

## **Farming GPS GIS II**

### **Help**

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## **Overview**

The Farming GPS GIS II app for the iPad® is loaded with a multitude of functions for mapping geographic features, collecting GIS data, and using GPS to locate points, lines and areas. You may use it to perform the following tasks:

- \* Import and export from/to Shapefiles and DXF files.
- \* Use GPS to map land features (Points, Lines and Areas).
- \* Precisely digitize Points, Lines and Areas over the built-in Map.
- \* Draw a deed plot by entering angles and distances.
- \* Transform data to commonly used coordinate systems.
- \* Move existing nodes to fine-tune the map drawing.
- \* Tag the Features with pre-defined Attribute/Values.
- \* View position, length and area values for the Features.

- \* Sub-divide an Area by Direction Cut, Hinge Cut or a digitized Split-Line.
- \* Combine two adjacent Areas into one Area.
- \* Create buffer zones around a Line or Area Feature.
- \* Create grid points or grid lines over an Area Feature.
- \* Label the Lines with segment lengths and directions as well as corner angles.
- \* Label the Areas with size in acres and square feet or hectares and square meters.
- \* Attach photos to the Features.
- \* Measure distances and areas.
- \* Create a Point from the entered address or coordinates.
- \* Create a Point or record a node by picking the GPS location.
- \* Use GPS to stake out Points or nodes on a Line or Area Feature.
- \* Use GPS to guide you along a specified Line or Area boundary.
- \* Save the data files on the device or iCloud.
- \* Output the drawing and the coordinates to PDF.
- \* Email the job data files and the PDF files to your colleagues.

There are two main ways of adding Points, Lines and Polygon Features to your mapping job. After you have created the Features, you may use the stakeout functions under **GPS** to help you locate them at the actual work site.

## 1) Digitization

This app will let you add Points, Lines and Areas to the map by tapping or dragging on the screen. You will first need to create a new Topic layer on which to store these Features. Specify the correct topic type (Point, Line or Area) for the New Topic. (See the Topic Menu section for details.)

The Tools Menu provides the Add Point manually, Add Line manually and Add Area manually functions. When a Point Topic is active, you can digitize points. When a Line Topic is active, you can digitize lines. And when an Area Topic is active, you can digitize areas.

Use the Edit Topic function to add Attribute fields to the Topic. After digitizing the Features, you can turn on Sheet View (the right-most icon at the top) and enter the values.

## 2) GPS Data Collection

With a Feature List defined and associated with a job, when you collect GPS data, you can record the attribute values at the same time.

The Feature List function is under GPS. You can pre-define the data collection parameters as well as the Attributes and Values for each Feature Topic. During data collection, you can simply select one of the pre-defined values instead of having to enter the data by hand.

Select Main Menu\Job\Current Job to get to the Job Set up screen. Here is where you can select the Feature List to be associated with the active Job. A couple of Feature Lists are built-in to serve as examples.

3) For creating points, there are also the **Traverse** method under data collection and the **Add Point by Coordinates** function.

Please follow the examples provided in this document to learn how to use the functions in this software for your mapping and data collection application.

## Map View

The **Map View** is the main screen that shows any spatial data (Features) and/or background map present in the currently active job.

You may select a displayed **Feature** by tapping on it in Map View. When you do so, the selected Feature will be highlighted in the default orange color. The Feature ID and the location coordinates will pop up in Map View.

You may also select a Feature by tapping on the corresponding Feature record in the spread-sheet called the **Sheet View**.

After selecting a Point, Line or Area Feature, you may tap the **Feature Properties** tool icon to assign a different symbol to represent it. You may also enter a description for the Feature or assign a pre-defined description to it via Feature Properties or Sheet View.

You may zoom into the map by double-tapping, or by pulling two fingers apart on the screen. You could zoom out of the map by tapping two fingers on the screen simultaneously, or by pinching two fingers on the screen.

The map scale is displayed at the lower-right corner of the Map View.

Displayed across the top of the **Map View** are the following tool icons.

Tap the **Main Menu** tool to see a menu of functions:



The **Topic Menu** provides functions to create, edit, move, delete or set up automatic labeling for the Feature Topics:



The **Map Tools Menu** lists the digitizing tools as well as the functions for entering deed calls and creating a grid over an area. Tap the **pull-down arrow** to reveal the map tools. The icon for the currently active map tool is displayed. For example the **Add Point manually** icon is initially displayed by default:



The **Utilities Menu** provides access to functions for measuring distances and areas, locating a point by address, subdividing or combining areas, as well as creating buffer regions. Initially, the Measure Distance utility is shown:



Tap on the **Zoom Fit** icon on the Toolbar to display all map elements:



The **GPS Menu** provides access to GPS-related functions, such as Feature List

setup, GPS/GIS data collection and Stakeout::



With a Feature selected, you will be able to view its coordinates as well as assign Attribute and Values to the Feature by using the **Feature Properties** tool:



Tap the **Topic View** toggle to select an active Topic:



Tap the **Sheet View** toggle to display data in a spreadsheet:




Additional tool icons may be displayed when you work with a specific function. All of these functions will be covered in this document. To gain a good understanding of the basic mapping functions provided by this app, please read the first ten sections of this document in the order presented.

### **On-screen keyboard**

An on-screen keyboard will automatically pop up when the focus is on a data entry screen. After entering data, tap the **Return** button on the pop-up keyboard. If a **Next** button is displayed in the data entry dialog, then tap that button to go to the next step. To hide the keyboard, tap the **Hide Keyboard Key** on the pop-up keyboard.

When you tap on an existing value in a data entry field, if one character is highlighted, you may replace it by entering a different character. If the cursor is displayed, you may insert characters at that location. To replace the entire text or numeric value in the field, first swipe the field to highlight all the characters then enter the new data.

When entering numeric data, you will notice that there is a **Separator Key**  showing several symbols on it. This key will facilitate data entry in several ways.

To enter a distance value with a fractional part, tap this key to put in the decimal point.

To enter angles in **DMS** (Degrees- Minutes-Seconds), if your data value will not fill in all the places, then tap the separator key after entering the desired value. For example, to enter the longitude of 91°09'26.082"W, you could type in 0910926.082W. Or, you could type 91, tap the special key, type 9, tap the separator key, then enter 26.082W.

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### **Set up a Job**

The application software requires a job file to be open for it to work with. The **Job**

**Menu** under the **Main Menu** provides functions for opening a job, saving a job, importing a set of Shapefiles as well as importing/exporting a DXF file.

### Opening or Creating a Job File

To open an existing job file, tap the **Main Menu** icon, select **Job** then select **Open Job** . Select a job file to open, such as **corners.pmp**. (The job files for this app have the **.pmp** file name extension.)

To create a new job file, tap the **New** button. Accept the proposed file name or enter a unique file name then tap the **OK** button. (Yes, it's okay to type over the displayed file name.)

You may select a Feature List to be associated with the job. Doing so will permit you to assign pre-defined Attribute/Values to a Feature that you have imported or digitized. The procedure for defining a Feature List is provided under **Set up Feature List**.

Once the proper files have been selected and any optional information has been entered, click on **OK**. If you have selected an existing job, your job data will be displayed.

If you are working with a job file and want to open another job file instead, select **Main Menu**, select **Job**, select **Open Job** then select the desired file name. This action will automatically close the previously opened file.

If you are not sure which job file you are working on, select **Main Menu**, select **Job** then select **Open Job** to view the File Dialog screen. The name in the **File Name** box is that for the currently open file.

To cancel out of the screen for opening a file, simply tap the **Cancel** button.

### Saving the Job File

To save the data in the currently open file, tap the **Main Menu**, select **Job** then select **Save**. The file extension will be **\*.pmp**.

To save the data under a different file name, tap the **Main Menu**, select **Job** then select **Save As**. Enter the new file name.

Let's save the **corners.pmp** example file that you have just opened under a different name, such as "mycorners". This way, you can work with **mycorners.pmp** and keep the original corners.pmp file intact for later use.

It's a good idea to save your job under a different name as a back-up before subdividing an Area Feature in case you need to use the original intact Area Feature for some other purpose. The newly saved file will be the active job file. Therefore, if you wish to work on the original file, then open that job file before proceeding.

Whenever you open another job, the program automatically saves the data in the

current job and closes the current job.

### Accessing the Documents Folder

The data files, such as the \*.pmp job files, will reside in the **Documents** folder for the application. To access your data files outside of the application, first sync your device with the iTunes® program. Then you should see an **Apps** tab across the top of the screen. Click on that tab then scroll down to the **File Sharing** section. Click on the **Farming GPS GIS II** app name. After a while, the data files associated with this app will show up on the right-hand side.

You may copy files between the Documents folder for the app and your desk-top computer. You can drag files into or out of this Documents folder. You may use the **Add** button on the iTunes® screen to select and add files from your computer to the Documents section. **Make sure the job file you are copying is not the working job file.** In other words, open a different job file to make it the working job file.

To delete a file, first highlight it then press the **Del** button on your computer.

**Caution: A deleted file cannot be recovered.** Always make sure you really want to delete a file before proceeding.

### **Please note:**

Before updating to a new version of **iOS**, first back up all you apps and data files. Also, should you decide to remove an application software for some reason, beware that all the associated data files will be deleted. If you wish to save the data files, please save a copy to your desk-top computer before removing the app.

### Importing Shapefiles

You may import the data from Shapefiles for use within this app. As each Shapefile has several files associated with it (e.g. the .shp, the shx, the .dbf, and the .prj files), please make sure all these files are present in the **Documents folder** for the application.

To import a Shapefile, first open the desired Job file, or create a new Job file. Choose **Job** then select **Import Shapefiles**, select the desired Shapefile then tap the **OK** button.

Select the Datum, Coordinate System, Unit and Region in which the data was saved in the Shapfile then tap the **OK** button. If the selected Datum and Coordinate System do not match those in the Shapefile, the data may fail to come in or it may not be properly displayed.

The imported data will be converted to WGS84(1150) ITRF00, METERS, and Epoch 01/01/2014.

## Importing a DXF file

You may import the shapes from a DXF file and work with them in this app.

To import a DXF file, first open the desired Job file, or create a new Job file. Choose **Job** then select **Import DXF**. The Import DXF screen will list all the DXF files present in the **Documents folder** for this app. Select the desired DXF file then tap the **OK** button.

Select the Datum, Coordinate System, Unit and Region in which the data was saved in the DXF file then tap the **OK** button. If the selected Datum and Coordinate System do not match those in the DXF file, the data may fail to come in or it may not be properly displayed.

The imported data will be converted to WGS84(1150) ITRF00, METERS, and Epoch 01/01/2014.

## Set up Coordinate System

To change the coordinate system for displaying Feature data, first tap **Menu**, select **Setup** then select **Coordinate System**. Select the desired system and distance unit then confirm.

**Caution:** Make sure the **coordinate system** and **distance unit** are correct before tapping on **OK** to confirm. For UTM, make sure the UTM Zone is correct. For SPC, make sure the State, Region and Zone are correct. For a user-defined coordinate system or a local NEZ plane, be sure to select the name of the proper system to use.

