Offsets

If you cannot travel over the top of, or right next to, a feature, you can enter an offset and record it at the specified distance. When collecting a tree feature, for example, it may be easier to stand some distance (for example, 10 paces to the North) from the tree and record its attributes. This ensures good GPS reception, and lets you see the tree clearly to assess its condition. Specify an offset to the tree of 10 m South. This is an example of an offset point feature. Entering an accurate offset ensures that the feature is positioned correctly in the GIS.

Note – The example above is a simple distance-bearing offset. For point features, you can also record complex offsets, which use measurements from two or more reference positions to calculate the feature position. See also Complex offsets, page 164.

To view or enter the offset for the feature being collected or updated, tap Options in the attribute entry form and then select Offset.
You can also use offsets for line and area features. For example, when collecting a line feature such as a fence, it may be easier to drive along the road beside the fence and record the positions of the fence as an offset. When collecting an area feature such as a lake, you could walk some distance from the lake edge and record its perimeter using an offset.

Note – A feature (point, line, or area) can have only one offset associated with it. To collect a line or area feature using offsets, the same offset value must apply to the whole feature. This may require a test run around or along an object to make sure that you can remain a consistent distance from it.

Note – You can record a line feature as a series of joined line segments, each with a different offset. See also Segmenting line features, page 169.

Offsets are added to GPS and digitized positions as they are recorded, and features are displayed in the Map section with their offsets. However, if the currently open line or area feature has an offset, acute angles and corners can appear distorted on the map. This is because exact offset values are not calculated for these positions until the feature is closed. When you close a feature, offsets for these positions are interpolated, and the feature is redrawn more accurately.
To record an offset for a feature:

1. Start the feature.

2. In the attribute entry form, tap **Options** and then select **Offset**.

3. If the current feature is a point feature, select the type of offset you want to record. Then tap **OK**.

   The appropriate offset form appears. The fields on the offset form depend on the type of feature you are collecting (point, line, or area) and the type of offset you are collecting.

4. Enter a value in each field as necessary. Alternatively, use data from a laser rangefinder. See also Using a laser rangefinder to record offsets, page 168.

5. When the offset form is complete, tap **OK**. The attribute entry form reappears.

6. When you have recorded attributes for the feature and logged sufficient GPS positions, tap **OK** to store the feature. The **Collect Features** screen appears.

   **Note** — *You can also record complex offsets for point features (see below).*

**Complex offsets**

When you record a complex offset, you do not record any position information for the feature. Instead, you record GPS positions for two or three reference positions and measure the distance or direction from each reference position to the feature. The TerraSync software uses coordinate geometry (COGO) to calculate the location of the feature, in much the same way as a GPS receiver uses the distances to GPS satellites at known locations to calculate GPS positions.

In the TerraSync software, you can record a complex offset using either two or three reference positions, and you can specify either the distance to the feature, or the bearing (direction). You can record the following types of complex offset:

- Distance-distance offset (see page 166)
- Triple distance offset (see page 166)
- Bearing-bearing offset (see page 167)
- Triple bearing offset (see page 167)

To increase accuracy, you can record each reference position as if it were an averaged vertex. If you log a number of positions at each reference point, the TerraSync software averages these positions to give a more accurate reference position. The principle of **Dilution of Precision** applies to complex offsets, so you should choose reference positions that are widely spaced.

For detailed instructions, see Recording a complex offset, page 165.
**Recording a complex offset**

To record a complex point offset:

1. Start the point feature.
2. In the attribute entry form, tap **Options** and then select **Offset**. The Point Offset Type form appears.
3. Select the type of offset you want to record and then tap **OK**. The appropriate offset form appears.
4. Follow the instructions at the top of the form. When you have completed each step, tap **Next** to move to the next step. For each reference position:
   a. Move to the reference position.
   b. Tap **Log** (or **Resume**) to begin logging.
   c. Remain stationary at the reference position while you log positions.
   d. When you have collected sufficient positions, tap **Next** to stop logging.
   e. Measure the offset. This is the distance or the bearing from the reference position to the feature. You can use data from a laser rangefinder. See **Using a laser rangefinder to record offsets**, page 168.
   f. Tap **Next** to confirm the measurement for this reference position.
5. If you are recording an offset that uses distances, enter the direction that the features lies in relative to the path between the reference positions. The software calculates the position of the feature.
6. When the offset form is complete, tap **OK**. The attribute entry form reappears.

*Note - Logging is paused because you only have to record positions for the reference positions, not the feature itself.*

7. Record attributes for the feature, and then tap **OK** to store the feature. The **Collect Features** screen appears.
**Distance-distance offset**

A distance-distance offset uses the distance between the feature and two reference positions (A and B) to specify the position of the feature. The feature lies at the point where the circles centered on A and B intersect. Because there are two points where the circles intersect, you need to specify which direction the feature is in, relative to the path from A to B.

![Distance-distance offset diagram](image)

**Triple distance offset**

A triple distance offset uses the distance between the feature and three reference positions (A, B, and C) to specify the position of the feature. The feature lies at the point where the circles centered on A, B, and C intersect. There can be only one point where the three circles intersect, so you usually do not need to specify a direction.

A triple distance offset is similar to a distance-distance offset, but a third measurement provides some mathematical redundancy that can improve accuracy.

![Triple distance offset diagram](image)
Bearing-bearing offset
A bearing-bearing offset uses the bearing from north from each of two reference points (A and B) to the feature to specify the position of the feature. The feature lies at the point where the two bearing lines intersect.

![Bearing-line diagram]

Triple bearing offset
A triple bearing offset uses the bearing from north from each of three reference points (A, B, and C) to the feature to specify the position of the feature. The feature lies at the point where the three bearing lines intersect.

A triple bearing offset is similar to a bearing-bearing offset, but a third measurement provides some mathematical redundancy that can improve accuracy.

![Triple-bearing diagram]