USER GUIDE

Trimble Positions software suite: Trimble Positions Mobile extension

Version 10.2.0.2
Revision A
August 2014

◈ **Trimble.**

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Release Notice

This is the August 2014 release (Revision A) of the *Trimble Positions Mobile Extension User Guide*. It relates to version 10.2.0.2 of the Trimble Positions Mobile extension.

Introduction

The Trimble® Positions™ software suite adds support for Trimble high-accuracy GNSS receivers using Esri ArcGIS for Windows Mobile technology.
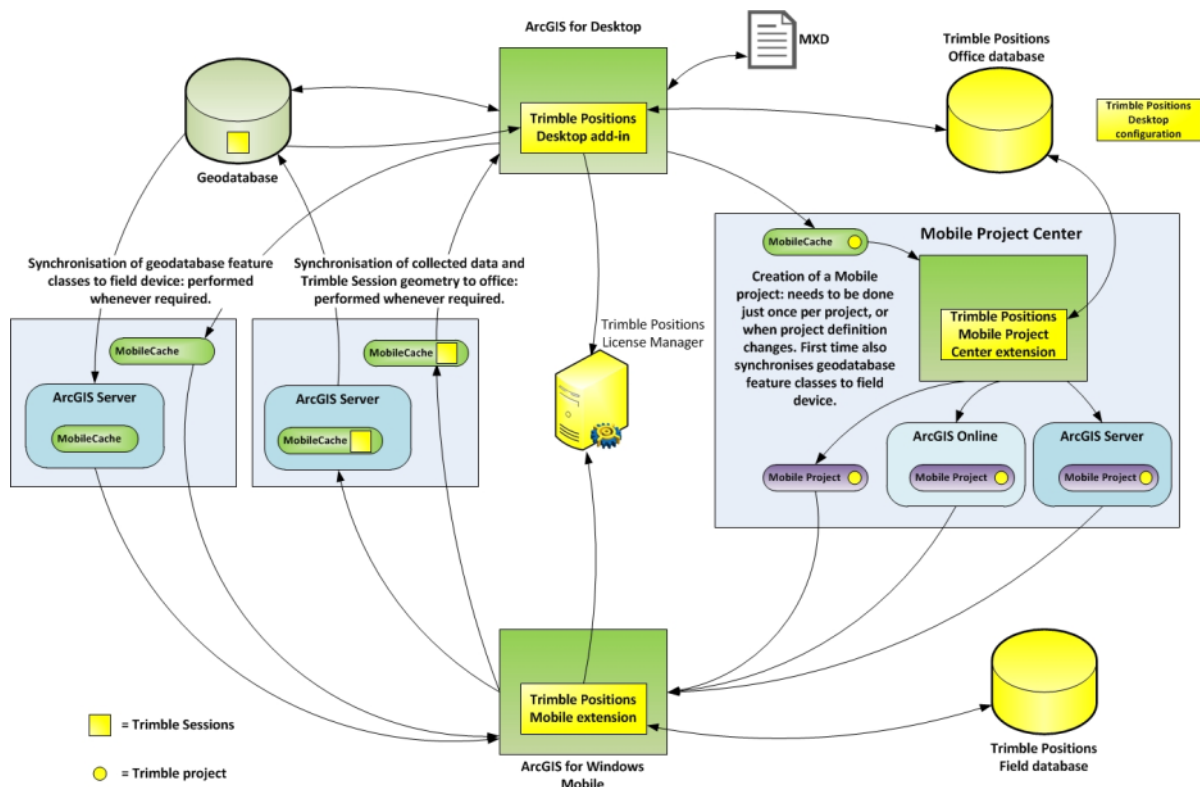
The Trimble Positions Mobile extension is an extension for the Esri ArcGIS for Windows Mobile application. The Trimble Positions Mobile extension is used to open high-accuracy projects and to collect high-accuracy Trimble geometry.

This guide explains how to use the Trimble Positions Mobile extension.

Note – *Trimble Positions Mobile extension version 10.2.0.2 users are expected to have a basic knowledge of and training in ArcGIS for Windows Mobile 10.2.0.*

Overview of the Trimble Positions Mobile extension

The following illustrates the components of the Trimble Positions software suite and the Esri ArcGIS software and applications:

The Trimble Positions Mobile extension allows high-accuracy geometry collection from within the Esri ArcGIS for Windows Mobile data collection application.