This app can work with a user-defined coordinate system that you have defined using the optional PC-GIS software. After defining the user-defined coordinate system, use iTunes to copy the **user\_cor.sys** file (in lower-case letters) from the PC to the Documents folder for your app. From the Main Menu of the app, select **Setup** then select **Coordinate System** then select **User Defined** to access the new coordinate system.

This app will let you calibrate a local NEZ coordinate system. To do so, first select **Setup** from the Main Menu then select **Coordinate System**. Tap on **NEZ** then tap on **OK**.

Tap on **Edit** then enter a name for the coordinate system into the Plane Name field..

Mark the **Control Point** option. Select **Reference Point** and enter the corresponding GPS and NEZ coordinates. Then select **Control Point** and enter the corresponding GPS and NEZ coordinates. You may use the **Pick** button to select an existing GPS point as the Reference Point or the Control Point, and its coordinates will be automatically entered. The resultant calibration angle and scale will be displayed.

If you know the angle and scale for calibrating the local coordinate system against the LLA system, then unmark the **Control Point** option and enter these parameters directly.



Please note that the "N" direction (or Y-axis) of the NEZ system is in the "up" direction on the screen.

### **Set up Units and Angle System**

Select the **Unit and Angle System** under **Main Menu - Setup** to specify the desired length unit for displaying distances and line segments. The areas will be computed in the metric or British system accordingly.

Available choices for displaying angles are **Azimuth** and **Bearing**. If Azimuth is chosen, also specify the **Angle System**: North or South. Angles will be displayed in Degrees, Minutes and Seconds (DMS).

This Setup screen will also let you select the elevation system used for displaying, importing or exporting elevation values. Select **Orthometric(MSL)** when working with Mean-Sea-Level elevations. Select **Ellipsoidal(HAE)** when working with elevations based on the ellipsoid.

### **Set up GPS Data Collection**

You may set up the **default data collection parameters** for Point, Line and Area Features by tapping the **Menu** button, selecting **Setup** then selecting **Data Collection**.

### **Set up Navigation**

Under Setup/Navigation Settings, you can also specify how to keep the screen focused on your location by selecting an option for the **Navigation Zoom Mode**.

In the **Auto Scroll** mode, the job map will scroll to keep your position displayed on the screen while you are moving along. The map scale will not change.

In the **Auto Zoom** mode, when you hit the border of the screen, the app will automatically zoom out to let you see more of the job map.

The **Move Map** mode does not apply to the built-in Apple Map, which is fixed in the "up" direction. The Move Map mode will work with the \*.pim map images prepared by using the PC-GIS software program. Such a background map will re-orient itself to align with your direction of motion in the Move Map mode. When you are moving at a high speed (such as in an aircraft), and you don't want the map to be constantly reorienting itself while you are collecting data, you could mark the check box for **Margin** and specify a boundary within which the map will stay still. When you cross the boundary, then the map will re-orient to align itself with your direction of motion.

### **Set up Color/Pattern**

You can set up the default symbols and colors to be used for displaying the Point, Line and Area Features.

**Selection Color** is the color that will be used for displaying the currently selected Feature. The orange color makes the selected Point, Line or Area stand out from

the other Features in the job map.

**Default Point Pattern** is the symbol/color that will be used by default for displaying newly added Point Features.

**Default Line Pattern** is the line style/color that will be used by default for displaying newly added Line Features.

**Default Area Pattern** is the pattern/color that will be used by default for displaying newly added Area Features.

### **Set up Stakeout**

Select **Stakeout Settings** under **Main Menu - Setup** to setup how the stakeout will be graphically displayed. In the **Stakeout Setup** screen you may turn off the **Navigation Beep**, if you wish. You may also specify the **Tolerance** range as well as the type of notification you wish to receive when you get within the tolerance range of the target.

If you mark the checkbox for **Display Message**, then when you are inside the target range, the "Target!" message will flash on the screen.

If you mark the checkbox for **Target Beep**, then when you are inside the target range, beeps will be sounded.

To use the tolerance range for checking only the horizontal distances, select **2D** for **Stakeout Mode**. If the the tolerance range is to be applied for checking the elevation, then select **3D**.

You can also specify how to keep the screen focused on your location by selecting an option for the **Stakeout Zoom Mode**. In the **Autoscroll** mode, the job map will scroll to keep your position displayed on the screen while you are moving along. The map scale will not change. In the **Autozoom** mode, when you hit the border of the screen, the app will automatically zoom out to let you see more of the job map.

### **Set up Feature Labels**

This app gives you the option of labeling the line segments, areas and corner angles for the selected Feature when feasible. This option is described in the section titled **Feature Properties**.

You can define the font color and size for the labels after selecting **Feature Labels** under **Main Menu - Setup**.

Mark the **Show white background** checkbox if you wish to have the labels displayed on a white background to make them stand out better over a satellite map.

### **Set up Auto Label**

You will also have the option of having the all Features in the selected Feature

Topic labeled with their ID information and/or Attribute Values.

You can define the default font color and size as well as the placement of these labels with respect to the Features after selecting **Auto Label** under **Main Menu - Setup**.

These settings will be applied to newly created labels. They will not affect any existing labels.

### Set up for iCloud® Service

This app supports iCloud® service for file storage. To make use of iCloud® Storage, make sure that Documents and Data is turned ON under the Cloud setting on your device.

In Farming GPS GIS II, under **Menu/Setup/iCloud**, mark the type of files for which you wish to enable iCloud.

When you enable iCloud for a file type, the app will move the selected type of files to your iCloud® storage location whenever you tap the **OK** button on the iCloud Setup screen. Afterwards the app will look for that type of files only from the iCloud storage until you unmark the iCloud check box for that file type.

For example, if you select iCloud® storage for the “**Job**” file type under **Menu/Setup/iCloud**, the folder for loading and saving the .pmp files and for importing the Shapefiles would be on the cloud. Therefore the app would attempt to look for the files in iCloud. Unmarking the iCloud storage setting will permit the app to look for the .pmp files and the Shapefiles in the local Documents folder for this app.

Helpful Tip: As there are two possible places for storing your files, when you are puzzled why you are unable find a certain file, be sure to inspect the iCloud Setup under **Menu/Setup/iCloud**.

To view the names of the files stored on cloud, tap the **Settings** icon on the Home page of your iOS device then select iCloud\Storage & Backup\Manage Storage\iGPSGIS II.


The files stored at the iCloud® storage location can be shared with another iPad® or iPhone® device. They can be shared between the Farming GPS GIS II, iGPSGIS II and iCMTGIS II applications. For example, if you use iCMTGIS II to load a **.pim background image to iCloud**, you could make use of that background image in Farming GPS GIS II or another iCMTGIS II using the same iCloud account.

A word of caution regarding sharing the **.pmp job files** or the **.fbr feature list files** using iCloud. As defined by Apple, if two apps use the same file on the cloud, these apps must synchronize the file automatically. Therefore, you must take care when using the same file in two different apps if you will be making changes to the file, or if the file formats of the two apps are not compatible with each other.

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## Display Map and Turn GPS On/Off

Whenever you are connected to the Internet via wi-fi and your location can be determined, the default built-in Map for your device can be displayed as the background map for your job data.

You may select one of the following view modes after tapping the **Main Menu** icon  then choosing **Map**:

**Show Standard** - Show a map of streets, landmarks, and bus stops.

**Show Satellite** - Show satellite photos.

**Show Hybrid** - Show street names on satellite photos.

To turn off the Map display, tap **Close Map** on the Map menu.

## Registered Image

You may select **Menu/Background Map/Load Registered Image** to select a geo-referenced image in the **.pim** format to be loaded as the background for the job.

The Raster images (\*.tif, \*.jpeg, \*.sid, \*.ecw) to be used with this app must be converted into the proper format (\*.pim) before they can be loaded into the app. You can use PC-GIS, PC-GPS or PC-MAPPER to do so. These are optional mapping software programs designed for use on a PC or on a Mac operating in PC mode.

Before loading a .pim file, make sure the correct coordinate system and distance unit have been selected under **Menu/Setup/Coordinate System**.

Click on the file you wish to load into Map View then click **OK**.

A sample DRG file named **squawcreek.pim** is included with this app. You could open the cvoarea.pmp Job file then load this registered image to view the Features displayed on top of this background map.


## Where am I?

When you start a new job, the app does not know where you are.

1. With the Map turned on, you can find your continent then zoom in to your country, your city, hence your neighborhood. You may zoom into or zoom out of portions of the graphical view by using your fingers to pull or pinch on the display, respectively.

2. When Map is turned on, you could use the **Locate a Point by Address** function


to enter your address or your coordinates to locate your position.

3. If your device is equipped with GPS or has Location Service, then you can tap the **GPS** icon  to turn on GPS. When prompted, confirm to allow the app to use Location Service to find your location. This will permit the app to immediately zoom to your location. (Make sure the **Location Service** is turned on for the Partition - Distance - Area application software under Settings on your device. With iOS6, Location Service setting is placed under Settings - Privacy.)

To view your current position and GPS accuracies, select **Position Info** after turning on the **GPS**. Wait 5 - 10 minutes to let the GPS stabilize. If your device is set to Auto-lock after a number of minutes then when it turns off, GPS will also turn off. You will need to unlock your device to continue working.

To nail down your location, you will need to digitize at least one Point location.

In the section titled **Digitize Features**, we will show you how to digitize a Feature in the **mycorners.pmp** job file. As the points in this job are located in

Oregon, USA, you will want to tap on  to **turn GPS OFF for now**. Otherwise, the app will always zoom to your current location, which most likely is very far away from the sample job location.

Go ahead and turn on **Map** in the **Show Satellite** mode.

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### **Set up a Feature List**

In this app a geographic feature is regarded as an object at a location. Such an object is called a Feature, which can be one of three types: **Point Feature**, **Line Feature**, **Area Feature**. For example, a barn could be represented by a Point Feature, a stream could be represented by a Line Feature, and a farm tract could be represented by an Area Feature. Besides recording the position information for a Feature, we usually also want to record a description and other relevant information for that Feature.

In this section, we will talk about setting up a Feature List for use with existing Features. Therefore, we will ignore the data collection parameter fields such as Collect Mode, Intvl/Sess and Dist.[Uft].

### **Features, Attributes and Values**

A good data organization practice is to place Features of the same type that share the same characteristics together into one group. Such a group of Features is called a **Feature Topic**, or simply a **Topic**. Each Feature Topic is placed on a separate GIS map layer. This will permit certain operations to be carried out on the entire map layer when so desired. For example, if there are three barns on a farm, we would put those three Point Features under the Feature Topic named "Barns". When we don't want those barns to show on the map, we could simply turn off the

"Barns" Feature Topic.

A **Feature** can be described by a set of **Attributes** and **Values**. An Attribute is the name of a specific descriptor. The Value is the actual quantitative or qualitative description.

**Example:** A tree may be recorded as follows:

Feature: Tree  
Attribute: Species  
Value: Fir


The app will automatically record the position data.

You can set up one or more **Feature Lists** to pre-define the Feature/Attribute/Value database. When you associate a job with a Feature List, you will be able to add Feature Topics from that Feature List along with the pre-defined Attribute and Values. This will speed up the process of tagging the Features with descriptions. Instead of typing all the descriptions, you will simply pick and choose the appropriate description for each Feature.

