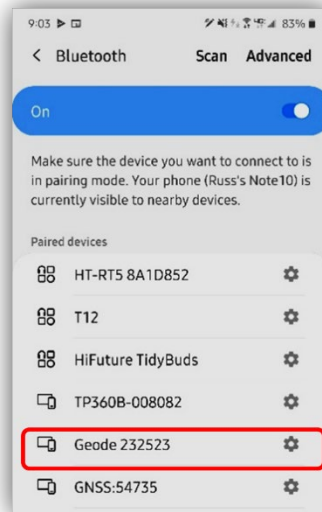


- f. Tap **Pair a Device**.



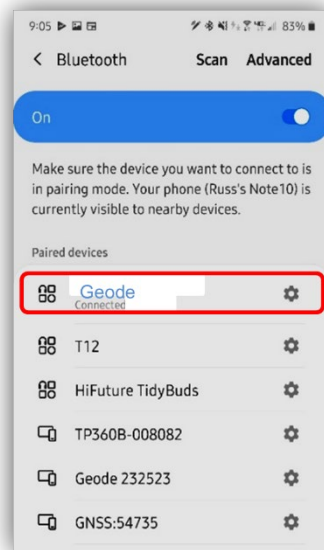
Pair a Device with Bluetooth

- g. In the Android Bluetooth Settings menu, tap **Scan**.
- h. If the device is not visible after scanning, hold the power button down on the receiver for several seconds until blue light flashes rapidly, which indicates the device is discoverable for 60 seconds. You will then need to re-initiate the scan for the device. The default name of Juniper Systems Geode receivers is **Geode :<digitsofserial#> (ex – Geode 187878)**.



Default Trimble R1 Name

- i. If the device is listed under **Available Devices**, tap it to pair with the mobile device.



Available Device List

- j. When pairing is successful, the device name will be listed under Paired Devices. Tap the device's back button to return to the S1 Mobile Mapper application.

Configure Geode NMEA Export via Geode Connect App

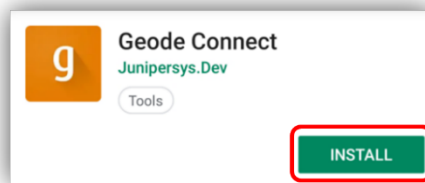
By default, the Geode is set to only use autonomous, uncorrected GPS positions to obtain a position fix. It may be desirable however to enable the device's ability to use real time corrections in the position fix. These corrections could come from WAAS (free) or RTK (paid subscription) signals. The device is configured using a separate application, called **Geode Connect**. This same app will be used to configure the necessary NMEA strings for export that are required for use with the S1 Mobile Mapper application.

- a. In the S1 Mobile Mapper app, tap **Setup Juniper Receiver**.



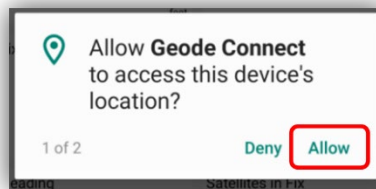
Setup Juniper Receiver with Bluetooth

- b. If the companion Geode Connect app is not already installed on the device, Google Play Store Opens. Tap **Install** to install Geode Connect on the device.



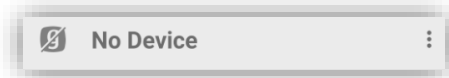
Install Geode Connect on the Google Play Store

- c. After the installation is complete, tap on the app icon to open the Geode Connect app. If presented, allow Geode Connect to access the device location and to connect to the device's photos, media, and files.

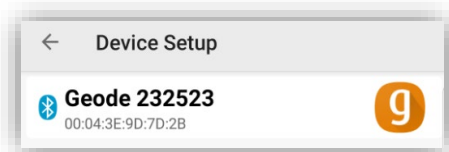


Geode Connection to the Device

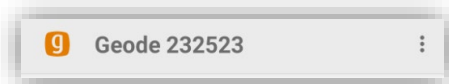
- d. The top of the screen should read **No Device** if the Geode is on and not previously paired. Tap the **No Device** text to access the Device Setup page.



