ArcGIS IPS Setup

The IPS Setup app gives users the ability to perform survey recordings inside facilities to collect location data. Record surveys in every area of your facilities where you want to enable IPS. Recordings can be uploaded from IPS Setup to an ArcGIS Online or Enterprise organization and converted to an indoor positioning file using the [Generate Indoor Positioning File](#) tool in ArcGIS Pro. Once you create an indoor positioning file, you can test it in Test mode of the IPS Setup app.

IPS Setup uses BLE beacon-based fingerprinting and received signal strength indication (RSSI) readings from multiple beacons that are measured asynchronously. To ensure accuracy, RSSI is supported by the motion sensor devices already built into smartphones, including an accelerometer, gyroscope, and magnetometer. During the survey, radio frequency measurements are collected at known locations. This dataset is used to generate a radiomap (.db) inside ArcGIS Pro, which is then loaded onto your device. Once created, your current signal strength observed at a certain location is compared with the fingerprints stored inside the radiomap. Your real-time position is determined and displayed on the phone as the blue dot.

System requirements for ArcGIS Steup

Mobile requirements

Mobile devices with a minimum of 2 GB RAM are recommended for running ArcGIS IPS Setup. Most current mobile device brands and models meet this requirement.

> ### Note:
>
> *ArcGIS IPS Setup uses data from various sensors on the mobile device, including GPS, Wi-Fi, and Bluetooth to determine indoor position. These sensors differ from device to device, so you may experience different precision of indoor position information based on the device you are using.*

Supoorted Devices:

- Most current Android devices are supported, including models from Google and Samsung.
- iPhone 7 and later
- iPad – iPad Mini 4th gen, iPad Air 3rd generation, iPad Pro 2nd generation, and later

Supported OS versions:

- Android 8 and later
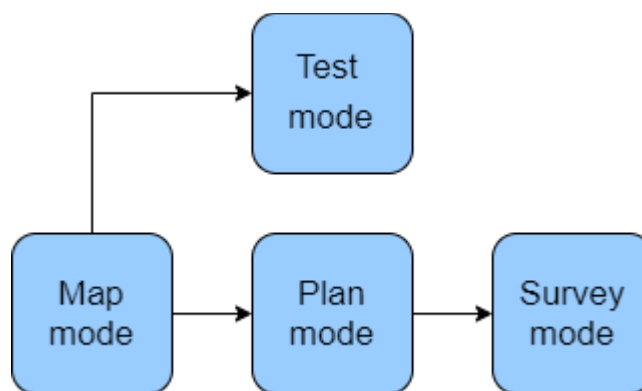- Apple iOS13 and later are supported.

Supported languages

ArcGIS IPS Setup for iOS supports most languages that ArcGIS Enterprise and ArcGIS Online support, except the following languages that are not available oniOS: Bosnian, Estonian, Lithuanian, Latvian, Slovenian, and Serbian.

The language used by the app is determined by the language and region chosen in the device settings.

Components of IPS Setup

ArcGIS IPS Setup is composed of five modes:

- Map list — View map details, set favorites, open maps, and access the recordings menu from the map list.

- Map mode — Visualize floor plans, switch between floors in a facility, and access Plan and Test modes from Map mode.

- Plan mode — Sketch paths and add survey points to build a survey route before recording.

- Survey mode — Collect radio reference data at an indoor site to build a record of trajectories, ground truth points, and locations, along with their corresponding geocoordinates.

- Test mode — Test a positioning file in Test mode after generating the file with the Generate Indoor Positioning File tool in ArcGIS Pro.

After logging into your ArcGIS IPS licensed Enterprise portal or ArcGIS Online organization, you can review and choose one of the web maps with an appropriate "IPS" tag.