A Feature List can be used by one or more jobs. Therefore, if you will be doing a number of similar jobs, you could define a Feature List containing Features, Attributes and Values that can be shared by all of these jobs.

The file name extension for Feature Lists is **.fbr**.

### Viewing a Feature List

To use the Feature List function, tap on the **GPS Menu icon**  then select Feature List. If there is a Feature List associated with the active Job, its contents will be displayed. Otherwise, the **Select Feature List** screen will pop up to display the existing Feature List files.

Your app comes with the sample Feature List named **farm.fbr**. Tap on farm.fbr then tap on the **OK** button to display the Feature List definition screen.

Tap the **Save As** button then enter "myfarm" to save the Feature List as **myfarm.fbr** to work with. This way the original farm.fbr will remain intact should you want to view it again as an example in the future. The **Save As** function is very useful if you need to create a new Feature List that has a similar setup as the currently active Feature List. Instead of adding all the Attributes and Values again, you will only need to make the necessary changes.

The Feature List screen contains three main sections for entering data. The active section is colored greyish blue.

For the **myfarm.fbr** Feature List, the **Feature section** shows two Feature Topics . The **"Well"** Topic will contain Point Features. Therefore it is assigned a Point Type and a representative point symbol. The **"Fence"** Topic is assigned a Line Type and a representative line style.

Tap on **"Well"** to highlight this Topic. In the **Attribute section** below, you can see

three Attributes that have been defined for this Topic.

Tap on "**Condition**" to see the three pre-defined Values for the well head in the **Value section**. Similarly, there are two pre-defined Values for "Contamination". Having pre-defined Values for an Attribute facilitates assigning descriptions to a Feature. Instead of having to enter the description for a Feature, you can simply select it from the displayed list. Feature attribution can be performed via the **Sheet View** or the **Feature Properties** function.

We did not define any Values for the "**Last checked**" Attribute because this could be any date.

In the same way, you can tap on the "**Fence**" Topic in the **Feature** section to view its Attributes and the corresponding pre-defined Values.

Below the Value section, there is a checkbox named **Activate Pattern**. When this checkbox is marked, a column titled **Pattern** is displayed in the **Value** section. This gives you the option of assigning a different symbol for each Value to help differentiate the Features in the Map View. In the farm, for example, we are making use of this capability to use symbols of different colors to represent the various conditions of the well heads and the different types of fences.

Please note that Activate Pattern can be active for one Attribute only. If you had this check box marked for an Attribute then decide to mark a different Attribute, the first Attribute will lose its Activate Pattern status. The currently active color/pattern scheme will apply automatically to newly added Features. However, you will need to take care of updating the color/pattern assignment for any existing Features if they have been previously assigned a different set of color/patterns.

The **Type** box below the Value section is for specifying the data type of the Values. The "**Text**" type is for text descriptions. You may specify in the **Width** box the maximum number of characters that can be entered for the text description. For the "Last checked" Attribute, we set the width to "10" as we expect to enter dates in the mm/dd/yy format.

For numeric Values, you would select "**Integer**" if all the pre-defined Values for an Attribute will be whole-numbers. You could select "**Decimal**" if the pre-defined Values for an Attribute will be decimal values. You can specify the **Dec. Digits** box the number of decimal digits that can be entered.

### **Editing a Feature List**

You may open an existing Feature List and change it as appropriate. The following commands are shared by the **Feature**, **Attribute** and **Value** sections:

**Add:** Add a new blank record at the end of the list.

**Insert:** Add a new blank record above the currently highlighted record.

**Delete:** Delete the selected record.

Let's add a new Feature Topic to the **myfarm.fbr** file that we saved in the previous subsection, and define its Attributes and Values. To do so, first open myfarm.fbr if it is not already open. Tap anywhere in the **Feature section** to activate it then tap the **Add** button.

The Feature Topic you will be adding is an Area Topic that represents farm plots. Enter "**Plot**" as the Feature name and select **Area** as the Feature Type. Double-click in the cell for **Pattern** then choose an area pattern to represent the farm plots on the map. The second pattern on the first row looks like a nice pattern to use.

With the "Plot" Feature Topic selected, tap anywhere in the **Attribute section** to activate it. Tap the **Add** button then enter "**Crop**". Tap the **Add** button again then enter "**Yield**". Tap the **Add** button again then enter "**Yield/acre**". If you need to edit a data field, first **double-tap** that cell then type over or change its contents. Leave the **Type** field as **List** for all of the Attributes in this example.

Tap the **Save** button from time to time to save what you have entered.

Now select "Crop" then tap anywhere in the **Value section**. To populate the List of pre-defined Values, tap the **Add** button then enter "**Beets**". Tap the **Add** button again then enter "**Cabbage**". Tap the **Add** button again then enter "**Carrots**".

Mark the **Activate Pattern** checkbox to see the **Pattern** column displayed in the **Value** section. Double-tap the pattern for Beets and assign a deep purple color to it. Assign a blue color to Cabbage, and assign a red color to Carrots.



Leave the "Yield" and "Yield/acre" Attributes without pre-defined Values. You will be entering the yield value at harvest time, and we will let the app calculate the yield per acre based on the acreage of the plots.

As we will be entering numeric values for the "Yield" Attribute, such as 27630.5 (lbs.), tap on "Yield", select **Decimal** for the **Type** box, and enter "**1**" for **Dec. Digits**. As we expect the computed yield per acre to be a decimal value, tap on the "Yield/acre" Attribute, select **Decimal** for the **Type** box, and enter "**1**" for **Dec.**




## Digits.

Tap on **OK** to save any changes and close the Feature List function. If you tap the **Cancel** button, then the screen will close without saving the last changes to the data.

## Creating a New Feature List

Now you can try and create a Feature List of your own after thinking about what types of Features you will be recording and what Attributes and Values might be useful to store with these Features.

Tap on the **GPS** Menu icon  then select **Feature List**. If there is no Feature List associated with the active Job, the **Select Feature List** screen will pop up to display the existing Feature List files. If there is a Feature List associated with the active Job, its contents will be displayed. In that case, tap the **Open** button to display the **Select Feature List** screen.

Tap the **New** button then enter a meaningful name in the “FileName:” box, then press the **OK** button.

The **Feature** section will be active in your new Feature List. Tap the **Add** button to add the Feature Topics you wish to define. You may define the Attributes and Value for each Feature Topic immediately after adding the Feature Topic, or you may add all the Feature Topics then define the the Attributes and Value for each.

In the **Attribute** section, tap the **Lock** checkbox for an Attribute if you wish to lock the Values associated with this Attribute. When this option is chosen, you may only select from the defined Values and not enter just any Value to tag the Feature.

For the **Type** column in the Attribute section, select **List** if the Values to be defined are a group of discrete numbers or names. Select **Range** if the Value entry will be a number between a lower limit and an upper limit. If you select **Range**, then the **Lock** checkbox will be automatically marked for the Attribute. This means that the Values entered will always be checked against the defined Range for data validity.

You will also be able to mark one of the Values as the **Default** Value. If most of the data you collect will have the same description, it will save time if you specify this as the default description for that Attribute in the Feature List.

If the Attribute is of **Range** type, enter the **Min** (lower bound) and **Max** (upper bound) Values. You will also be able to enter a **Default** Value to be displayed during data collection.


After defining the Attributes and Values for the Feature Topic that you have added, if you need to define another Feature Topic with a similar Attribute and Value setup, then you can save time by using the **Duplicate** function. You will need to change the duplicate Feature Name to a new unique name yourself. To do so, **double-click** on one of the duplicate Feature Topic Names then type over it.

Tap the **Save** button from time to time to save what you have entered so far.

After completing the Feature List, tap on **OK** to save any changes and close the screen. If you tap the **Cancel** button, then the screen will close without saving the last changes to the data.


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## Topic View

The Features in your map are organized into Feature Topics, or Topics for short. To see a list of all the Feature Topics you have in the currently active job file, tap the **Topic View** icon . This icon is a toggle tool for turning the Topic View on or off.


When you tap on one of the Topics in the Topic View, that Topic becomes the **active Feature Topic**.

Also, when you to **tap on one of the Features in Map View**, the Topic, to which that Feature belongs, becomes the active Topic.

For example, in the **mycorners.pmp** job, there is one Topic named "Corner" that contains three Point Features represented by the blue dots. When you tap on , you will see "Corner" listed in the Topic View panel on the left side of the screen. You can tap on "Corner" to highlight it and make it the active Topic.


You can toggle the **display** of a Topic ON and OFF by clicking on the mark box to the left of each Topic name.

To change the **symbol** assignment for a Topic, simply double-tap the existing symbol displayed by the Topic name in Topic View then select the new symbol.

The **Topic Menu**, represented by the **Topic Menu icon** , provides the function to create a new Topic, as well as a number of other functions that operate on the currently active Topic.

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## Topic Menu

The **Topic Menu** contains functions that operate on the Feature Topics. It is accessed by tapping the **Topic Menu icon** .

## Creating a New Feature Topic in a Job

Before adding a Feature to the map by digitization, you will need to select the appropriate Feature Topic into which that Feature will be placed. If such a Feature Topic does not exist, then you will need to create it.


To create a new Feature Topic in a job file such as **mycorners.pmp**, tap the **Topic**

 then select **New Topic**. Enter a Topic Name, such as **Tree**. Since trees are regarded as point objects, select **Point** for the **Type** field. You can add one or more **Attribute Names** (title of description) for this Topic and specify the data type and parameter. Let's tap the **Add** button and enter "Species" as the (Attribute) Field Name. This Attribute is a Text descriptor. We can leave the **Width** at 23 to accommodate certain long species names.

Notice the little pull-down arrow in the **Field Name** cell after you tap the **Add** button? This app comes with a number of **Built-in Attributes** that you may incorporate into a Topic as an Attribute. To add such an Attribute, tap on the pull-down arrow then select the desired item. If you select the Elevation attribute, the MSL or HAE elevation will be used depending on what you've selected for the Unit and Angle System Setup.



If a **Feature List** is associated with the active job, you can tap on the down arrow for the Topic Name field and see a list of the pre-defined Feature Topics. You may select one of these pre-defined Topics to include in the active job.



We have previously created a Feature List named **myfarm.fbr**. We will associate this Feature List with our sample job. To do so, select **Job** from the Main Menu then select **Open Job**. For File Name select "**mycorners.pmp**". For Feature List select "**myfarm.fbr**". Tap the **OK** button to confirm and return to Map View.

 then select **New Topic**. Tap on the pull-down arrow for the Topic Name field to see the available Topics to add from myfarm.fbr. Select "**Well**" then tap the **OK** button to confirm. In the same way, add the "**Fence**" Topic and the "**Plot**" Topic from myfarm.fbr.

When done, tap the **OK** button to close the Sheet Update screen.

## Editing a Feature Topic

To edit an existing Topic, first tap on  and select that Topic from the Topic View panel. Tap the **Topic Menu** icon  then select **Edit Topic**. You may make changes to the **Topic Structure**, such as by adding more Attributes to the Topic. Or you may tap the **Sheet Setup** tab and change the order in which the Attributes will be displayed in **Sheet View**.