Transferring data between the field and the office

Projects and project data, including Trimble Positions session data, must be transferred between the office system accessing the GIS and the field device. You can do this using ArcGIS for Server, or by manually transferring files (using Microsoft® ActiveSync® technology or Windows Mobile® Device Center) and synchronization of the mobile cache using the Synchronize Mobile Cache mobile geoprocessing tool. For more information, refer to the *Trimble Positions Desktop Add-in User Guide*.

How the extension works

When the Trimble Positions Mobile extension version 10.2.0.2 is installed, it enables the ArcGIS for Windows Mobile 10.2.0 application to recognize and to be adaptive to Trimble Positions workflow and extensions by recognizing a TrimbleSessions-enabled mobile cache.

High-accuracy projects

When you load a project that has a verified TrimbleSessions layer, the Trimble Positions Mobile extension enables high-accuracy data collection and maintenance.

This enables Esri ArcGIS for Windows Mobile to connect to supported Trimble GNSS receivers. You can then collect high-accuracy geometry.
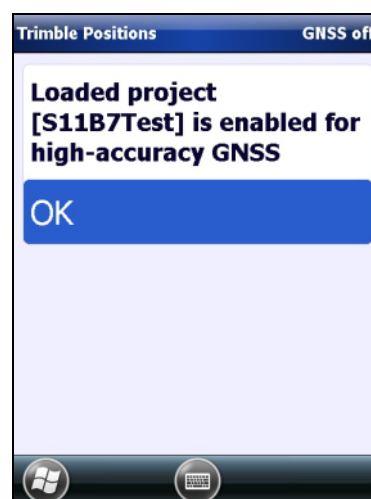

GNSS Settings

Before you can collect Trimble Positions geometry, the GNSS receiver must be connected, and you must choose a field configuration. You can connect to the GNSS receiver before you select a project, but no field configurations will be available (the Default configuration is used).

To set-up the GNSS receiver:

1. Tap the **GNSS off** status text at the top-right corner of the screen. The *GNSS Settings* page appears:

2. In the *Field configuration* field, tap **>**, and then select a field configuration appropriate for the open project. The <Default> configuration connects to the internal GNSS receiver, if available, with autonomous (uncorrected) positions. Depending on the field configuration, you may need to supply a username and password to gain access to the real-time correction stream.

3. If you are using an external antenna (or external receiver) and want to collect accurate heights, use the *Antenna* field to select the type of external antenna, height of the external antenna, and type of height measurement. Although the height can be changed per feature, the antenna type cannot be changed within a session.
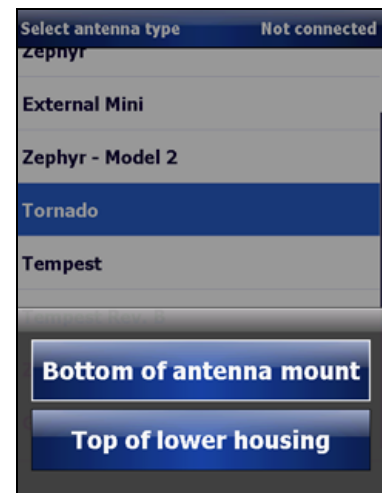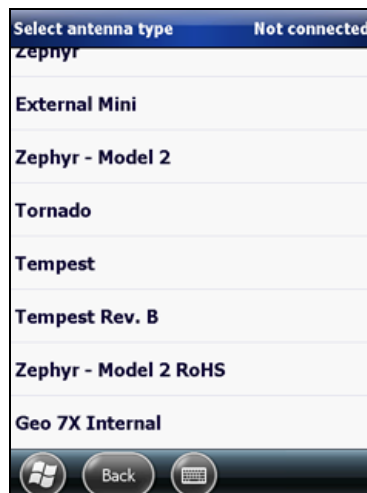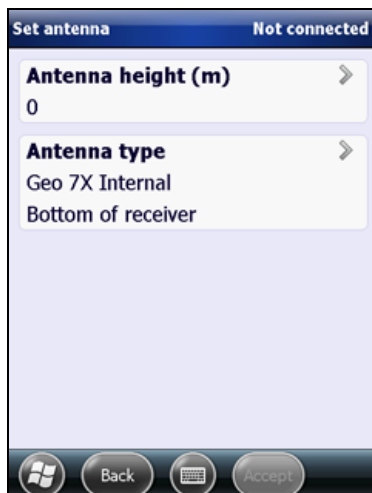
4. If you want to connect a laser rangefinder to the data logger to help you with range and bearing readings, tap **>** in the *Range finder type* field, select the type of supported laser rangefinder from the list, and then the COM port it uses. If you are using a Bluetooth-enabled laser rangefinder, you should pair the device with the data logger and allocate the COM port before starting ArcGIS for Windows Mobile. When the rangefinder type has been selected, you can test it by tapping within the the *Rangefinder status* field.