View Maps

Map list features

The map list is displayed when you open ArcGIS IPS Setup. From the map list, you can open maps shared with your ArcGIS organization and access the **Recordings** menu. The map list includes thumbnail images of the active map, maps marked as favorites, and other web maps shared with your organization
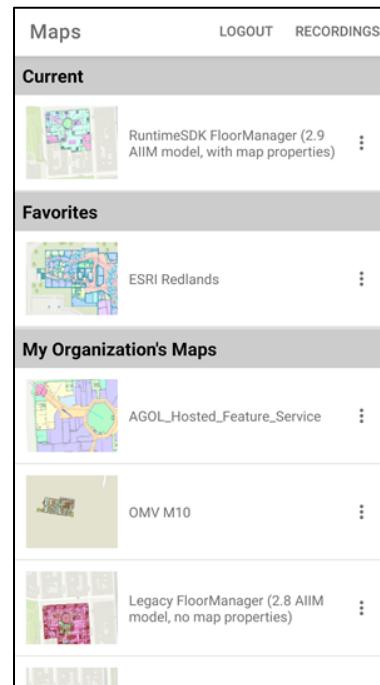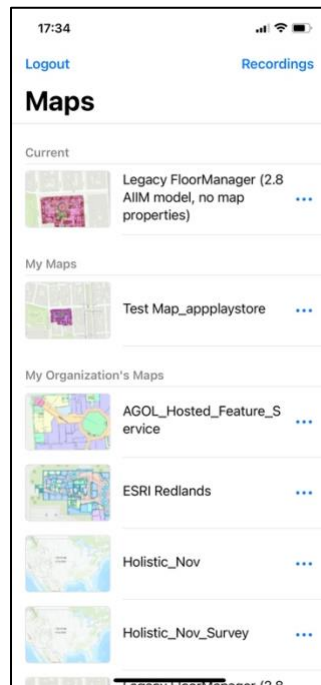
> ***Note:***
>
> *ArcGIS IPS Setup list of displayed maps shows all maps containing an "IPS" or "ips" tag shared with the organization.*

From the map list, you can do the following:

- To review the details for a map, tap the options button ••• and choose **View Details** ⓘ to view the name of the map owner and time and date the map was last modified.

- To add a map to your favorites, tap the options button ⋯ and tap **Add to Favorites** ☆ ☆ . To remove a map from your favorites, tap the options button ⋮ ⋯ and tap **Remove from Favorites** ☆ .

- To access the **[Recordings]** menu, tap **Recordings** on the options bar above the map list.

Recordings

The **Recordings** menu provides an overview of survey recordings on the device, including successfully uploaded recordings and pending uploads. Once you close IPS Setup, recordings that have been successfully uploaded are cleared from the menu. To review the recordings, tap **Recordings** on the options bar above the map list. Recordings are displayed with the following icons, depending on status:

Icon	Description
✓	The recording was successfully uploaded.
☐	The upload is pending and will be uploaded automatically when a stable connection is available.
⚠	The upload failed. IPS Setup automatically tries to upload these recordings when a stable connection is available.
🔒	Multiple users are using the device and there are pending uploads from another user.

Map Mode

When you choose a map, it opens in Map mode, where you can view floor plans, switch between floors in a facility, check sensor status, access Plan and Test modes, and return to the map list.

In Map mode, you can do the following:

- To open the **Sensor Check** menu, tap the sensor check bar above the map.

- To choose a floor, tap the floor picker and tap the floor. You must choose a floor in Map mode before opening Plan mode.
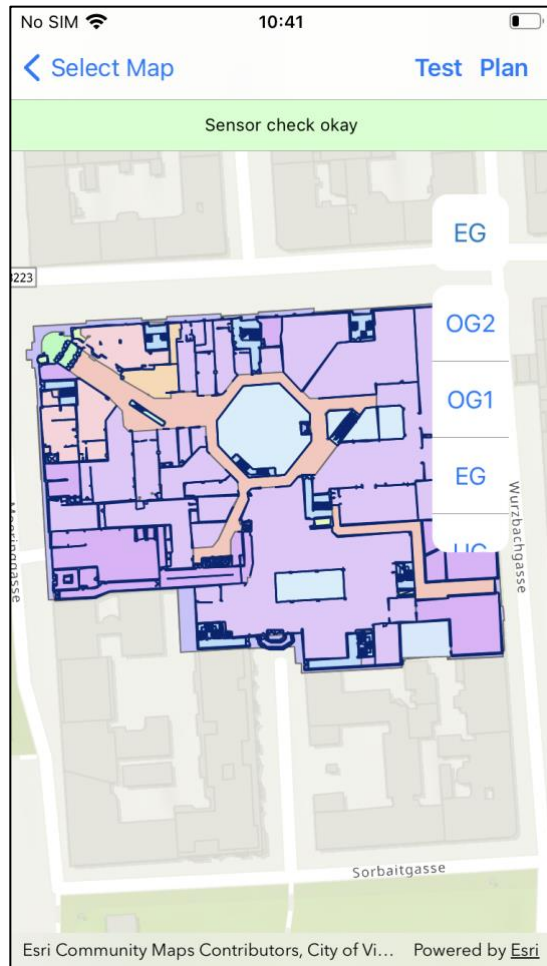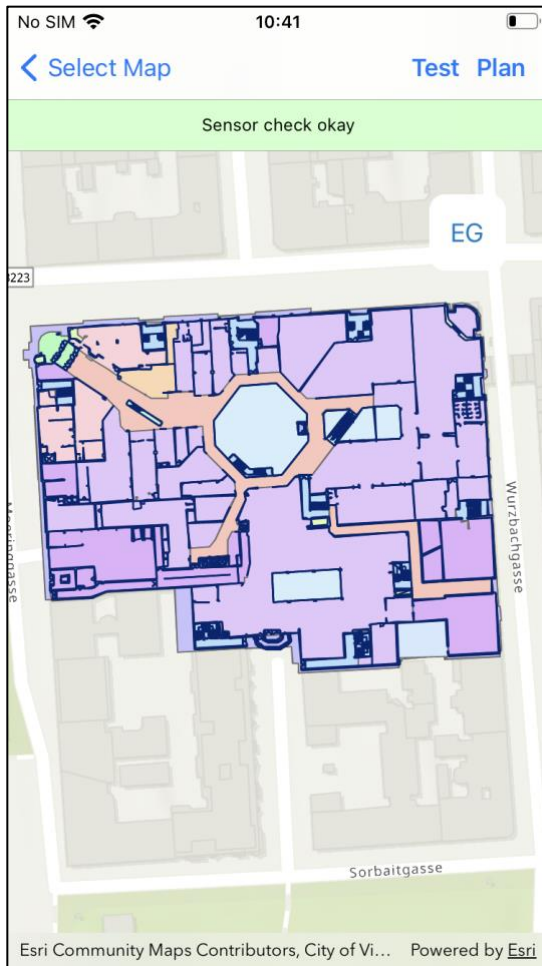
> ***Note:***
>
> *If your web map contains multiple sites or facilities, zoom to a facility to enable the floor picker for it.*