Let's add a built-in Attribute to the "**Plot**" Topic in the **mycorners.pmp** job. Tap on  then tap on "**Plot**" in Topic View. Tap on  then select **Edit Topic** to display the Sheet Update screen.

Tap the **Add** button then tap on the pull-down arrow by the highlighted "Name1" to display the built-in Attributes. Select "**Area\_Acres**" and enter "2" for Decimal Digits. Tap **OK** to confirm. This Attribute will automatically compute the acreage of an Area Feature you place in the Plot Topic.

## Defining a Formula



While creating or editing a Feature Topic, you may enter a formula for an Attribute based on the Values of other Attributes for the same Feature Topic.

For example, if you have an Attribute defined for Unit Price, and an Attribute defined for Yield, you could define an Attribute for **Revenue** and enter for it the formula:

**Unit Price \* Yield**

The reason we added the "**Area\_Acres**" Attribute to the "**Plot**" Topic in **mycorners.pmp** job is so that we can compute the yield per acre for each vegetable crop. In other words, we want to define for the "**Yield/acre**" Attribute the following formula:

**Yield / Area\_Acres**

To do so, first tap on  then tap on "**Plot**" in Topic View. Tap on  then select **Edit Topic** to display the **Sheet Update** screen.

Highlight the **Yield/acre** Attribute then tap the **Formula** button.



Tap the **Select Attribute** button and select "**Yield**". Enter the division operator "/" then tap the **Select Attribute** button and select "**Area\_Acres**". The resultant formula will be displayed in the Formula box.

Tap on **OK** to save the formula.



Specifying a formula for an Attribute means that the Value for that Attribute will be automatically computed from the Values of the Attributes used in the formula .

### Moving a Feature Topic

In general, you will want to have Point Feature Topics and Line Feature Topics placed above the Area Feature Topics so that the Area Feature layers won't block out the Points and Lines underneath.


You can **change the order** of the Topic layers. To do so, first tap on  then tap on  and select **Move Topic**. A handle will appear by each Topic Name. Now grab a Topic by the handle and drag it to a different location in the Feature Topic List.

### Deleting a Feature Topic

To delete an existing Topic, first tap on  and select that Topic. Then tap on  and select **Delete Topic**. This will delete the Topic definition as well as all the Features on that Topic layer.

**Caution: A deleted Topic and the Features in that Topic cannot be recovered.**

## Auto Label

If you wish to have the Features displayed in Map View along with one or more of its identification labels or descriptions, first tap the **Topic Menu** icon  then select **Auto Label**.

You may opt to show the Feature's **Topic Name**, **Sequence#** or **Feature ID**.

You may select one or more **Attributes** to be displayed.

Select **Delete Labels** if you wish to have the labels deleted.

Select **Hide Labels** if you only want to hide the labels but not delete them.

Tap on the **Font** tab to change the font size, font type face, or the **Freeze label size in zoom** setting.

You can set the default size, color and placement of these labels with respect to the Features by using **Main Menu - Setup - Auto Label**.

The settings under **Main Menu - Setup - Auto Label** will only be applied to newly created labels. They will not affect any existing labels. If you wish to have the new settings applied to all existing auto labels then you should use the **Delete Labels** button to remove all existing auto labels then create the auto labels again.

You may adjust the placement of an auto label by tapping on it to select it in **Map View** then dragging it to the desired location.

You may change the properties of an auto label by tapping on it to select it then tapping on the **Feature Properties** icon.

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## **Digitize Features**

You may manually add new Features to the current Job file. GPS is not needed, but if you wish, you could pick the GPS position for adding a Point Feature or for adding a node for a Line or Area Feature.


Let's open the **mycorners.pmp** job, to which we have previously added a few Feature Topics.

### Adding a Point Feature



The first step in digitizing a Point Feature on the displayed Map is to create or activate a Point Topic.


In the **mycorners.pmp** job map, tap the **Topic View** icon  then select the Point Topic named **"Well"**. Tap the Topic View icon again to toggle the list of Topics



off.

Now, tap the pull-down arrow beside the **Map Tools** icon. Select **Add Point Manually** .


Tap once on the satellite Map near the houses with red roof tops to drop a point. Tap on the Map again in the area between the triangular plots and the larger plot to their right.

The **Add** tool   at the top is a toggle switch that you can use to halt the point digitization and reactivate the regular **touch-screen** mode so you may zoom or pan the screen. Tap on this toggle again when you are ready to add more points.


If there are existing Features on the map and you want a new point to snap to one of the existing Features, then tap the **SnapToNode tool** . When the SnapToNode toggle is on, the point you add will be dropped on top of the nearest Point or node.

If your device has GPS capability, you could add a point right at the current GPS position. To do so, first tap the **GPS icon**  to turn on GPS then tap the **Pick GPS icon**  to add the Point Feature. (Do this in another job file as we do not wish to add a very distant point to this sample job file.)

Tap the **Back** button to return to the main Map View.

Now we wish to add a Point to the "**Corner**" Point Topic. First tap on  then select "**Corner**" in the Topic View panel. Tap the Topic View icon again to toggle the list of Topics off.

On the Corner Topic layer there are already three Points marking three corners of a triangular plot of land. If you look carefully, you will notice that the right-most corner of the plot is actually clipped off and is not represented by a single apex. Our task is to add another point at the fourth corner of this land plot.

To accomplish the daunting task of placing a dot precisely at the desired location, tap on the donut-shaped **Node tool** . A larger donut with crosshairs at its center will be displayed on the map. Touch on the purple area of this tool and drag the crosshairs to the fourth corner of the land plot. Then tap once in the donut hole to drop the node. (You could also keep holding down on the purple donut and use another finger to touch outside of the donut area to drop the node.)

When done with the point digitization, tap the **Back** icon to end the digitizing session and go back to Map View.

If you wish, you could select the Tree Topic that you have added to this job previously and digitize a couple trees on this Topic layer.

### Add Point by Coordinates

If you know the coordinates for the point you wish to add to the map, you may add the point by using this information. To do so, first create or activate a Point Topic. Then tap the pull-down arrow by the **Map Tools** icon and select **Add Point by**

**Coordinates**  .

Enter the known coordinates then confirm the screen. Make sure you specify the correct North or South Latitude, and the correct East or West Longitude. Otherwise a point may be created very far away from your job site.


You may tap on the **Pattern** button to select a different symbol and color for the Point Feature to be created.


The Orthometric height is the elevation based on mean-sea-level. The ellipsoidal height is based on the ellipsoid.


Tap on **Cancel** if you decide not to create the new point.

### **Adding a Line Feature**



To digitize a Line Feature, first select an existing Line Topic or create a new Line Topic.


In the **mycorners.pmp** job map, tap on  then select the Line Topic named "**Fence**". Tap the Topic View icon again to hide the list of Topics.

When a Line Topic is active and you tap the pull-down arrow for the **Map Tools** icon, you will see that the **Add Line manually** tool is active. Tap this selection, and the Add Line manually tool icon  will be displayed as the active Map Tool.

Now, tap along the left border of the larger field to add a fence line. Use the **Node** tool  to add nodes and make a line that looks very close to the one shown below:




The **Add** tool , the **SnapToNode** tool , and the pick GPS position function work in the same way as for digitizing Point Features.

Turn on  **Snap to Line** when you wish to snap your new line to an existing Line or Area Feature. Then when you tap close to that Line or Area Feature, your new line will snap to the nearest node on the existing Line or Area Feature.



**Include Boundary** is a powerful tool that lets you incorporate all or part of a line or an area boundary in the new Line Feature you are digitizing. After turning this tool on, first tap on the line or area of interest then tap on the starting and ending nodes of the section you wish to include in your new line. Tap on the **Finish** button to finalize this action. Then you may select another boundary line to include, or continue to tap on the screen to drop nodes for the new line.

You may tap the **Undo** icon  to back-step and remove the last added node, if necessary.

When you have digitized the last node for the Line Feature, if you wish to add another Line Feature, then tap the **Next Line** button. Otherwise, tap the **Back** button to exit this screen.


When you tap on the Line Feature on the main screen, its Point ID and coordinate information will pop up briefly.


### **Adding an Area Feature**

To digitize an Area Feature, first select an existing Area Topic or create a new Area Topic. Digitizing an Area Feature works the same way as digitizing a Line




Feature, except that the Area Feature forms a closed region.

In the **mycorners.pmp** job map, tap on  then select the Area Topic named "Plot". Tap the Topic View icon again to hide the list of Topics.


When an Area Topic is active and you tap the **Map Tools** pull-down arrow, you will see that the **Add Area manually** tool is active. Tap this selection, and the Add Area manually tool icon  will be displayed as the active Map Tool.

In the screen for digitizing an Area Feature, you may tap on the **Area Pattern** button to select a different pattern and color for the Area Feature you digitize.

Let's create an Area Feature by joining the Point Features at the four corners of the nearly triangular land plot.

With the **Snap to Node** icon  turned on, tap close to each of the four Point Features in the clockwise or counterclockwise direction. You don't need to tap on the first point again. Tap the **Next Area** button to close the **Plot001** area you have just formed.

Now let's digitize the larger plot by the fence. Since the fence lies along one side of this plot, we can save some time by making use of the **Include Boundary** tool. In

the screen for digitizing an area, tap the **Include Boundary** icon . Tap on the Fence feature to display its nodes. Select the lowest node as the Start Node then

select the uppermost node as the End Node. Tap on  to turn it off. Then use

the **Node** tool  to help complete **Plot002**, which should look very close to the one shown below:




You may tap the **Undo** icon  to back-step and remove the last added node, if

necessary.

When you have digitized the last node for the Area Feature, tap the **Back** button. The software will automatically close the gap between the first and the last digitized nodes and return to the main Map View.

### **Adding Description for Digitized Features**

To be able to enter descriptions to a Feature that you have digitized manually, you must have Attributes set up for the Feature Topic to which the Feature belongs. If you have not set up the Attribute Names while creating the Feature Topic, you can do so after tapping on  then selecting **Edit Topic**.

Once the Topic/Attribute structure is in place, the Attributes can be presented in a spread-sheet format and you will be able to enter the corresponding Values into the cells. Please see **Sheet View** for details.

Another way to add or change the description for a Feature is through the Feature Properties screen. Please see **Feature Properties** for details.

### **Labeling the Features**

There are two ways to display labels for the Features in a job.


1. Label all the Features in a Topic by using **Topic Menu - Auto Label**. This function is described under **Topic Menu**. Try labeling the areas in the Plot Topic in **mycorners.pmp** with the name of the Crop.
2. Use **Feature Properties** to label a selected Feature with its corner angles, segment lengths and directions, and/or area with units. Some of these labels may not display because of the large map scale used or because there is not enough room to display them in the map.


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### **Move Node**

The **Move Node** tool on the Map Tools Menu will let you adjust the position of an existing Point Feature or a node on a Line or Area Feature.

The steps for moving a node of a Feature are as follows:


1. Tap on the Feature to select it then tap on the Digitizing Tool Menu and select **Move Node**. If the Move Node icon  is already displayed, then simply tap on that icon to get to the Move Node screen.


If you've tapped on the wrong location, you may tap the **Reset tool** icon  to reset the selection then select the correct location.


2. Drag the **Crosshairs** to the node you wish to move then tap once in the center of

the donut to mark the node.