5. To connect to the GNSS receiver, tap **Connect To GNSS**. The GNSS status message shows "no GNSS fix". Wait for the GNSS receiver to initialize with the selected field configuration. The GNSS status changes to "GNSS fix". If a real-time correction source has been selected, the GNSS status changes to "RT fix" when real-time corrections are being received and applied.

6. To return to the *ArcGIS for Windows Mobile Task* screen, tap **Tasks** on the bottom left of the screen.

GNSS Status

To view the current status of the GNSS receiver and positions, on the *GNSS Settings* screen, tap **Status**. (To open the *GNSS Settings* screen, tap the GNSS status text at the top-right of the screen).

For autonomous positions (that is, not real-time corrected), the *Current Accuracy* before logging reports the autonomous accuracy.

For real-time corrected positions, the *Current Accuracy* reports the corrected accuracy. This value depends on the base line distance, the number of satellites in common observed by both base and receiver, and correction type.

Clicking on the *Satellites* text toggles the display of the list of satellites used in the solution, grouped by constellation.

While waiting for a real-time fix, the Real-time status shows "Waiting".

When corrections are received, the status changes to "In use" and other real-time correction stream information is updated on a regular basis.

To return to the A*rcGIS for Windows Mobile Task List* screen, tap **Tasks** on the bottom left of the screen.
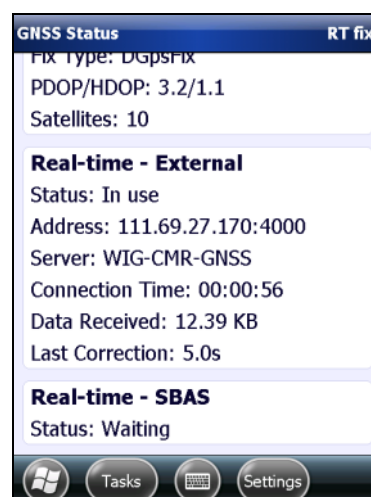
Collecting features

Collecting features with the Trimble Positions Mobile extension is similar to collecting fetaures with the ArcGIS for Windows Mobile field application:

1. In the *ArcGIS for Windows Mobile Task List* screen, tap **Collect Features** to start collecting features. Choose the type of feature to collect (as defined by the loaded project).

   Note – if you have not already connected to the GNSS receiver, you are prompted to do so before continuing.

   The *Collect Feature* screen displays, showing the Trimble Location (for point features) or Trimble Shape (for line and polygon features), followed by the other feature attributes (if applicable).

   At the top-right, next to the GNSS status text, a colored box appears. The color represents whether or not the required accuracy for the current feature class, as defined by the loaded project, has been achieved: green for achieved; red for not achieved.

2. To log a GNSS position, tap **Trimble Location** (for point features) or **Trimble Shape** (for line or polygon features).

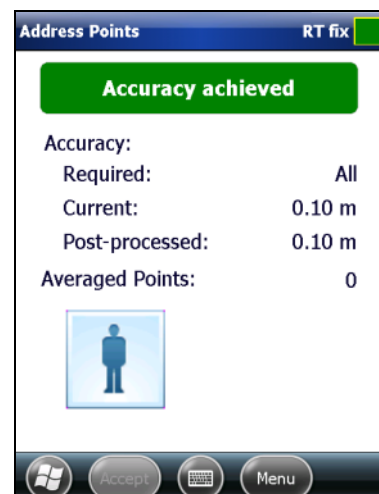### Collecting point features

To log a point feature:

1. Go to the location of the feature and, whilst standing still, tap 🧍 once to start logging.

   During logging, the number of GNSS positions recorded increments. The current and postprocessed accuracies are also updated regularly.

2. When the required number of averaged points has been collected, tap 🧍 to stop logging.

   All GNSS positions collected are averaged and a final position given to the point feature.

   Note – When a final position has been logged for a point feature, if you tap 🧍 again, the previous GNSS positions are discarded and the extension starts collecting a new averaged position for the feature.

3. To store the point feature position, tap **Accept**.

To cancel the geometry collection, tap **Menu** and select *Cancel Geometry*. This discards all GNSS positions logged for that feature and returns you to the *Collect Feature* screen.