- e. The Device Setup menu will display a list of devices currently available via Bluetooth. Tap **Geode** from the list of available receivers.



- f. Select **OK** to connect to the Bluetooth device. Geode should now display at the top of the screen.

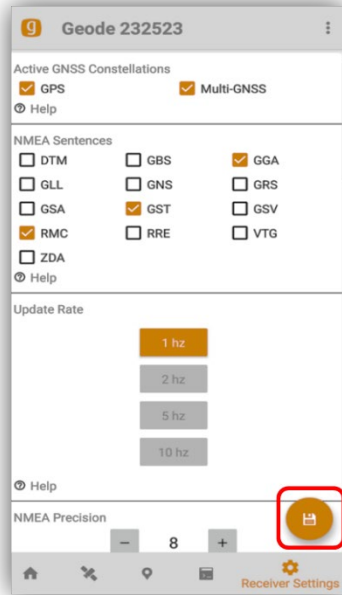


- g. In the lower right-hand corner of the screen, tap the **Gear** to access the Receiver Settings menu. Menu button to the left of the Geode Connect text and choose **Geode Configuration** from list.



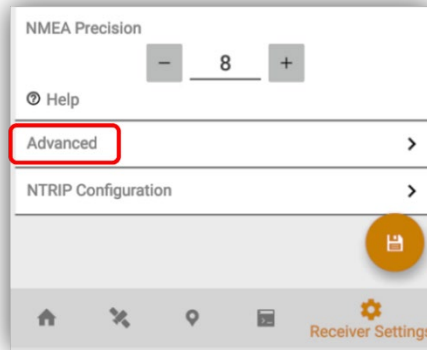
- h. In the Active GNSS Constellations section, check the boxes next to following: **GPS, Multi-GNSS**.

- i. In the NMEA Sentences section, check the boxes next to the following: **RMC, GST, GGA.**
- j. Tap the floating **Save** button in the lower right corner of app.



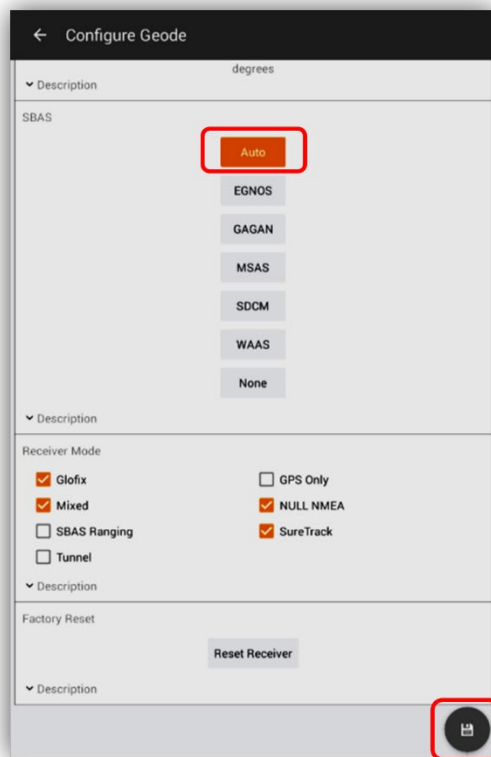
Geode Options

- k. Scroll to the bottom of the Receiver Settings menu and tap **Advanced** to expand the section.



Receiver Settings

- l. Ensure that under SBAS the **Auto** box is selected in orange.



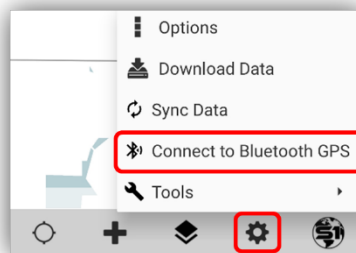
Configure Geode

- m. Tap the **Save** button in lower right corner of app if it is orange. If the save button is Grey, no changes were made so save is unnecessary.
- n. Tap the **Back** button to return to the Geode Connect main menu and then close the application. The Geode is now ready for use with S1 Mobile Mapper.