3. Drag the **Crosshairs** to the new position and tap once in the center of the donut to affix the node there.

When you wish to snap to an existing Point or node by tapping in its vicinity, remember to first tap on the **Snap to Node** icon  to turn it on

If the Crosshairs have moved off the screen, you could tap on the  icon to bring the Crosshairs back to the center of the screen.

You may turn off the instruction text by tapping the **View Hint** icon . This will free up more screen space for displaying the job data, especially when you are using your device in landscape mode.


Tap the **Back** button to exit this screen.

Please open the job named **veggies.pmp** and use **Main Menu - Job - SAVE AS** to save it under the name **myveggies.pmp**. The data in this job looks similar to what you have in the **mycorners.pmp** job.



You will see that a corner on the right side of **Plot002** is cutting into the adjacent path. Go ahead and use the above procedure to adjust the position of a couple of the nodes to correct this problem.

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## Sheet View


After activating a Topic either by selecting it from the Topic View or by selecting one of the Features in that Topic, you may tap the **Sheet View** icon  to list all the Feature records in that Topic. The Sheet View presents the Features and their Attributes in a tabular format based on the Feature Topic setup.





As an example, select **Main Menu - Job - Open Job**. For **File Name** select **myveggies.pmp**. For the **Feature List** box, select **myfarm.fbr** then tap on **OK**. (If you haven't added the **Plot** Topic to this Feature List per our previous instructions, then select **veggies.fbr** instead.)


Tap on  then tap on the "**Well**" Topic name in Topic View. When you tap the **Sheet View** icon , you will see the spread sheet for this Topic.

Sheet View provides an alternative way for you to select the desired Feature for viewing or editing. Simply tap a record in Sheet View and watch the corresponding well get highlighted in the map.

Normally only a few records will be visible along with the map display. You may click on the **Full Sheet View** icon  to have the entire screen dedicated to Sheet

View. To return to the normal view, tap on the  icon.

You may change the order of Features in a Feature Topic by highlighting the Feature record in the Sheet View and then using the , ,  and  icons.

To delete a Feature, first highlight it then tap the **Recycle Bin** icon .

**Caution:** Always make sure you really want to delete a Feature before confirming the deletion action. **A deleted Feature cannot be recovered.**

### **Feature Attribution**

Sheet View provides a convenient way for you to add or change the description for each Feature record. You may edit the displayed Value if it is not a Value computed by using a Formula, or a Value for a built-in Attribute (such as ID and Area\_Acres).

To change a Value displayed in a cell of the Sheet View, double-tap on the cell then type over the existing data. You may do so as soon as each Feature position has been recorded. Or, you could enter the descriptive data after all the Features in a Topic have been recorded.

If a Feature belongs to a Topic added from the Feature List currently associated with the job, then the pre-defined Values will be available for you to select. For an Attribute of the **List** type, you may click on the pull-down button in the cell to select the desired value. If the Attribute is not locked, then you may also enter any Value. For an Attribute of the **Range** type, you may only enter a Value within the allowed range.


In the Sheet View for the **myveggies.pmp** job, you will see that we have already entered the Value data for some of the Features. Go ahead and enter data in the empty cells for the Features in the **Well** and **Fence** Topics. Because we have associated this job with the **myfarm.fbr** Feature List, which contains pre-defined Values for some of the Attributes, you will see a pull-down arrow for the cells in those columns, and you will be able to select the appropriate Value instead of having to type in the data.

Notice how the "Corroded" well shows up in red color, and the "Wood" fence is displayed in brown? These are exactly the colors we have assigned in the Feature List to the symbols representing those Values. Similarly, a "Cabbage" plot will be colored blue, and a "Carrot" plot will be colored red.

For the **Plot** Topic, notice how the "Area\_Acre" field is automatically populated with the acreage of the vegetable plots. Also, as soon as you have entered a value for the "Yield" Attribute, the yield per acre is automatically computed and displayed in the "Yield/acre" column.

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### **Feature Properties**

With a Feature selected in the Map View, you may tap the Feature Properties icon  to view the relevant information.

Four pages are provided for displaying the Feature properties.

Tap on the **Coordinates** button to see the Latitude-Longitude -Elevation information for the Feature. MSL is the Mean-Sea-Level value, and HAE is the elevation referenced to the ellipsoid.

Tap on the **Attribute** button to see the Attribute/Value information for the Feature.

For a Line or Area Feature, tap on the **Area and Length** button to see the line length or the perimeter and acreage of the area in the currently active units of measurement.

To attach one or more photos to the Feature, tap on the **Photos** button. You may link photos from the Photo Library or a folder on your device. And, you may tap the **Camera** button to snap a picture and have it automatically linked to the Feature.

If you would like the app to show the file name of the attached photo in Sheet view, you must add the built-in Attribute **Photos** in the Topic Structure page for the Feature Topic. If you have not yet added this Attribute, you can use **Topic/Edit Topic** to get to the Sheet Update screen to do so. The data field for displaying the photo file name(s) is limited. If the string of file names is too long, it will be truncated. Therefore, it is advisable to keep the photo file names short.

### **Assigning a Feature Symbol or Pattern**

By default, a Feature added to a Topic will assume the same symbol and color as those for the Topic. However, you may use a different symbol to represent an individual Feature if you choose to do so.

On the **Coordinates** page of the Feature Properties screen for the selected Feature, you may pick a symbol or pattern and a display color after clicking on the **Pattern** button. You may also specify a line style as well as the color and size for the border of an Area Feature.

After making the desired changes, click on the **OK** button to accept the settings.

### **Area Transparency**

You can adjust the transparency of an Area Feature within the Area Pattern Dialog.

To do so, simply enter a percentage value into the **Transparency** field, or tap the little arrows to scroll either way.

### **Show Segment, Area and Corner Angle Labels**


For Line and Area Features, you may opt to have the segment, area and corner angle labels displayed on those Features when feasible. On the **Coordinates** page,

mark the checkbox for the labels you wish to see:

### **Show Corner label**

### **Show Segment label**




### **Show Area label** (for Area Features only)

For example, in **myveggies.pmp** job, tap on one of the two vegetable plots then tap on  and mark the **Show Area label** checkbox. Do the same for the other vegetable plot.

You can change the size and color of these labels by using **Main Menu - Setup - Feature Labels**.


### **Edit Feature Attribution**

If a Feature has Attributes associated with it, the Attributes and the corresponding Values will be automatically displayed when you tap the **Attribute** tab. To change the Value for an Attribute, double-tap that cell then type over any existing Value. Alternatively, place the cursor at the appropriate position then change a few characters as needed.

In the **View mode**, with the  icon displayed, the cells are not editable until you double-tap on them. To switch to the **Edit mode**, represented by a  icon, tap on the  icon. In the **Edit mode**, each cell is ready to receive input unless that Attribute is non-editable, such as a built-in Attribute or an Attribute with a Formula defined for it.

If a Feature belongs to a Topic added from the Feature List currently associated with the job, then the pre-defined Values will be available for you to select. For an Attribute of the **List** type, you may click on the pull-down button to select the desired value. If the Attribute is not locked, then you may also enter any Value. For an Attribute of the **Range** type, you may only enter a Value within the allowed range.

### **Auto Label Text Setup**

With an Auto Label selected in the Map View, you may tap the Feature Properties icon  to view the relevant information.

You may change the label properties such as the font size and orientation. Specify the label orientation in degrees in the clockwise direction.

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### **Create Deed Calls**

The Farming GPS GIS II app will automatically generate a list of directions and distances describing a Line Feature or the boundaries of an Area Feature. This list

is referred to as the deed calls.

In addition, this app will let you create a Line Feature or an Area Feature by entering the deed calls for that Feature. This means you will be able to get a drawing of a parcel of land by using the directions and distances provided in the legal description of that property.

### **Viewing the Deed Calls for a Line or Area Feature**

Please open the sample job named **cvoarea.pmp** and save it as **cvoarea1.pmp**.

Use **Main Menu - Close Map** to turn off the map.

Tap on the purple SPRAY AREA1 to select it. Tap the down arrow for the **Map Tools** menu then select **View Deed Calls**. (If you did not select a Line or Area Feature before tapped the pull-down arrow for the **Map Tools** menu, you would have seen the Create Deed Calls function listed.)

The first node is highlighted in green color. Its coordinates are shown in the **Lat** and **Lon** boxes.

Tap on the **Calls** tab to view the deed calls for the selected area. You may scroll the deed call records up or down.

To view the details of the currently highlighted call record, double-tap on that record or tap the **Edit** button. In landscape mode, you will need to scroll to see the Edit button.

Tap the **Calls List** button from the editing screen to return to the list of deed call records.

Tap the **Back** button to return to the main Map View.

### **Entering Deed Calls to Create a Line or Area Feature**

The following example illustrates the procedure for entering bearing and distance calls for each segment of a boundary to create the deed drawing.

First, let's create a new job named **mydc.pmp** and set **Map** to **Show Satellite**.

For this example, we will be using **US Feet** as the distance unit, and we will be entering **DMS** angles in the **BEARING** mode. Please call up **Menu - Setup - Unit and Angle System** and set up the system accordingly.

Now tap the pull-down arrow for the **Map Tools** menu then select **Create Deed Calls**. (If you had selected a Line or Area Feature then tapped the pull-down arrow for the **Map Tools** menu, you would have seen View Deed Calls function listed.)

As we will be entering the deed calls for a closed Area Feature, leave the **Area** tab highlighted. If you were entering the deed calls for a Line Feature, then tap on the **Line** tab to select it.

We will use the default **Topic Name** "DeedCall". If you wish, you could tap on the **Pattern** button to change the line style for the line plot or the fill pattern for the area plot..

In the **First Node** section, enter **44°11'49.773"N** into the **Lat:** box, and enter **123°30'48.818"W** into the **Lon:** box. The node that shows up at the southwest corner of the plot will be our point of beginning.

We will leave the **Orientation** field at 0. If you enter an angle value into the Orientation field, the entire deed plot will be rotated by that amount. Therefore, this functionality could be used to re-orient a completed deed plot to line up with the background map. It will also be handy for entering deed calls that refer to the magnetic north.

Tap the **Calls** tab to go to the page that lists the existing deed calls records. Initially there are no records shown.

Tap the **Add** button to add a new call record and display the data entry screen.



First, specify the type of segment you will be adding. Choose between **Line Segment** for straight lines or **Arc Segment** to define an arc.

Our first call is a straight **Line Segment**. We enter the horizontal distance of 459 US Ft from the **green** starting point and also specify the bearing of N 10 E.

Tap the **Calls List** button to return to the listing of the Deed Calls records.





If you need to change the data entered for any record, simply tap the **Edit** button for that record to call up the data entry screen then enter the correct data. In landscape mode, you will need to scroll to see the Edit button.