- To sketch a path and add survey points in Plan mode, tap **Plan** on the options bar above the map.

- To test the accuracy of an indoor positioning system in Test mode, tap **Test**. If no positioning file is found in the selected map, Test mode is not available.

Sensor Check

The Sensor Check menu displays the real time status of each **sensor** the IPS Setup app uses
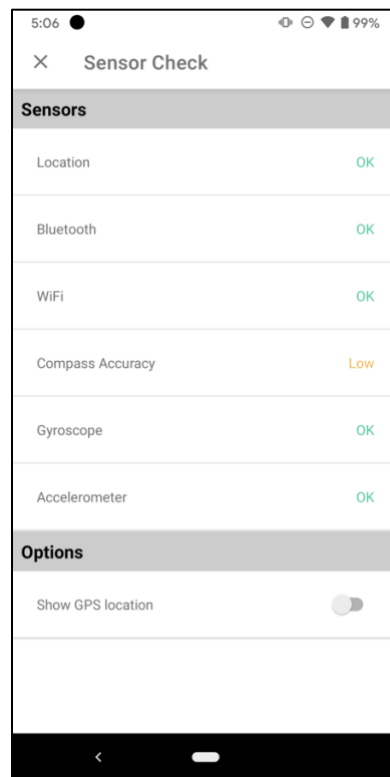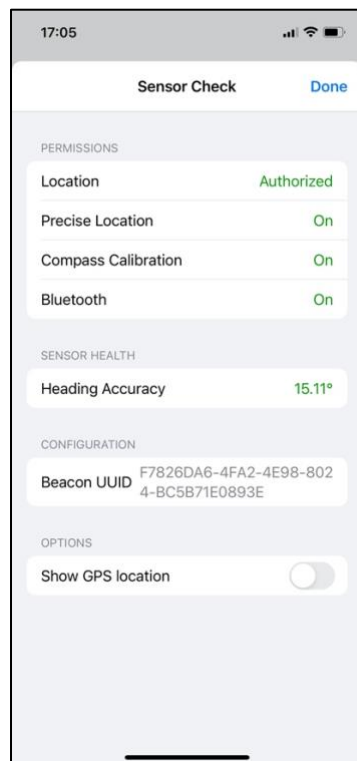
Permissions

You must grant permissions for the sensors used by the IPS Setup app:

- Location
- Bluetooth
- Compass (magnetometer)

The app also uses sensors that you do not need to enable permissions for:

- Gyroscope
- Accelerometer

Ensure the Sensor Check banner is green before proceeding. If the banner is red, one or more sensors fail and require either permission or calibration. Follow the steps from the *Permissions* pop-up window to enable access to the necessary sensors.
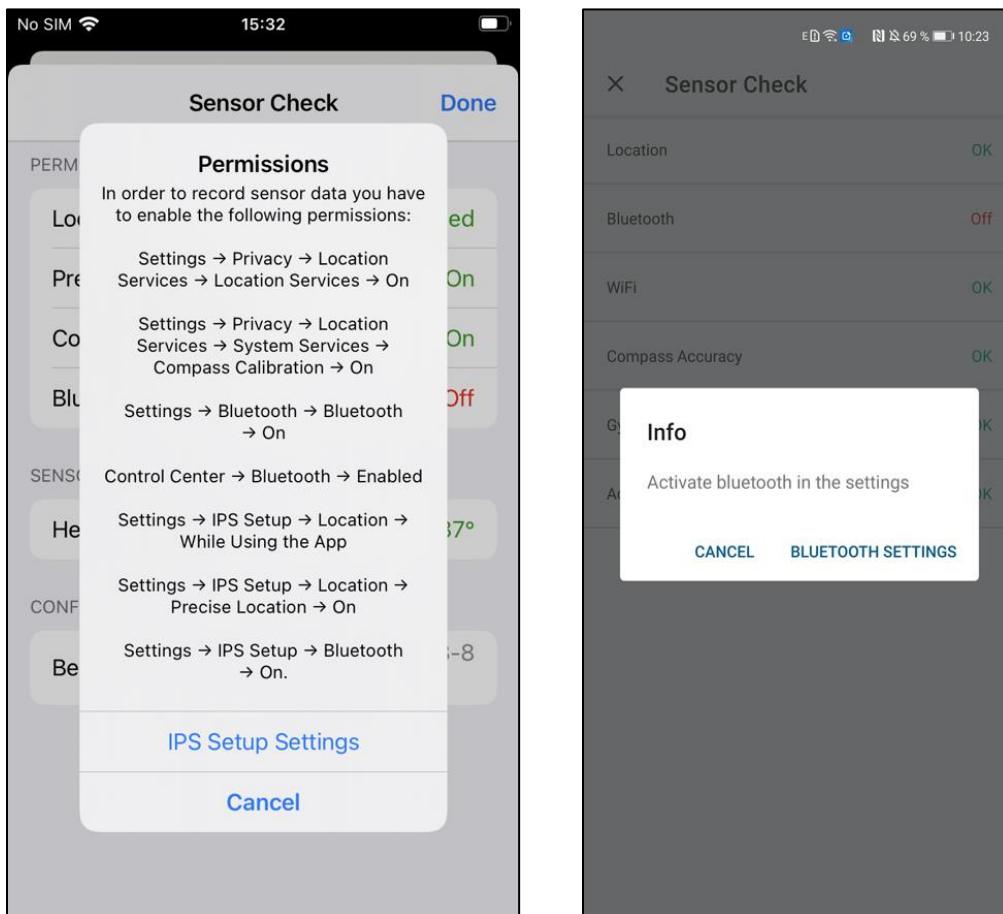
Access to the Survey mode is restricted if Sensor Check bar is displayed in red color, which indicates that one or more sensors required for the survey failed or are not calibrated.

Note:
When a surveyor is not familiar with a facility, turn on Show GPS location to enable the GPS location in Map mode (as well as Plan mode, but only until the first survey point is entered). GPS location can help determine position before planning and surveying.

Verify heading accuracy

Use the compass in your survey device to determine its heading. Heading accuracy is the deviation between the reported heading and the true geomagnetic heading, measured in degrees. A positive value between 0 and 35 indicates that the heading is accurate; a negative value indicates an inaccurate heading.

If the Heading Accuracy value contains a negative value or is above 35, tap Heading Accuracy and follow the prompts to calibrate the compass.
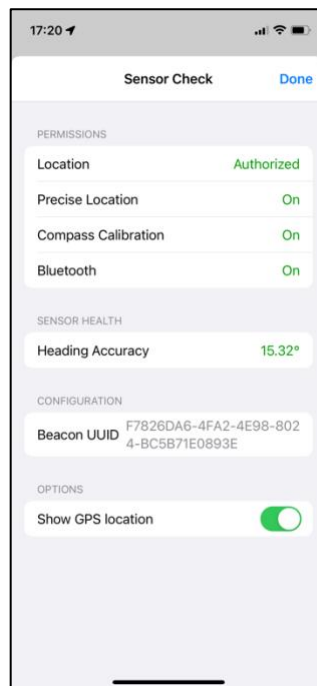
Note:

If you are unable to obtain a calibration value between 0 and 35, there may be interference from local magnetic fields. Move to a different location away from potential sources of interference, or calibrate the device outdoors where there is a GPS signal strong enough for successful calibration.

Configure beacon UUID (iOS only) - Enter the Beacon UUID to which your network is configured or leave it blank to accept the default UUID value and press *Finish Planning*. If the beacon network contains multiple UUIDs, you must survey separately for each unique UUID available.