Collecting point features using a point offset

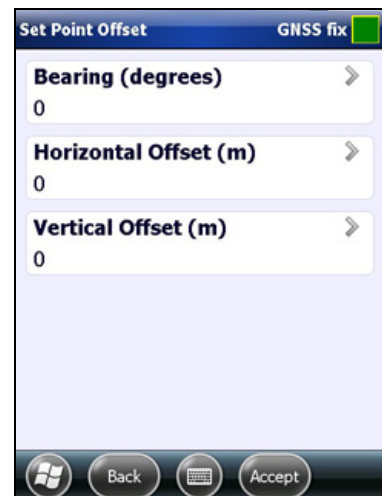To log a point feature with a point (distance-bearing) offset:

1. Go to the location of the feature and, whilst standing still, tap 🧍 once to start logging.

   During logging, the number of GNSS positions recorded increments. The current and postprocessed accuracies are also updated regularly.

2. If you want to record a point feature position using an offset from your current position, whilst logging GNSS positions, tap **Menu** and select *Set Point Offset*.

   The *Set Point Offset* form appears.

3. If you have a laser rangefinder connected, trigger the device to automatically populate the fields. You can manually edit the field values. Tap **Accept** to return to the GNSS logging screen, or **Cancel** to return without adding an offset to the feature position.

   Note – The bearing value is always interpreted as relative to True North. The supported laser rangefinders have a configuration option to configure the device with the magnetic declination. Remember to regularly calibrate and configure your electronic compass.

   Note – If you re-enter the Set Point Offset form without ending GNSS position recording, you will be able to inspect and modify the offset values.

   All GNSS positions collected are averaged and the offset values applied to the averaged position, and a final computed position given to the point feature.

   Note – When a final position has been logged for a point feature, if you tap again, the previous GNSS positions and offset values are discarded and the extension starts collecting a new averaged position for the feature.

4. To store the feature position, tap **Accept**..

To cancel the geometry collection, tap **Menu** and select *Cancel Geometry*. This discards all GNSS positions logged for that feature and returns you to the *Collect Feature* screen.

Collecting line and polygon features

1. To log a line or polygon feature, you can do either of the following:

   – To log individual vertices made up of averaged GNSS positions along a path or polygon perimeter, tap [icon] once to start logging.

   – To log streamed GNSS positions as you walk along a line or polygon perimeter and collect as you go, tap [icon] once to start logging.

   The active collection mode icon is highlighted with a yellow border.


2. To end logging, tap the active icon.

   You can switch directly between the two collection modes by tapping the inactive icon. If you are collecting a stream of GNSS positions, remember to stop before starting to collect an averaged vertex.

   Note – Unlike with point features, repeated collection of vertices using the [icon] icon will add to the number of vertices recorded for the current feature, that is, the current vertex will not be discarded and recollected. Vertices collected in error (perhaps whilst walking rather than whilst standing still) will need to be edited in an ArcGIS for Desktop edit session after the GIS has been updated.

3. To store the GNSS positions, tap **Accept**.

To cancel the geometry collection, tap **Menu** and select *Cancel Geometry*. This discards all positions logged for that feature and returns you to the *Collect Feature* screen.
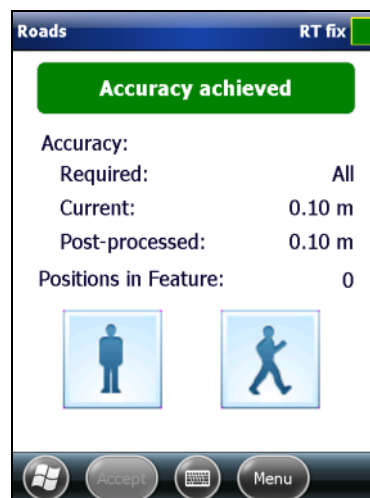
Collecting line and polygon features using offsets

To log a line or polygon feature that you cannot directly access, you will need to use offsets. As with a Point feature, you can elect to collect individual line or polygon feature vertices using the vertex offset method, or you can apply a line offset at a fixed distance from the feature. Which method or combination of methods you choose depends on your collection environment and preference. These methods are described below.

Collecting line and polygon features using vertex offsets

1. To log individual vertices made up of averaged GNSS positions along a path or polygon perimeter, for each vertex tap [icon] once to start logging, and then tap **Menu** and select *Set Vertex Offset*.