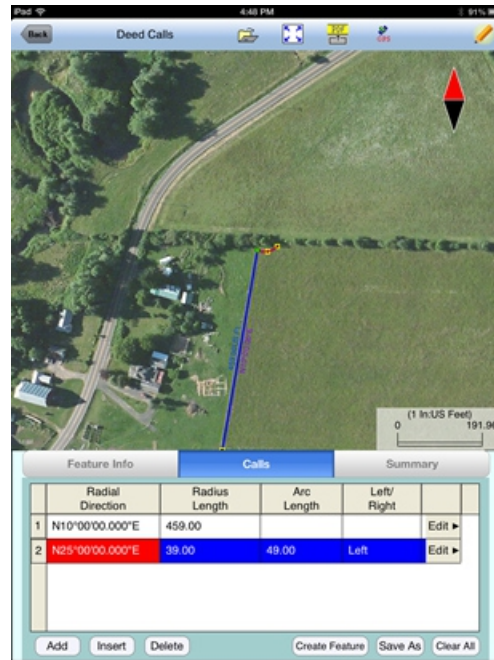
Tap **Add** and enter an Arc Segment as shown below. Tap the pull-down arrow for each field to select the appropriate option.



For an Arc Segment, specify the size and length of the arc by entering a combination of the **Radius** and one of the following: **Arc Length**, **Chord Length**, **Central Angle**. Also specify the orientation of the curve by entering the **Chord Direction**, the **Tangent Direction** or the **Radial Direction** (from the first node of arc to the center of the circle, of which the arc is a part). Select the **Continuous** option if the curve is to continue in the direction of the last defined curve or line segment. Finally, specify the **Curve Direction** to indicate whether the arc turns left

or right.

Tap the **Calls List** button to return to the listing of the Deed Calls records.



The last entered segment is highlighted in red in the graphical view.

You may zoom into or zoom out of portions of the graphical view by using your fingers to pull or pinch on the display, respectively. To fit the drawing to the screen, simply tap the **Zoom-Fit** icon. When **Map** is turned on, you may not be able to zoom to a really small scale. In that case, turn off the Map then pull to zoom into the map.

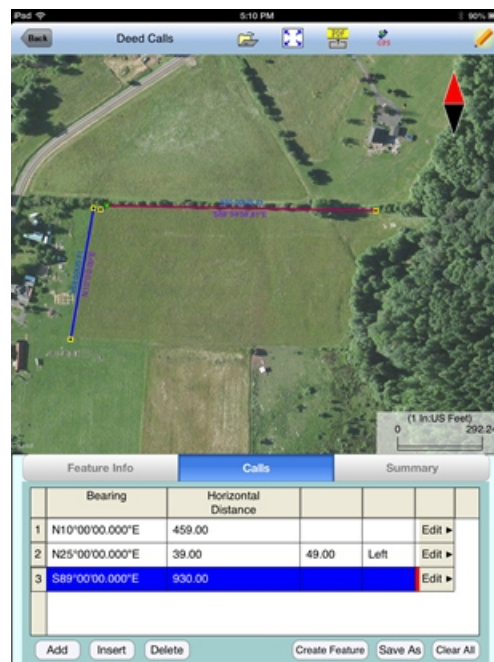
As there could be line segments as well as curve segments in your deed drawing, please note that the column titles for the list of deed calls records will correspond to the highlighted record.

Now tap the **Add** button to add a Line Segment as shown below:




If you wish to add a new segment, you could as well tap the **Add** button on this screen. This button will permit you to quickly add one segment after another without having to go back to the previous screen.

We will tap the **Calls List** button to review all the records that we have stored so far:



Whenever the Deed Calls records are displayed, you may tap the **Insert** button to insert a record before the highlighted record, tap the **Delete** button to delete the highlighted record, or tap the **Clear All** button to clear all existing deed calls from the list and start a new deed call drawing.

**Caution:** Make sure you really want to delete a record or clear all records before confirming to do so. Deleted records cannot be recovered.

When you tap the lit **Edit** icon  to turn it off, any drawing you have made so far will be displayed in **full screen**.

**Complete the drawing by entering the following data.** Remember to tap the **Add** button before entering a new call, and pay attention to the N, S, E, W designation.

**Line Segment**

Horizontal Distance: 172

Horizontal Angle: S82°00'00.000"E

**Line Segment**

Horizontal Distance: 120

Horizontal Angle: S60°00'00.000"W

**Arc Segment**

Radius: 200

Arc Length: 170

Chord Direction: S58°00'00.000"W

Curve Direction: Left

**Arc Segment**

Radius: 170

Arc Length: 188

Continuous

Curve Direction: Left

**Arc Segment**

Radius: 90

Arc Length: 185

Continuous

Curve Direction: Right

**Line Segment**

Horizontal Distance: 900


Horizontal Angle: N87°23'00.000"W

Tap the **Summary** button to see the closure errors and the perimeter and area that you would get when the figure is closed.



If this is satisfactory, tap the **Back** button then confirm to create the Feature.

### **Editing the Deed Calls**

To modify the deed calls for the Area Feature that you have just created, first tap on that Area Feature in Map View then tap the **Deed Calls** icon .

You may change the location of the Feature by changing the position of the First Node. If there are points or nodes in your job, you could tap the **Pick** button then select one of them as the first node.

You may re-orient the deed plot by changing the Orientation angle.

You may change the area pattern and color for the Area Feature represented by the deed calls.

On the Calls Page, you may **Add**, **Insert** or **Delete** a deed call record.

Be careful with the **Clear All** button as this will delete all the deed call records.

To edit a record, double-tap on it or tap the **Edit** button. ( In landscape mode, you will need to scroll to see the Edit button.) Make sure you know what you are doing before changing the distance or angle values.

If the data viewed is not the first or the last deed calls record, the **UP** and/or **DOWN** arrows will be active. You may tap the appropriate button to view or change the previous or next data record, if you wish.

To return to the display of the deed call records, tap the **Calls List** button from the editing screen. From this page you may tap the **Save As** button to save the deed calls to a text file. Enter a names such as "mycvoarea". The app will automatically add the file name extension **.dcf** (deed calls file).

If you are at the last deed calls record, you may tap the **Add** button to add a new call.


To return to the list of deed calls records, tap the **Calls List** button.

If you intend to have the changes applied to the original Area Feature, then tap the **Update Feature** button. Otherwise, tap the **Back** button to return to the main Map View. (You will be given another chance to update the Feature if you have not updated the Feature based on the changes.)

### **Saving the Deed Calls to a Text File**

To save the deed calls to a file, tap the **Save As** button on the page listing the Deed Calls records and specify the name of the file. The file extension is **\*.dcf (deed call file)**. This is a text file that you will be able to read by using a text editor.

### **Opening a Deed Calls Text File**

You may open a .dcf file that you have previously created by using this app or a text editor. To open the deed calls file, tap the **Open File** icon  on the **Deed Calls** page.

Then you may view and edit the deed calls, re-save them to a .dcf file, or create a new Feature based on the deed calls.

Please note that the Deed Calls function in this app does not support re-orientation of the deed plot. Therefore, if the .dcf file you are opening contains a non-zero orientation parameter, it will have no effect on the deed plot displayed in this app. And if you open a .pmp job file containing a Feature with associated deed calls with non-zero orientation parameter, there will be a discrepancy between the displayed deed plot and the Feature. In this case, you may clear the deed calls then create new ones based on the displayed Feature.

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### **Create Grid**

Suppose you wish to install sprinkler heads at fixed intervals in both directions to irrigate your vegetable farm. You could use the Create Grid function to create an array of **Grid Points** in the Area Feature that represents the vegetable farm. Grid points are also useful for recording soil sampling results such as the pH variation across the plot.

If you wish to have a set of parallel lines drawn over the Area Feature to represent the location of irrigation pipes, then you could use the Create Grid function to create such a set of **Grid Lines**.

The Grid you create for a selected Area Feature is placed in the **Non-Spatial Data** Topic layer. To place a grid over an Area Feature, first click in that Area Feature

then tap the pull-down arrow for the **Map Tools** menu and select **Create Grid**.

You can try it out using the Area Feature that you created in the **mydc.pmp** job.

The Grid Property dialog will be displayed:



The **Start Point** section lets you specify the reference location for the grid. You may enter the coordinates for that point or tap the **By Pick** button to select the location from Map View. If the reference point is a known point but you want to shift the grid a distance from it then tap the **Offset** checkbox to display the relevant data entry fields. The software will compute the new grid reference point.

You can change the default **grid spacing** and **grid orientation** to those appropriate for your application. You may define the grid orientation by using an existing line segment or two existing nodes. For the **mydc.pmp** job, you could select the line segment on the south side as the reference direction.

Select the **Grid Nodes** option if you wish to see the grid nodes. If you wish to see the grid lines then select **Lines**. You will have the option to create Grid Lines in the X-direction, the Y-direction, or in Both directions.


In the **Boundary** section, you may specify the boundary line style and line width.


You may also dictate whether Point Features should be created from the grid nodes, or Line Features should be created from the grid lines.


If you selected the **Grid Nodes** mode, you have the option to mark the **Create Points from Grid** checkbox to have Point Features created at the grid nodes. Accept the default Grid Points Topic, or select another point topic in which to store the new Point Features.

If you selected the **Lines** mode, you have the option of marking the **Create Lines from Grid** checkbox to have Line Features created at the grid lines. Accept the default Grid Lines Topic, or select another line topic in which to store the new Line Features.

Tap the **Preview** tab to view the grid. When you confirm the **Grid Property** screen by tapping the **OK** button, you will see the grid points or the grid lines displayed in the map.

To avoid confusion, it's best to just keep one grid for an Area Feature. To delete an unwanted grid, first tap the **Topic View** icon  and select **Non-spatial Data**.

Then tap the **Sheet View** icon , select the unwanted grid then tap the **Delete** button. The grid records are all named the same. Newer records are added at the end of the list by default.

You may edit an existing grid by tapping on it in Map View or by selecting it from Sheet View then tap on the Feature Properties icon .

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## Link Photo

The Tools menu provides the Link Photo function. With a Feature selected in Map View, when you select the Link Photo function, you will be taken to the Photos page in the Feature Properties screen.



You may link photos from the Photo Library or from the app's Documents Folder on your device.

To snap a photo on the spot, tap on the **Camera** button. When the photo you've just taken looks fine, tap the **Use** button to have it automatically linked to the Feature. If you decide not to use that photo, then tap the **Cancel** button.

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## Create Buffers

This app will allow you to create a buffer zone around a **Point Feature**, along a **Line Feature** or along the perimeter of an **Area Feature**. You may also create multiple buffers at a fixed interval, multiple buffers at different distances from the Feature, as well as **Area Strips** with specific starting and ending distances.

To use this function, tap on the **Utilities menu** icon  then select **Create Buffer** . The Buffering dialog will be displayed.

Suppose we wish to map the area to be mowed between the fence in **myveggies.pmp** and the stand of trees on its left side. Instead of digitizing this strip




of land, we could create a 60 ft wide buffer zone for the **Fence001** Line Feature. Please set the distance unit to **Feet** for this example. (If you are working with meters then use 18.29 Meters for the buffer interval.)


With the cursor at the **Source** box, tap on the **Fence001** Line Feature to select it.

Enter 60 as the **Buffer Interval**. Tap on the button showing "**Left**". Leave the Resultant Topic as "Buffer".

We will keep the checkbox for **Entire Feature** marked because we want to create a buffer for the full length of our fence. If you wish to buffer just a part of a Line Feature, you could unmark the checkbox for **Entire Feature** then specify the starting and ending nodes.