Connecting to Paired Bluetooth Receiver in S1 Mobile Mapper

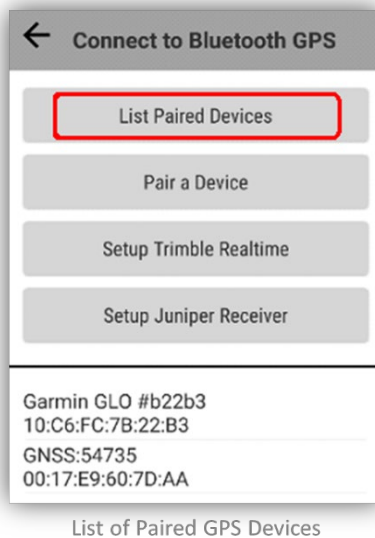
Assumed: Both Android & GPS receiver devices are powered on and have Bluetooth turned on, Mock Location has been enabled on the Android device (v5.1 or older) and both devices have been previously paired.

- a. Launch S1 Mobile Mapper, if not already open.
- b. Tap the **Tools/Options** button on the Application toolbar. Tap **Connect to Bluetooth GPS**.

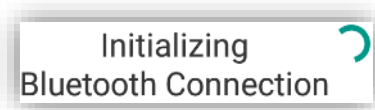


Connect to Bluetooth GPS Tool

- c. Tap **List Paired Devices**. Choose the device from the list of paired devices to connect.



- d. The GPS Status bar will display the message below while the connection to the Bluetooth receiver is being initialized. Depending on the model of GPS receiver, this process can take several seconds to several minutes. Be in an area with optimal sky visibility to minimize the wait time.



- e. Once initialization is complete, the **Bluetooth GPS** will connect automatically. The **Activate GPS** icon is replaced in the application toolbar by the **Bluetooth GPS** icon.



NOTE: You should ensure you have good sky visibility when connecting to a Bluetooth receiver, and once it is connected and using the GNSS status information from the external receiver, the GPS status bar should show “DGPS” as the location source, and the estimated accuracy should be better than what is usually seen without the external receiver. See GPS status bar below:



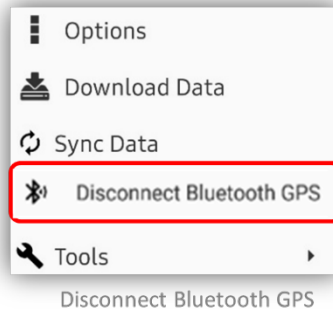
Disconnect Bluetooth Receiver/Return to Internal GPS

- a. Tap **Bluetooth GPS** to disconnect the Bluetooth GPS receiver.





- b. The Bluetooth GPS icon will become inactive.
- c. Next, tap **Tools/Options** on the Application toolbar, then tap **Disconnect Bluetooth GPS**.



- d. If Activate GPS button is pushed once disconnected from Bluetooth GPS, the application will use internal GPS instead of Bluetooth GPS.

Laser Rangefinder Integration Capability

This functionality supports connecting the TruPulse 360 laser rangefinder to your mobile device to use within the S1 Mobile Mapper App. It will allow the user to capture both geometry & auto populate field attributes within a supported data set. Please do use the in-app feedback option or contact the S1 Mobile Mapper team directly to report issues or provide feedback related to this function.



Assumptions:

- Mobile device has at least version 5.0 of the S1 Mobile Mapper Application installed.
- User has access to a TruPulse 360 laser rangefinder.
- User has a basic understanding of how the rangefinder works.
- User has a z-enabled feature service published to use in the S1 Mobile Mapper if capturing z values with the rangefinder. See how to [create a Z-enabled feature](#) service below.
- AA Batteries with sufficient charge in laser rangefinder.