Android:

1. Open the Sensor Check menu to view the Compass Accuracy.
2. If compass accuracy is unreliable, calibrate the compass by moving the phone in a figure eight shape
3. Swipe down on the screen to refresh the sensor check to see if the compass is calibrated.
    - o Note: Due to hardware variations among Android devices available on the market, magnetic field (compass) often does not satisfy the optimal performance requirements. Compass Accuracy may register as one of four states:
        - ▪ Unreliable - If compass accuracy is poor the app prompts you to calibrate your device.
        - ▪ Low -If compass accuracy is low, the status is displayed as "Low" in yellow.
        - ▪ Medium - If compass accuracy is moderate, the status is displayed as "Medium" in orange.
        - ▪ High - If compass accuracy is high, the status is displayed as "OK" in green.
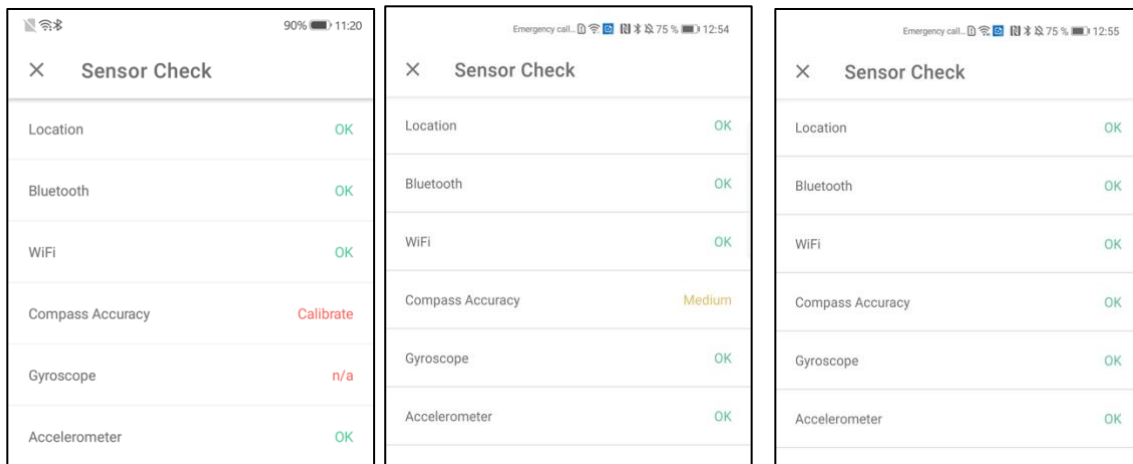
If Compass Accuracy is between high, medium, or low it will not affect IPS performance. If Compass Accuracy is unreliable, you must calibrate your device.

Note:

If your survey device is not equipped with a compass or gyroscope, it may not meet sensor calibration requirements. If this is the case, switch to a device that is equipped with these sensors to successfully collect the necessary data.

To collect radio reference data for an indoor positioning system, use ArcGIS IPS Setup to plan, record, and upload survey data that can be used to enable indoor positioning in your facilities. Surveys consist of short, continuous recordings that gather signals from Bluetooth beacons installed inside facilities and can be uploaded to your ArcGIS organization and used to create an indoor positioning file. You can use the indoor positioning file, which comprises all of the recordings for a facility or site, to enable IPS for those facilities.

To enable IPS for a facility, you must create survey paths that pass through every room and corridor where IPS will be enabled. Survey each area twice, moving in opposite directions, to ensure that enough data is collected to create a robust indoor positioning system.

Plan a Survey

Plan mode enables you to sketch survey points and prepare a survey path on a selected floor in your facility.

Before opening Plan mode, ensure that the device sensors are enabled and use the floor picker to choose the floor you want to work on from Map mode. Once the app switches to Plan mode, the floor picker is locked. Interact with the map to plot survey points and sketch a path inside facilities equipped with Bluetooth beacons.

> **Tip:**
>
> *Keep the following in mind when planning a survey path:*
>
> - *Sketch the survey path at the location where you want to record. Survey plans cannot be saved in IPS Setup.*
>
> - *Sketch the survey path across areas that can be moved through without significant obstacles. For example, avoid creating survey paths through walls or columns.*
>
> - *Place a point on each location along the survey path where the direction changes, for example, when you turn a corner or need to move around a table or bench.*
>
> - *A survey plan must contain at least two points—one to represent the start and one to represent the end of a survey path.*

Plan multiple survey recordings throughout an area so that the whole site is covered, and data can be gathered for every area inside a facility where IPS will be enabled. To create a survey path that effectively covers a floor plan, place survey points at least every 30 to 60 feet and at each change in direction. When surveying for long stretches, placing survey points near visible landmarks can aid in locating them when recording the survey. Survey each area in both directions to ensure that sufficient reference data is created. For example, if you survey a corridor that runs north to south, survey it going north, and reverse your path to survey it going south.