When you tap the **Solve** icon , the buffer is created. Tap the **Back** button to return to the main Map View.



Tap on the buffer zone to highlight it then tap the Feature Properties icon  to get to its **Area and Length** page and view its perimeter and area values.


You can use a similar procedure to create a single buffer or multiple buffers around an **Area Feature**.

For an Area Feature, you can create **Inside** buffers or **Outside** buffers. If you just wish to buffer a portion of the boundary of the area, then unmark **Entire Feature**, and specify the starting and ending nodes. As there are two possible routes to go from the starting node to the ending node on an Area Feature, a **Reverse** checkbox is provided.

The **Area Strip** option will let you create buffer strips with given starting and ending distances. For example, if you wish to create a 10 ft wide buffer strip that starts 20 ft from the Area Feature boundary, and another 20 ft wide buffer strip that

starts 50 ft from the Area Feature boundary, you would turn off the **Equal Intervals** checkbox then enter the following values into the table:


	<b>Start</b>	<b>End</b>
1	20	30
2	50	70

Tap on a buffer zone to highlight it then tap the Feature Properties icon  to view its perimeter and area values. Please note that the net area for each outside buffer is the total area less the area of the Area Feature.

If you create overlapping buffers, the newly created buffer will lie below the one created earlier.

You may find that you are unable to select an inside buffer for an Area Feature and view its area by tapping on the buffer area. This is because the inside buffers are placed underneath the Area Feature. You can reveal an obscured Feature in the following ways:

1. Each Feature belongs to a Feature Topic layer. You can move a Topic upward by tapping the Topic Menu, selecting Move Topic, then dragging the Topic up above the one obscuring it.
2. You could turn off the Topic layers obscuring the desired Topic layer.
3. Within a Topic layer, you can change the order of the Features by turning on the Sheet View, selecting the record for a Feature and using the “To Front”, “To Back”, “Forward” and “Backward” buttons.

Here is another way to view the area for a buffer that is covered by an Area Feature or another buffer. Turn on Topic View and select the Buffer Topic. Then turn on **Sheet View** to display the buffer records. Select the desired buffer record, and it will be highlighted in Map View. Then you can tap the Feature Properties icon  to get to its **Area and Length** page and view its perimeter and area values. Of course, you could also add the Area\_Acres or the Area\_Ha built-in Attribute to the Buffer Topic so that the buffer areas are automatically displayed in Sheet View.

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## **Subdivide Areas**


If you have not yet done so, please open the sample job named **cvoarea.pmp** and save it as **mycvoarea.pmp**. We will use mycvoarea.pmp to illustrate the **Hinge Cut**, **Direction Cut** and **Split** methods for dividing up an area .

Select the "**Show Standard**" Map mode, and select **Meters** as the distance Unit for this job.

### **Division by Hinge Cut**

In the center of the map is a spray area with the Feature ID SPRAY AREA1. Tap

on that Area Feature to highlight it.


From the **Utilities Menu** select **Hinge Cut** .

The Hinge Cut method will let you start the division line at any node on the Target Area Feature and specify the size of area to cut out.


Enter "8" into the **Hinge Node #** field then tap the **Enter** key on the pop-up keyboard. You will see the selected node indicated by a little green square. Enter "63801.84" into the **Cut Area** field.




In most cases, there will be two solutions that satisfy the specified conditions. To get the cut-out area that includes the node preceding the hinge node, select **Previous**. If it's the other solution that you desire, then select **Next**. You can use the displayed result to help you decide.

With the **Previous** tab highlighted, tap the **Solve** icon  to compute the solution. The following screen will be displayed.



If you've made an error and wish to undo the Hinge Cut, tap the **Reset** icon .

If you are sure this is how the original area should be divided, then tap the **Save Result** icon .

The app will automatically assign the next available ID(s) to the newly created Feature(s). If you wish to assign a different set of IDs to the new Features, you may tap on the Starting ID field then enter the first ID number, such as "SEC1". The second newly created Area Feature will assume the ID "SEC2", and so on.

Let's enter "SEC1" as the Starting ID.

**Tap on the OK button to finalize the hinge cut** and store the newly created Features, or tap on the **Cancel** button to abort this action. Let's tap on **OK**.


Please note that **once the area partition has been finalized, the original area cannot be recovered**. Therefore, it is a good idea to save a copy of the original job file under a different name before splitting an area.

Tap the **Back** button to return to the main Map View. Here, you may tap on a newly created Area Feature and use the **Feature Properties** tool to rename it or to assign a different area pattern to it.

### **Division by Direction Cut**

As described under Hinge Cut, we have cut SPRAY AREA1 in **mycvoarea.pmp** into two sections, SEC1 and SEC2. Suppose we wish to divide the section on the west side (**SEC1**) into **three equal parts** and have the division lines go parallel to the eastern border of this section. For this, we will use the Direction Cut method, which lets you specify the direction of the division line and the size of the area to be cut out.

First, tap on the target area, SEC1, to highlight it in the main Map View.

From the **Utilities Menu** select **Direction Cut** .






In the above screen, the ID of the Target Feature is SEC1. This area is highlighted in the displayed view. If it is not the correct one, you may tap on the intended target area to select it.

As we will be creating more than one sub-areas, select **Multiple** for the Mode field.

If you know the exact orientation of the division line, you may enter the known value.

For this exercise, use your finger to orient the **Direction Guideline** in the desired direction, i.e. parallel to the eastern border of the target area.

If you wish to zoom into the map, you must first turn off the Cogo mode by tapping on the  icon.

Alternatively, you may specify the direction for the cut by tapping on  then selecting two existing Points or nodes. For example, we could use this tool and select the two terminal nodes of the line segment representing the eastern boundary of our target area. If you selected an incorrect Point or node as the First Point, you may tap on it again to unselect it. Similarly, you may tap on the currently selected Second Point to unselect it. To disable this mode, tap on  gain.

After aligning the Direction Guideline with the eastern border of the target area, enter "**21267.6**" into the **Cut Area** field. If you need to adjust the direction again, then tap on the Direction field to activate it.


In most cases, there will be two different solutions that satisfy the specified conditions. To get the cut-out area that starts from one side of the target area, select **Side 1**. To get the cut-out area that starts from the other side of the target area, select **Side 2**.


As the Cut Area we have specified for this example will divide the target area into nearly equal thirds, the remaining area after the cut is close to zero. Therefore, it is immaterial whether you select Side 1 or Side 2 for this example.

Tap the **Solve** icon  to compute the solution.

The following screen shows that the target area will be divided into three equal pieces.



If you've made an error and wish to undo the Direction Cut, tap the **Reset** icon .

If you are sure this is how the original area should be divided, tap the **Save Result** icon .

The app will automatically assign the next available ID(s) to the newly created Feature(s). If you wish to assign a different set of IDs to the new Features, you may tap the Starting ID field then enter the first ID number, such as "PLOT1". The second newly created Area Feature will assume the ID "PLOT2", and so on.

**Tap on the OK button to finalize the direction cut** and store the newly created Features, or tap on the **Cancel** button to abort this action.

Please note that **once the area partition has been finalized, the original area cannot be recovered**. Therefore, it is a good idea to save a copy of the original job file under a different name before splitting an area.


Tap the **Back** button to return to the main Map View. Here, you may tap on a newly created Area Feature and use the **Feature Properties** tool to rename it or to assign a different area pattern to it.

### Division by Splitting

You may split an Area Feature along a Split-Line. Let's continue to use **mycvoarea.pmp** as our sample file.

Tap on the area named **SEC2** to select it.


From the **Utilities Menu** select **Split**  to display the Split Area screen.


Opt to **Digitize** a division line to split this area into two areas. The **Node tool** 

will be automatically activated to help with the digitization.

Tap on the **Snap to Node** tool to turn it on. Move the Node tool to the node close to where the road enters this area on the west side then tap in the center of the Node Tool.



Tap on  to turn it off. Zoom into the map to get a better view of the road then move the Node tool along the northern border of the road. Tap at appropriate locations to create the division line.

If the Crosshairs have moved off the screen, you could tap on the  icon to bring the Crosshairs back to the center of the screen.

**Make sure the division line ends on the border or extends beyond it.**



Tap the **Split** button to view the result.

If you've made an error, you could tap the **Undo** button to erase the division line and start over in this screen.

If the division result is what you want, then **select the "heir" to finalize the split**. To do so, tap on one of the areas that is to assume the same Feature ID and area pattern as the original area. The other portion will be assigned a different ID and area pattern.

Please note that **once the area partition has been finalized, the original area cannot be recovered**. Therefore, it is a good idea to save a copy of the original job file under a different name before splitting an area.


If you wish to use an existing Line Feature as the division line for splitting an area, then tap on the **Existing Line** button in the Split Area screen. The selected Split-Line must pass through and extend beyond the perimeter of the area to be divided.

Tap the **Back** button to return to the main Map View. Here, you may tap on a newly created Area Feature and use the **Feature Properties** tool to rename it or to assign a different area pattern to it.

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## Combine Areas

You can use the Combine Areas function to combine two adjacent Area Features to form a larger Area Feature. For example, if you divided an Area Feature into two subareas by mistake, you could recombine them.

To combine two Area Features, first select **Combine**  from the **Utilities** menu. Select the two source areas then tap the **Combine** button.



For the **Topic Name** field select the appropriate topic into which to store the combined area.

You may change the displayed **Feature ID** and the area pattern if you wish.


If there are gaps between the two areas to be combined, they will be displayed and you will be given the option to delete those **Gaps**.

If both of the source areas belong to the Topic selected for the resultant area, then the **Copy values from Area1** checkbox will be displayed. You may mark this checkbox if you wish the combined Area Feature to assume the same Attribute Values as the first source area. If only one of the source areas belongs to the Topic selected for the resultant area, then the **Copy values from Area** checkbox will be displayed for that source area. If neither source area belongs to the Topic selected for the resultant area, then the **Copy values from Area** checkbox will not be displayed.



Mark the **Delete original Areas** checkbox if you wish to have the original Area Features deleted and only retain the combined Area Feature. Otherwise, the newly created combined Area Feature will be placed on top of the original source Area Features, and you could later delete the combined Area Features to reveal the original Area Feature again.


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## Measure Distance

If you would like to know the distance between two or more map locations, first tap on the **Measure Distance** icon  on the **Utilites** pull-down menu. Then tap on the map locations to have the distance calculated. The total distance as well as the length and direction of the last segment added will be displayed.

Whenever you need to place a node precisely, tap on the **Node tool** then use the crosshairs to zero-in on the desired location.

If your device has GPS capability, you could tap the **GPS** icon  to turn on GPS then tap the **Pick GPS** icon  to add a node for the line to be measured.


Tap on the **Snap to Node** icon  to turn it on when you wish to snap to an existing Point or node by tapping in its vicinity.

To back-step, tap the **Undo** icon . To delete all the nodes made in this measurement session, tap the **Reset** button .


If you wish to convert the shape you have delineated to a Feature, then click on the **Create Feature** button. Otherwise, the temporary shape will be discarded when you tap the **Back** button to close this screen.


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## Measure Area

The **Measure Area** tool  on the **Utilities** pull-down menu will compute the area enclosed within a boundary that you form by tapping on the map.