Rangefinder Known limitations:

- Cannot collect geometry and attributes simultaneously.
- Rangefinder must be connected via device's native Bluetooth settings prior to enabling settings in the S1 Mobile Mapper app.

Supported Auto-Populate fields

The following field types are supported by the laser rangefinder functionality: **Slope_Distance, Horizontal_Distance, Vertical_Distance, Azimuth, Inclination, Slope_Percent & Height**. If your Z-enabled feature service has any of these fields present and the **attribute capture enabled** in Manage Laser Settings, then they will auto populate with the info from the laser shot. You can also use the Manage Auto-Populated fields in the S1 Options to populate these values to a specific field in the user's specific feature service. **All laser supported field types are [DOUBLE]**. See [Managing S1 Auto-Populate fields](#) section for more info.

Enable Bluetooth on the Rangefinder

The first thing needed, is to ensure the laser rangefinder has the Bluetooth option enabled. Follow the instruction in the [TruPulse 360B Manual](#) to power on the rangefinder and enable Bluetooth located on pg. 20. You may also want to bookmark the TruPulse manual to reference for other settings and calibrations of the rangefinder.

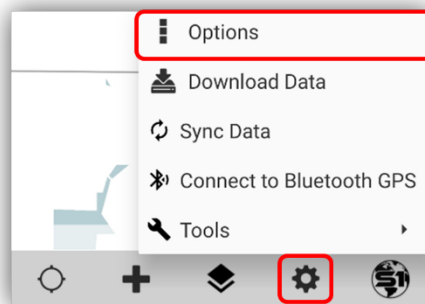
Connect Rangefinder to mobile device:

Next you will need to use the native Bluetooth settings on the mobile device to connect the rangefinder to your mobile device. This process will depend on your device, but it essentially works the same way for most devices.

- Swipe down from the top of the device to access the quick access menu/notifications.
- Tap Bluetooth settings on the quick access menu.
- Ensure Bluetooth is enabled on the mobile device.
- Pair Rangefinder in Bluetooth settings.

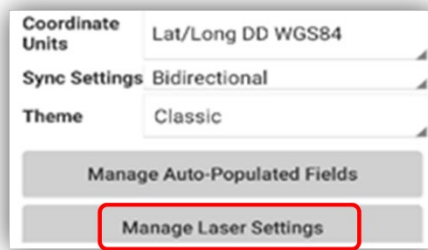
Enable Bluetooth Rangefinder in S1 Mobile Mapper

- a. Tap the **Tools/Options** button on the Application toolbar. Select **Options**.



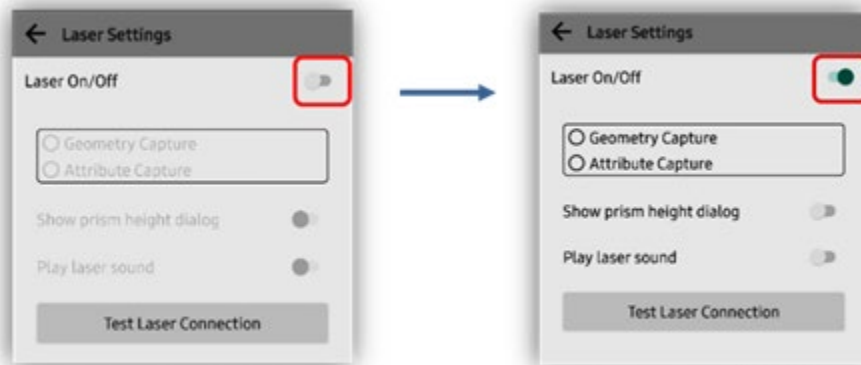
S1 Options on the Application Toolbar

- b. S1 Options window opens, select the **Manage Laser Settings** button at the bottom of the window.