Sensor check okay

Survey Point 8   •••

Add Survey Point

Sensor check okay

Reverse path	↻
Remove last survey point	⊗
Discard all survey points	🗑
Undo	↺

Survey Point 8   •••
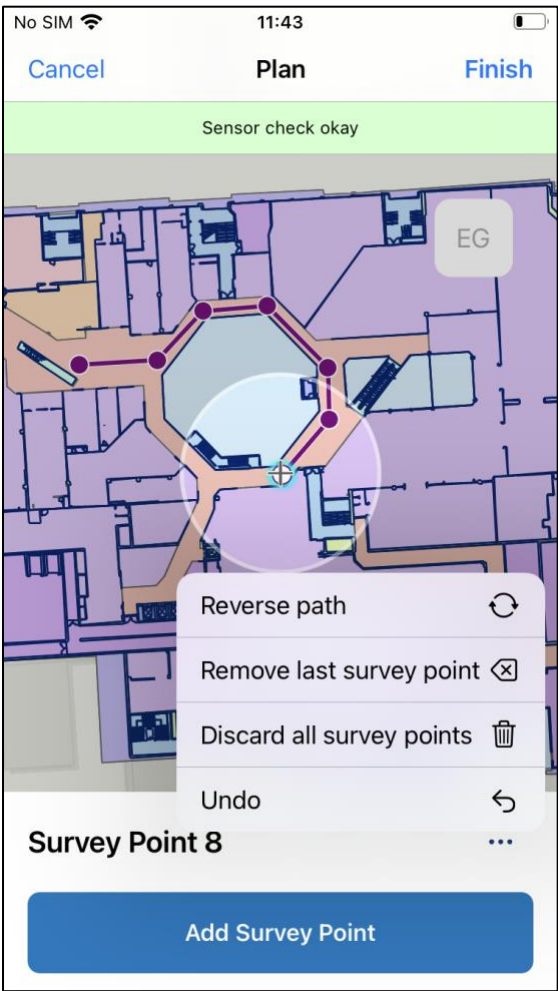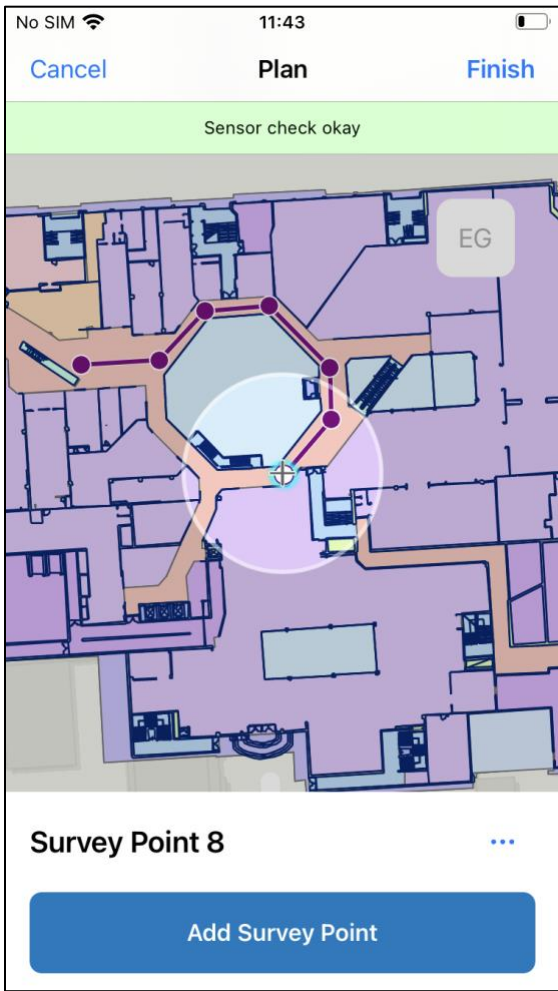
Add Survey Point