   The **Set Vertex Offset** form appears.

2. If you have a laser rangefinder connected, trigger the device to automatically populate the fields. You can also manually edit the field values. Tap **Accept** to return to the GNSS logging screen or **Cancel** to return without adding an offset to the feature vertex position.

3. When the required number of averaged points has been collected, tap to stop logging.

   Note – You will need to enter the Set Vertex Offset form for each vertex and enter the new offset values for each vertex.

   Note – The bearing value is always interpreted as relative to True North. The supported laser rangefinders have a configuration option to configure the device with the magnetic declination. Remember to regularly calibrate and configure your electronic compass.

   Note – Unlike with point features, repeated collection of vertices using the icon will add to the number of vertices recorded for the current feature, that is, the current vertex will not be discarded and recollected. Vertices collected in error (perhaps whilst walking rather than whilst standing still, or from aiming the laser rangefinder at the wrong target and accepted) will need to be edited in an ArcGIS for Desktop edit session after the GIS has been updated.

Collecting line and polygon features using a simple line offset

1. Before you start logging GNSS positions, set your offset values in the *Set Line Offset* form—tap **Menu**, select *Start Line Offset*, enter the values or populate using a laser rangefinder, and then tap **Accept**.

2. You can now start logging streamed GNSS positions as you walk along a line or polygon perimeter at a constant distance and collect as you go. Alternatively, you can log averaged vertex positions at that constant distance by standing at the defined distance from the feature at each vertex. (See Collecting line and polygon features, page 9.) The active collection mode icon is highlighted with a yellow border.

3. To end logging, tap the active icon.

   You can switch directly between the two collection modes (vertex or streamed) by tapping the inactive icon. If you are collecting a stream of GNSS positions, remember to stop before starting to collect an averaged vertex.

   Note – Unlike with point features, repeated collection of vertices (whether averaged or streamed) will add to the number of vertices recorded for the current feature, that is, the current vertex will not be discarded and recollected. Vertices collected in error (perhaps whilst walking rather than whilst standing still) will need to be edited in an ArcGIS for Desktop edit session after the GIS has been updated.

4. When you have finished collecting using a Line offset, tap **Menu** and select *End Line Offset*.

5. To store the GNSS positions, tap **Accept**.

To cancel the geometry collection, tap **Menu** and select Cancel *Geometry.* This discards all positions logged for that feature and returns you to the *Collect Feature* screen.

It is possible to collect a single line or polygon feature with different line offset values, for example, if a pipeline crosses from one side of the road to the other, or a fence is staggered and changes its distance from the path you are following. In this case, end logging and tap **Menu** and then select *End Line Offset*, and immediately tap **Menu** and select *Start Line Offset*. Enter the new values of the offset. Once you accept these values, you can continue logging GNSS positions and the new offset values will be applied to just those positions.

☼ **Tip –** When using streaming to log simple line offsets, be careful to not log more than one position when you come to the end of the line, as this may induce distortions into the feature. Trimble recommends that the streaming is discontinued a way back from the end of the line and the last position of the line is recorded as a vertex with simple line offset.

Collecting line and polygon features using a combination of vertex and line offsets, as well as on-feature positions

It is possible to log using a combination of vertex offsets and line offsets in a single feature. If you are logging using a Line offset, you will need to end that Line offset and start a new stream or vertex, with or without offset.

## Collecting nested point features during line or polygon feature collection

In certain workflows it may be necessary to collect a point feature while in the process of collecting a line or polygon feature. To do this, tap **Menu** and select *Nest Point Feature,* then select from a list of all point feature types and log positions for that feature. On the next screen you can complete the attribute collection. If you are in the process of streaming a line segment, you should stop streaming before you start the nested point feature.
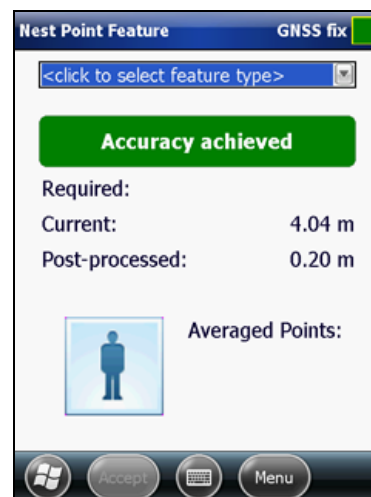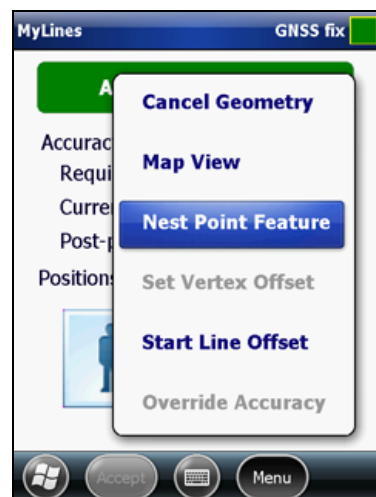
Overriding accuracy requirements