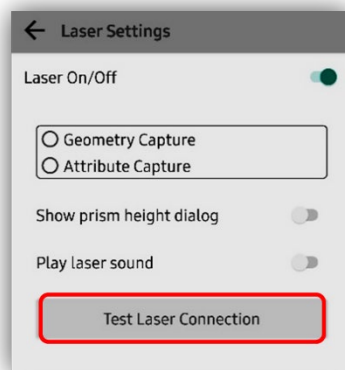
Manage Laser Settings in S1 Options

- a. The Laser Setting options opens in its default state, Laser Off. **Tap** the slider to enable **Laser On**.



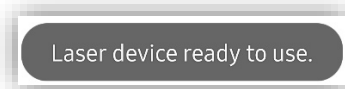
Laser Settings from the S1 Options

- b. Once the Bluetooth connection is made in the Android settings and the S1 Options are set to enable the laser, you can tap the **Test Laser Connection** button to verify the laser is ready to capture information in the S1 Mobile Mapper.



Test Laser Connection

- c. For conformation, you should get an S1 Mobile Mapper pop-up showing that the laser is ready to use.



Deciding which type of laser data capture to choose

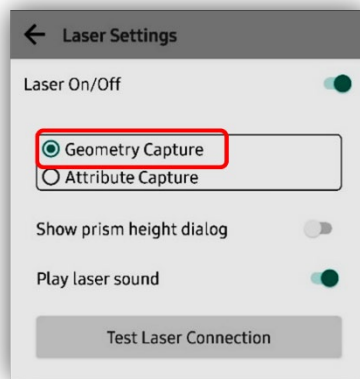
Now depending on what you want to capture with the laser, there are 2 options once connected to the mobile device via Bluetooth, and you have enabled the laser **On** in **Manage Laser Settings**. You must decide between **Geometry capture** and **Attribute capture**. You cannot currently do both at the same time.

NOTE: It is highly recommended that **Play laser sound** is also enabled in all laser modes.

Geometry Capture

Enabling **Geometry Capture** allows the user to capture feature geometry (point, line, or polygon). This setting allows the user to stand in one known reference location and create new geometry based on the distance and direction captured by the laser from the known location. For example, the user could stand in a clearing and capture the clearing polygon by shooting multiple laser shots from the reference point (current location) to multiple spots along the edges. This option also includes using the standard **Offset Feature Tool** workflow for points that are available in the S1 Mobile Mapper. The offset distance and direction will be auto populated to offset the point feature instead of requiring the user to input those values manually.

- a. To select **Geometry Capture**, tap S1 Options > Manage Laser Settings > enable Geometry capture.



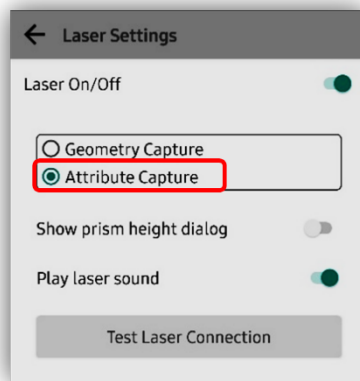
Laser Settings – Geometry Capture

Attribute Capture

Enabling **Attribute Capture** allows the user to capture any of the newly supported [Auto-Populate fields](#) described above by using the laser shot information instead of having to manually enter any information from the laser.

NOTE: Feature service must be Z-Enabled to allow attribute capture with this Beta functionality.

- a. To select **Attribute Capture**, tap the S1 Options > Manage Laser Settings > enable Attribute Capture.



Laser Settings – Attribute Capture

Using the Laser Functionality

The Laser functionality will work using Z-enabled or non-Z-enabled feature services. However, if you want to capture height values, this will need to be enabled on the Geodatabase feature class prior to publishing the feature service. If the feature service is not Z-enabled, the S1 Mobile Mapper will not allow height values to be captured using the laser rangefinder functionality.