Once a survey path is drawn and the Sensor Check banner is displayed in green, you can enter Survey mode by tapping Finish (iOS) or tapping the button in the upper right corner ✓ (Android).
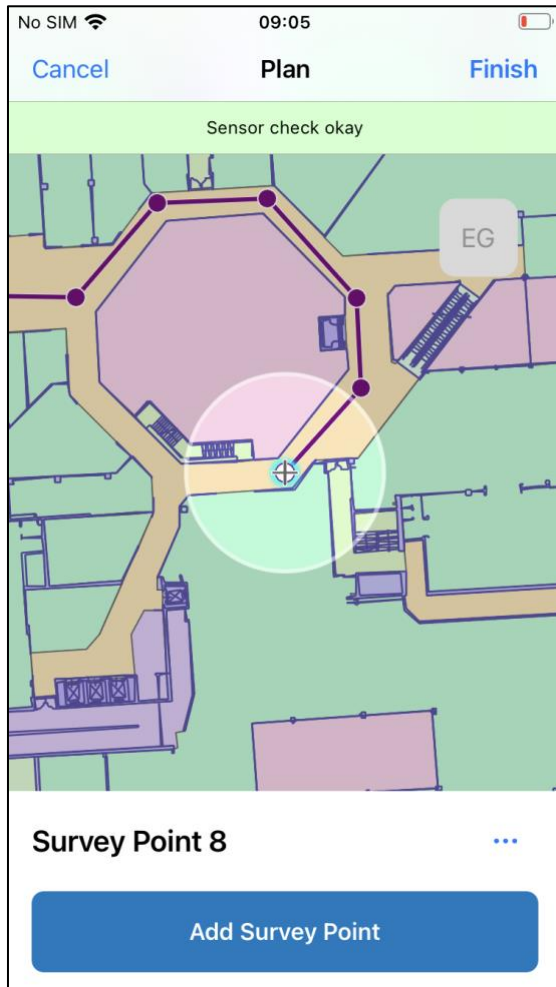
Record a survey

Once you add your survey points and sketch the path in Plan mode, you can record a survey in Survey mode. When you record a survey, the device collects Bluetooth signals from beacons placed in your facilities and uses them to build a radio fingerprint map. To record a survey, travel the path created in Plan mode and confirm each survey point when you reach its location. Surveys should be at least 10 seconds long, contain at least two points, and be limited to approximately two minutes to maintain concentration and avoid obstacles, such as people crossing the survey path. Start at the first survey point on the path.

When you finish a survey, you are prompted to reverse your path. Reversing the path and recording from the opposite direction ensures that radio reference data is collected from both directions. When you reverse a path, the app switches to Plan mode. From there, you can return to Survey mode and the path will start at the last survey point. Alternatively, you can continue to edit the path in Plan mode.

Caution:

Use devices of the same brand and model to record all surveys for a site. Combining recording device brands and models can negatively affect the quality of the positioning file and overall accuracy.

When you finish sketching a path in Plan mode, the app switches to Survey mode. Complete the following steps to capture the survey recording:

1. Position yourself at the first survey recording point.

Note:

Keep your phone next to your chest as you would while writing a text message with one hand for the entire recording period. Directional information and motion sensor statuses from the device help to ensure an accurate survey path.

Tip:

*Tap the **Zoom to Location** (Find me) button to center the map at your location.*

2. Tap the **Start Recording** button

Caution:

IPS Setup records continuously during the survey. Keep the phone oriented in the direction of the survey path throughout the recording period. Directional information from the mobile device helps establish an accurate survey path. Changing the direction of the device can affect motion sensor status.

3. Move at a steady pace toward the next survey point and tap the **Confirm Survey Point** button when you reach it.

Tip:

Follow the planned path as closely as possible. Confirm the survey points in the specific places they were placed when sketched in Plan mode. For example, if you sketched a point near a wall, move to and confirm the point near the wall.
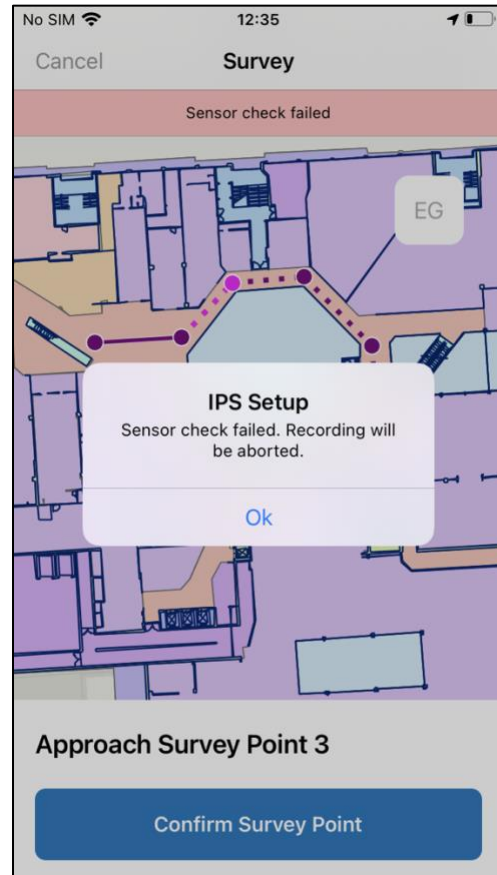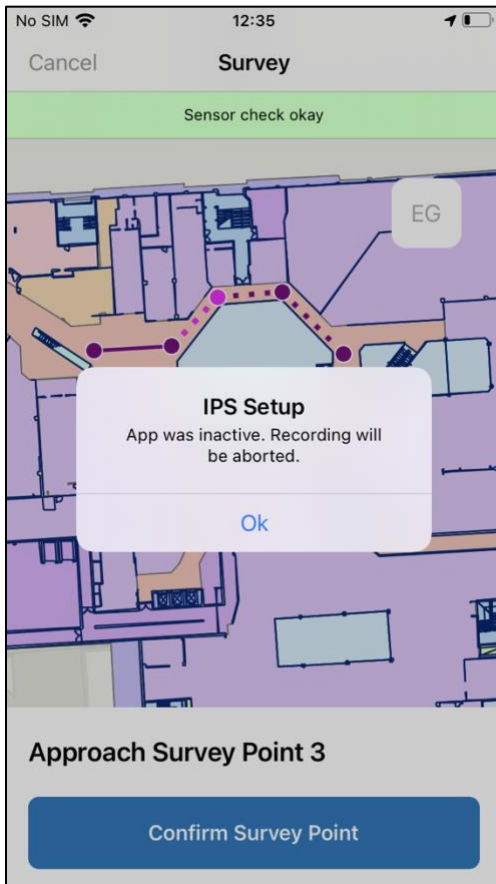
4. Confirm each survey point location in order until you reach the last one