If the accuracy achieved is not sufficient to log the GNSS position (due to accuracy requirements defined by the project), and if the project definition allows it, you can override the accuracy requirement of a feature, enabling you to log a GNSS position even if the required accuracy has not been achieved.

To override the accuracy requirement, tap **Menu** and select *Override Accuracy.* Confirm the override.
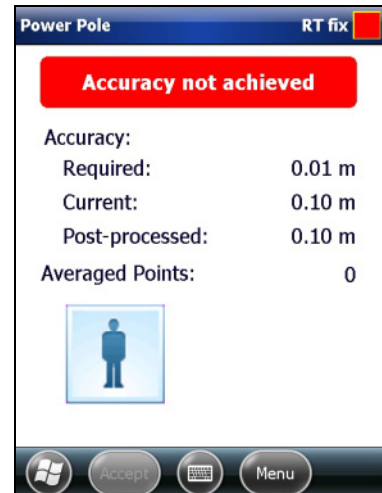
The accuracy is only overridden for the current feature.
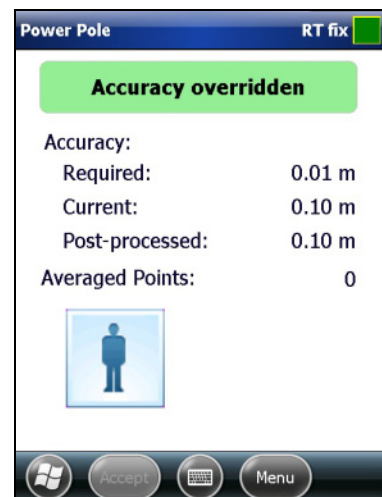
Verifying collected feature geometry

When you accept the collected geometry for a feature, the *Collect Feature* screen appears.

- For a point feature, the point geometry statistics are displayed immediately below the *Trimble Location* heading. These statistics are the point coordinate, the number of averaged GNSS points for the point feature, and the estimated CEA and PPA values.

- For a line feature, the line geometry statistics are displayed immediately below the *Trimble Shape* heading. These statistics are the number of vertices (the sum of averaged vertices and streamed positions) in the line feature, the length of the line feature (in meters), and the worst estimated CEA and PPA values.

- For a polygon feature, the polygon geometry statistics are displayed immediately below the *Trimble Shape* heading. These statistics are the number of vertices (the sum of averaged vertices and streamed positions) in the polygon feature, the area enclosed by the polygon feature (in square meters), and the worst estimated CEA and PPA values.

- If Auto Fill fields were specified for either of the two Trimble Positions metadata values (Feature Height, Horizontal Estimated Accuracy) in the Trimble Positions Mobile Project Center extension during project authoring, these will now be populated. The value for Feature Height will be dependent on the Elevation Settings selected at that time. If *Calculate geoid separation from file* was selected, the specified GGF file must be manually deployed to:

  \My Documents\Positions.

  If the GGF file is not deployed to the device, feature heights will be ellipsoidal and postprocessing (and subsequent feature updating) will be required to properly calculate Mean Sea Level elevations.

If you are not satisfied with the geometry, you can re-collect the complete geometry by tapping *Trimble Location* or *Trimble Shape* again.

If required, enter any further feature attributes, and then tap **Save** to save the feature.

To cancel the feature collection, including geometry, tap **Cancel**.

Using the Map View

You can collect geometries using the Form View or the Map View. To toggle the view, tap **Menu,** then tab *Map View* or *Form View*, as required. You can toggle between Form View and Map View during active geometry collection.

The ⬛ and ⬛ icons are displayed on the right-hand side of the map screen, and remain active throughout geometry collection. The active collection mode is highlighted. To switch between collection modes, tap the inactive icon.

Note – For point features, only ⬛ *is shown.*

When collecting in Map View, the GPS Info bar is visible at the bottom of the screen. This bar shows the current position, current GNSS accuracy, postprocessed accuracy, and the number of positions in the current feature opened for geometry collection.