Create a Z-enabled Feature Service using ArcPro/ArcMap

Here are links with instructions from ESRI on publishing Z-enabled services:

In ArcPro:

<https://pro.arcgis.com/en/pro-app/latest/help/data/feature-classes/create-a-feature-class.htm>

In ArcMap:

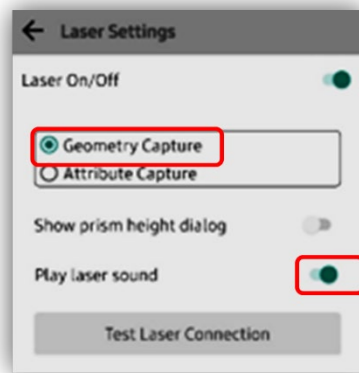
<https://desktop.arcgis.com/en/arcmap/latest/manage-data/databases/create-a-feature-class-in-a-database-in-arcgis.htm>

Offset a Feature using the laser

Essentially offsetting a feature works the same as the standard S1 Mobile Mapper [Offset feature workflow](#), except, instead of manually inputting the distance, when **Manage Laser Settings** is enabled as described above, the S1 Mobile Mapper uses the laser shot value to populate the distance and direction of the offset.

Create New Feature Geometry using Geometry Capture

The user can create feature geometry using the laser functions. Ensure the laser settings are enabled and set to **Geometry Capture**. It is also recommended to enable the **Play laser sound slider**, which alerts the user when the laser has been fired.

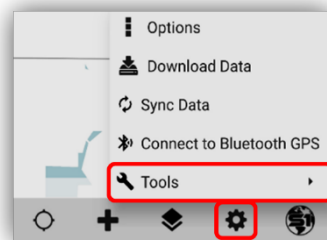


Geometry Capture & Laser Sound On

Occupy Reference Point

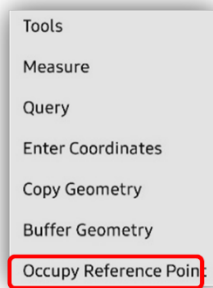
To create new geometry, the user must **Occupy Reference Point** to allow the laser to create geometry based on distance and direction from the reference point (user’s current location). With the current functionality, the user cannot create this reference point and use it as part of the feature they are trying to create. For example, the user cannot use the GPS to average a point in the desired feature service and then select that point to use as a reference point without saving it and reselecting it. So, to get a point to use as a reference point, to “Occupy” the recommended workflow, is to capture an S1 Waypoint using position averaging and save that S1 Waypoint. Then select that S1 Waypoint to set it as the **Occupy Reference Point**.

- a. To set the reference point, **tap** an existing feature in the map in S1 Mobile Mapper (this can be an existing point feature in a feature service, or most likely a newly created S1 Waypoint captured via GPS averaging at your current location to use as the reference point).
- b. Once you have tapped the existing feature, tap the **Tools/Options** button on the Application toolbar. Tap the **Tools** option on the list.



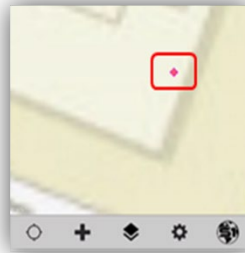
Select Tools from the Tools/Option List

- c. Then tap the **Occupy Reference Point** option which will use the currently selected feature as the reference point for the laser to use.



Occupy Reference Point from the Tools List

- d. The selected feature should now show the **new pink diamond symbology** shown below.



Occupy Reference Point - Pink Diamond Symbology

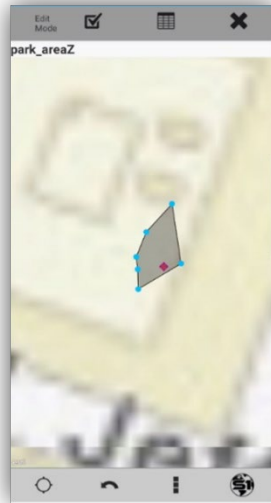
To start collecting Geometry features using the laser:

- e. Tap the **Create Features** button.