Note:

If the IPS Setup app is interrupted during a survey, the recording is canceled and discarded. Interruptions may occur if you switch to another app, receive a call, or sensors fail during the survey.

Once the last survey point is confirmed, the recording stops, and the upload button appears. The completed recording can be uploaded to your IPS Recordings table.

Once you survey all the areas in your facility where you want to enable IPS, you can use the recordings to create a positioning file.
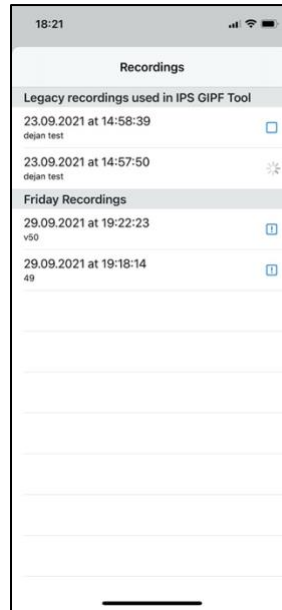
Upload a survey recording

When you confirm the final survey point on a path, the survey automatically ends and the **Upload Recording** button appears. You can now upload the survey to your ArcGIS organization and use it to create an indoor positioning file.
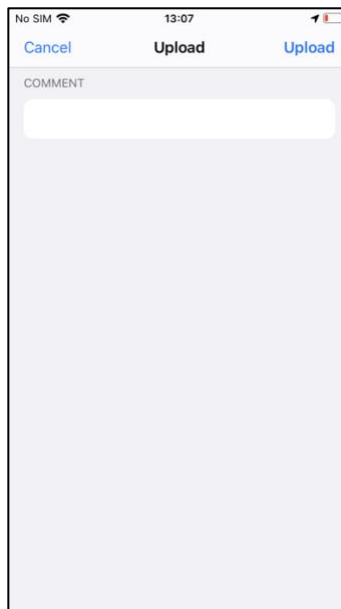
To upload a survey recording follow these steps:

1. Tap **Upload Recording** to upload the recording to the ips_recordings table

2. Optionally, add comments about the survey recording into the text box in the **Upload** menu.

Note:

Comments can be used to keep track of survey areas, the direction of survey recordings, surveyor names if there are multiple surveyors, or to identify mistakes during a recording.

3. Tap **Upload** (iOS) or button in the top right corner ✓ to upload your survey recording.

The survey recording is added to the ips_recordings table. If there is no connection, the recording is automatically uploaded when a stable connection is available.

Note:

Collect multiple survey recordings to fully enable IPS at an indoor site. Once the Survey process is complete, you can use the Generate Indoor Positioning file tool to create an Indoor Positioning file.

4. If you choose to reverse the path, IPS Setup returns to Plan mode. You can add survey points to the path before starting the survey in reverse. When you are ready to begin the survey, tap the finish button ✓ to start recording from the final survey point on the original path.

Note:

To check the status of the survey recordings, open the [Recordings menu](#) from the map list.

When you finish surveying a facility, sign in to your ArcGIS organization to view the ips_recordings table and verify that all the survey recordings have been added to the table. If all the recordings were successfully added to the ips_recordings table, you can run the Generate Indoor Positioning File tool and create a positioning file. Return to IPS Setup to test the positioning file for accuracy and completeness.