When you have finished collecting and you tap **Accept**, the *Collect Feature* screen appears, enabling you to enter feature attributes.
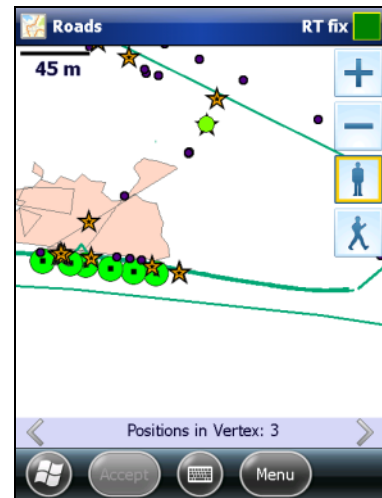
Managing GNSS sessions

To manage Trimble Positions GNSS session data, on the main *Task List* screen, tap *GNSS Sessions*.

If a GNSS Session has not been started, you can manually start one by tapping <tap here to start session>. This starts the TrimbleSessions recording and enables PPA accuracy reporting.

To add a note to the currently active session, click <tap here to view/edit note>. This text is also editable after the session is stopped.

If a GNSS Session has been started, you can manually stop the session by tapping <tap here to stop session>. This saves the session data so it can be synchronized with the Mobile cache.

Sessions in cache are reported: these are the number of sessions that are still on-board and copied to the Mobile cache, but have not yet been synchronized to the GIS.

Clicking on a session entry in this list (the date/time value) will open the *Session Info* screen where you can view more details about the session including information about how the session data is stored (for example, as an attachment). You can also edit the session note by clicking the *Note* field.
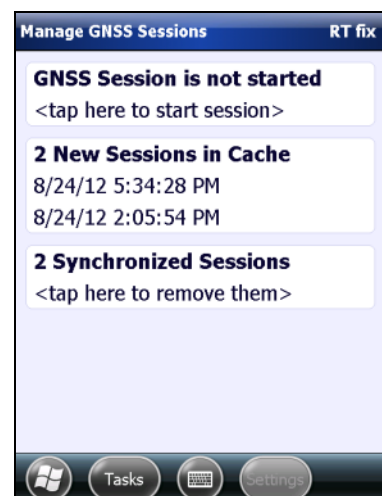
Synchronized sessions are also reported: these are sessions that have been successfully transferred to the GIS, and can be removed from the mobile device. This removal cannot cannot be undone, so you are prompted to confirm it.

## Extending an existing line feature

To extend an existing line feature (one that has been synchronized from the GIS):

1. Select the line feature; in the Map view, zoom in on the feature. Tap on the ⓘ icon in the Map view and lasso the feature of interest. Tap on the feature of interest from the list (there may be more than one if the lasso captured other features). Select **Edit Feature**. Select **Trimble Shape** and then select **Extend feature**.
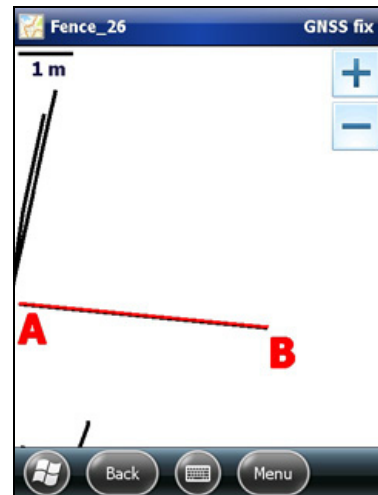
    The feature is highlighted on the Map with 'A' and 'B' annotating the two ends.

2. Tap **Menu** and then select how you would like to extend the line. The options are:

    –   Towards A

    –   From A

    –   Towards B

    –   From B
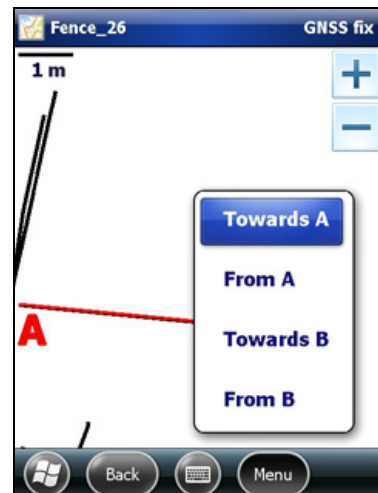
3. You can now start to extend the line feature in a similar fashion used to construct a new line feature, using vertices, streamed positions, and offsets.