Create Feature Button

- f. Choose the layer to collect a new feature. This could be a point, line or polygon based on what feature service is loaded in the map view.
- g. Since the laser is in **Geometry capture mode**, it is now ready to create features by shooting the laser. Ensure the laser device mode is set to “SD”, refer to [TruPulse 360B Manual](#) if needed.
- h. Aim the laser at an object and fire the laser to begin creating the feature. You should hear the laser sound indicating the laser was fired and is connected to S1 Mobile Mapper. If a point feature is being created, the new feature should show up in the map view based on the distance and direction from the occupied reference point you selected above.
- i. **If the feature is a line or polygon**, then continue to fire the laser at objects to continue creating the feature. With line features you will need 2 vertices to begin drawing the line, for polygons at least 3 vertices will need to be shot before the polygon will begin to show on the map.



Collecting Polygon Vertices with a Laser

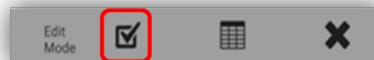
- j. Continue firing the laser to continue creating the feature, you should hear the laser sound each time you fire, and you should see new vertices created on the map.
- k. Fill out the appropriate attribute info using the attribute table view in the S1 Mobile Mapper.

NOTE: This workflow is currently only capturing the feature geometry not the Laser auto populate field values.



Attribute Table View Button

- l. Once you have finished capturing the feature geometry and filled out the (non-laser auto populate) attributes, tap the submit edit button to save the feature.

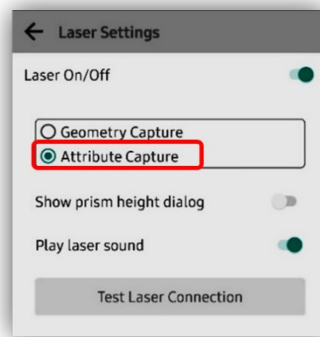


Submit Edits Button

- m. The feature geometry should now be saved and show up on the map.

Update Laser Auto-Populate Fields using Attribute Capture

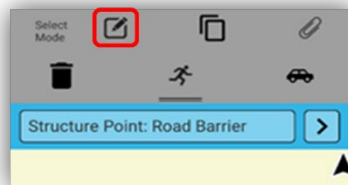
Once the new geometry for the new feature is created and you want to capture attributes from the laser, you will need to go back into the **S1 Options**, Laser settings and switch the laser capture mode to **Attribute Capture**. See [Enable Attribute Capture](#) section above if needed to enable.



Laser Settings – Attribute Capture

NOTE: The current laser workflow only supports one laser shot per feature (except for height). Whatever values are returned from that laser shot will be attributed to the appropriate auto-populate fields present and enabled in the feature service.

- a. **Tap** the feature you want to **capture attributes** for in the map to select it.
- b. Once the desired feature is selected, **tap** the **Edit Feature button** on the selection toolbar.



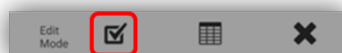
Edit Feature Button

- c. Edit mode will be enabled, Fire the laser to capture any laser auto-populate fields enabled in the S1 Mobile Mapper **Manage Auto-Populate Fields settings**. See [Auto-Populate Fields section](#) above in this guide for more information on how to manage or add Auto-Populate fields.
- d. You can verify the fields are Auto-Populating by tapping the Attribute Table View button, on the Edit toolbar, to see that the fields are populating once the laser is fired.



Attribute Table View Button

- e. Once you have finished capturing the feature attributes, tap the Submit edit button to save the feature. The feature attributes should now be saved to the feature.



Submit Edits Button



For more information on the S1 Mobile Mapper application, visit:

<https://www.blm.gov/services/mobile-gis/s1mobile>

To submit application bugs or app enhancement requests, use the online form at the location below:

<https://forms.office.com/q/zmPkst3rjZ>

S1 Mobile Mapper Application

U.S. Department of the Interior, Bureau of Land Management, Oregon/Washington State
Office, Information Resource Management