4. When you have finished collecting the extension, tap **Accept**. The *Collect feature* screen appears, enabling you to monitor the geometry synopsis or to enter feature attributes. Tap **Save** to save the extension.

    Note – You are only able to extend line features that have been checked-out of a GIS, that is, you cannot collect a line feature and extend it without it first making a round trip to the GIS.

Note – *You are only able to extend a line feature from one end. You cannot extend a line feature from/to both ends without losing GNSS data from the previous extension.*

Finding additional information

If you have a problem and cannot find the information you need in the product documentation, contact your Trimble reseller.

Documentation and downloads

- Trimble Positions Desktop Add-in Administrator's Guide
- Trimble Positions Desktop Add-in User Guide
- Trimble Positions Mobile Extension Administrator's Guide
- Trimble Positions Mobile Project Center Extension Administrator's Guide
- Trimble Positions Mobile Project Center Extension User Guide
- Trimble Positions Desktop Add-in Release Notes
- Trimble Positions Mobile Extension Release Notes
- Trimble Positions Mobile Project Center Extension Release Notes

Appendix A: Positions software suite workflow overview

The following table provides an overview of the steps required to install and use the Trimble Positions software suite. The steps in bold are covered in detail in this guide. For all other steps, refer to the other Trimble Positions software suite documentation, as listed above.

Initial administration tasks	Install and license ArcGIS for Desktop 10.2 on each office computer.
	Install ArcGIS for Windows Mobile 10.2.0 (this is to get the Mobile toolbox for ArcGIS for Desktop installed, and to install the Esri Mobile Project Center utility) on each office computer and Windows Mobile device.
	Download Trimble Positions Desktop add-in 10.2.0.1.
	Optionally, install the Trimble Positions License Manager to a computer(s) that is/are accessible from the office computer (and field devices).
	On each office computer that has ArcGIS for Desktop 10.2 installed, install and license Trimble Positions Desktop add-in.
	Download Trimble Positions Mobile extension 10.2.0.1.
	On each mobile device that has ArcGIS for Windows Mobile 10.2.0 installed, install and license Trimble Positions Mobile extension.
	On office computers that have the Esri Mobile Project Center 10.2.0 installed, install Trimble Positions Mobile Project Center extension 10.2.0.1.
	Optionally, create a new Microsoft SQL Server or Oracle database, if an enterprise database is required and not yet created.
	Configure Trimble Positions Desktop database (*Start / All Programs / Trimble / Trimble Positions Tools / Desktop Configuration*).
	Start ArcGIS for Desktop and enable Trimble Positions Desktop add-in.
	If not already done during a previous installation, add TrimbleSessions to each geodatabase using Trimble Positions Desktop add-in.
Desktop add-in tasks when enabling Map documents	Open map document.
	Add feature layers to Map from geodatabase.
	Add TrimbleSessions to Map using Trimble Positions Desktop add-in.
	Check Map for compatibility using Trimble Positions Desktop add-in.
	Create a Mobile Cache using Trimble Positions Desktop add-in.
	Create Field Configuration(s).
Mobile Project Center extension user tasks for each new or modified mobile project	Open Mobile Project Center (*Start / All Programs / ArcGIS / ArcGIS for Windows Mobile / Mobile Project Center*).
	Create a new Project.
	Import operational layers from Mobile Cache.
	Configure layer for data collection and metadata autofill fields.
	Configure TrimbleSessions Data Collection Layers' Accuracy-Based Logging thresholds, and Field Configurations.
	Configure Project extents.
	Save Project.
	In Trimble Positions Desktop add-in, associate Project and Map.

Regular transfer tasks between field and office	Transfer Project definition and Mobile Cache to Windows Mobile field device.
	Collect data using Trimble Positions Mobile extension 10.2.0.1 for ArcGIS for Windows Mobile 10.2.0.
	Transfer Mobile Cache to office computer.
Regular Desktop add-in user tasks	If not already created, in Trimble Positions Desktop add-in, create processing profile(s).
	If not using ArcGIS for Server, use Trimble Positions Desktop add-in to synchronize the mobile cache.
	In Trimble Positions Desktop add-in, Manage devices and optionally associate with a processing profile.
	In Trimble Positions Desktop add-in:
	• Check for new sessions
	• Postprocess against chosen processing profile
	• Verify against required accuracy thresholds
	• Modify geometry (unlink, exception)
	• Update GIS geodatabase
	Save and close Map document.