Whenever you need to place a node precisely, tap on the **Node tool** then use the crosshairs to zero-in on the desired location.

If your device has GPS capability, you could tap the **GPS** icon  to turn on GPS then tap the **Pick GPS** icon to add a node for the area to be measured.


Tap on the **Snap to Node** icon  to turn it on when you wish to snap to an existing Point or node by tapping in its vicinity.

To back-step, tap the **Undo** icon . To delete all the nodes made in this measurement session, tap the **Reset** button .

If you wish to convert the shape you have delineated to a Feature, then click on the **Create Feature** button. Otherwise, the temporary shape will be discarded when you tap the **Back** button to close this screen.

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## Locate a Point by Address

To look for a location on the displayed built-in Map by address or coordinates, tap on the pull-down arrow of the **Utilities Menu** icon  then select **Locate a Point by Address**. This function will only work when **Map** is turned on.


If you know the address of the location of interest, tap the **By Address** tab then enter the address.

If you know the coordinates of the location of interest, tap the **By Coordinate** tab then enter the coordinates. Make sure you have entered the correct N/S and E/W designations.

After tapping the **Go** button, you will see the target location marked on the screen. You may search additional locations by address or by coordinates. All the locations you searched for will stay marked before you exit this screen.

If you can recognize the desired location on the displayed Map, you could select that location by tapping the **Pick** icon  then tapping on the target location. The relevant address information will pop up on the screen, and when you tap the **Go** button, that location will be marked. You can view its coordinates by tapping the **By Coordinate** tab.

When you tap on a marked location, the corresponding marker will turn orange. If you wish, you may save that location as a Point Feature by tapping on the **Save**

**Result** icon . You may change the Feature ID and the symbol used to represent the new point before tapping on **OK** to create the Point Feature.

When you no longer need the displayed information, tap the **Back** button to close this screen.

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## **Export Job Data**

You may export all the Feature data in a Job in a number of formats.

### **Export Shapefiles**

To export the Features in the active Job to Shapefiles, tap the **Main Menu** icon, select **Job** then select **Export Shapefiles**.

Select one or more Topic layers to export. Each Feature Topic will be exported as a separate set of Shapefiles.

Each set of Shapefiles consists of several files (e.g. the .shp, the .shx, the .dbf, and the .prj files). The exported data files will reside in the **Documents folder** for the application. To access your exported Shapefiles outside this app, first connect to the iTunes® program then look in the Documents folder for Farming GPS GIS II in the File Sharing section.

If you need to use the Shapefiles data with another GIS application, please copy the .shp, the .shx, the .dbf, and the .prj file by the same job name to your desktop computer.

As there is a limit of 10 characters in the field name for the DBF file, if an Attribute name exceeds 10 characters, it will be truncated.

### **Export DXF**

The Features in the working job file may be exported to a DXF file. The exported DXF file will reside in the **Documents folder** for this app.

To export the Feature data to a DXF file, choose **Job** then select **Export DXF**. Mark the Topics that are to be exported and select the desired options then tap the **OK** button.

Mark the **3D** checkbox if the elevation values are also to be exported.

Mark the **3D** checkbox if the elevation values are also to be exported.

Select the **In Block** option if you wish to export the Features in block format into the .DXF file. Then you may mark the **With Attributes** checkbox if you wish to have the Features exported along with their attribute values.

The app will create a DXF layer for each Topic marked for export. If you wish to export the selected Topics to the same layer, then mark the **Export to one layer** checkbox and enter the name of that layer in the **Layer name** box.

Data will be exported in the working coordinate system. The distances and angles will be exported in the active distance and angle units.

### **Export to PDF**

To export the Feature data to a PDF file, tap the **Main Menu** icon then select **Export to PDF**. If you wish to include all the Features in the PDF file, then first tap the Zoom-Fit icon to fit the map elements to the screen,

To export to a new PDF file, tap on the **New** button. Rename the file, if you wish then tap on **OK** to confirm.


If you wish to overwrite an existing PDF file, then select that file from the list. **Beware that doing so will erase all the existing contents of the selected PDF file.**

To make sure you really want to overwrite an existing PDF file, tap on the **View File** check box then select the file you wish to view. In this mode, instead of the **OK** button, you will see a **View** button. Tap the **View** button to display the contents of the highlighted PDF file. Then tap the **Back** button to return to the File Dialog. When you are ready to overwrite the file, unmark the **View File** check box then tap on **OK** to overwrite the file.

The contents of the PDF file will be displayed. The first page will show the drawing of the Features as they are displayed on the screen.

The additional page(s) will show the boundary coordinates and areas of the Area Features as well as the coordinates of the Point Features or the starting and ending nodes of the Line Features.

The **View File** function is also useful for viewing any other PDF documents that you have placed in the Documents folder of this app. If you have a document or cheat sheet that you will need to refer to while working in the field, it is a good idea to save a copy of the file in the Documents folder of this app by using the iTunes® program.

If you have an AirPrint Printer, you may tap on the **Printer** icon  then confirm to print the contents of the PDF to that printer.

The exported PDF files will reside in the Documents folder for the application. To access the PDF files exported from the application, first connect to the iTunes® program then look in the Documents folder for the **Farming GPS GIS II** app.

**To delete a PDF file**, use the iTunes® program to access the Documents folder for the app then select the file and hit the **Delete** button on your desk-top computer. **A deleted file cannot be recovered.**

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## Email Files

You may email Job files (\*.pmp), Feature Lists (\*.fbr), PDF files (\*.pdf), DXF files (\*.dxf) and Deed Calls files (\*.dcf). To do so, first tap the **Main Menu** icon and select **Email Files**.

Enter the destination email address and select the file type. The files listed in the displayed table depends on the file type selected. Mark the checkbox for the files you wish to send, then tap the **Send** button.

When the email is displayed with the attachments, tap the **Send** button at the top to send the email, or tap **Cancel** to cancel the action.

This app supports the capability to get attached .pmp and .fbr files from an email.

Suppose a colleague sent you an email with a .pmp job file attached.

When you open the email and hold down on the email attachment, you will be given the option to select the app for opening the attachment. For this example, you will select Farming GPS GIS II, and the app will start automatically and provide a preview of the .pmp job. You can then use Job\Save As to save the job file on your iPad device.

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## Collect GPS/GIS Data

This app will let you create a Job and select a **Feature List** to use, collect location data for Point, Line, and Area Features, and tag them with descriptions. Point Feature data may also be collected in the **Offset** or **Traverse** mode.

Within the data collection function, you will select a Feature Topic for which to collect data. You may select a Feature Topic from the Feature List associated with the Job. In this case, the **data collection parameters** are predefined in the Feature List, but you can overwrite them by entering new parameters if you wish. You could also select any existing Point, Line or Area Topic layer for which to collect GPS data. Or, you could have a new Feature Topic created on the go. In the latter two cases, you will need to specify the desired data collection parameters.

### Defining Data Collection Parameters using a Feature List

Besides using a Feature List to assign the Feature Type and defining the Attributes and Values for a Feature Topic, you can also use it to pre-define the GPS data collection parameters.

Please tap on the GPS icon, select Feature List then select an existing Feature List such as myfarm.fbr to see the data fields discussed in this section.

If you mark the **Feature Lock** checkbox, the user will be forced to select a Feature from the Feature list for tagging GPS data during data collection. This will

be helpful for keeping the Feature Names consistent in the data file.

Following is a description of the **GPS data collection modes and parameters**.

**Type:** Select Point, Line or Area as appropriate.

**Collect Mode:** Select the mode of data collection.

**Static Time:** In this mode, you will log a stationary Feature for the specified time period. This is the default mode for Point Features. Enter into the **Intvl/ Session** field the amount of time in seconds that you will be staying at each point to log the GPS position data.

Lines and Area Features may be collected in Static mode. In this case, you would let the GPS receiver stay at each node of the Line or Area Feature for the duration of the Time Session. The software will join these nodes or vertices with straight lines.

**Dynamic Time:** In this mode, you will log a Line or Area Feature at the specified **Time Interval** in seconds.

**Dynamic Distance:** In this mode, you will log a Line or Area Feature based on the specified **Distance Interval** in the active distance unit. The result will be a Feature with equally spaced nodes.

When you select a Feature Topic from the Feature List associated with a Job to record GPS data, the app will automatically use the data collection parameters defined for that Feature Topic in the Feature List. For example, if for the Well Point Feature Topic the Collect Mode is static time and the Intvl/Sess is 30, then you should stay still at the point to be recorded for 30 seconds for the app to log the GPS fixes. If you wish to log certain points for only 15 seconds, there is a Stop button that you could use to end the session.

Please see the section titled **Set up Feature List** for details about defining the Attributes and Values for each Feature Topic.

### **Job Setup**

After tapping the **Menu** button, select **Job** then select **Current Job**.

You can select an existing Job in your area to open it.

If this is a new job you are starting, tap the “**NEW**” button and accept the default Job name or enter the desired Job name, such as "myveggies".

You may select an existing **Feature List**, such as "myfarm" to be associated with the Job.

Press **OK** to confirm the screen.

### **Turn the GPS ON**

Tap on the **GPS** icon then select **Turn GPS On**. To save power, tap on the **GPS** icon then select **Turn GPS Off** when you are not actively collecting GPS data.

Make sure you have turned on **Location Services** under Privacy in the **Settings** of your device. Also, on the Location Services page, find **Farming GPS GIS II** and turn the switch on to make Location Service available for this app.

When GPS is turned on, there is a **GPS marker** to indicate your position. If you walk at a brisk pace, the arrow inside the circle will point in the direction you are walking.

The large arrow in the GPS marker indicating your current position will be a gray color when your speed is very slow (e.g. less than 1 m/s). The arrow will change to a red color when your speed is above 1 m/s. The direction of the arrow indicates your current direction.

If you are using an external GPS receiver that is compatible with your iOS device and your iOS device comes with built-in GPS, you may wonder which GPS is being used. The answer is not as simple as you'd wish it to be:

1. To make use of GPS, Location Services must be turned on under Settings and also turned on for the specific app you are using.
2. The iOS device will automatically use the internal GPS if you turn on GPS within an app while no external GPS is connected.
3. When any app is using the internal GPS, iOS cannot work with an external GPS connected to the device.
4. Therefore, to make use of the connected external GPS, you will want to turn off GPS from all running GPS apps (including the one you are actively using) then turn on GPS within the app you are actively using.
5. When Bluetooth connection is lost, then iOS uses the internal GPS. This could happen randomly. To make sure the app will use the external GPS, please do the following:

Turn off Bluetooth on the iOS device.

Turn off the external GPS.

Turn on Bluetooth.

Pair with the external GPS again. The status maybe shown as "Connected", but just tap on the GPS device name again to reconnect.

### **Position Information**

To view your current position, click on the **GPS** icon then select **Position Info**.

### **Select a Feature Topic**

Tap the **GPS** icon then select **Collect**.

Tap the **New** button to call up the **Store Feature** screen.

Select the desired Feature Topic (such as **Well**) from a list of the predefined Feature Topics. Or enter a new **Feature Topic** name and specify the **Topic Type**.

The fields for **ID** (for the individual Feature to be logged, e.g. **Well003**), **Feature Type**, **Log Mode** and **Time Session** or **Time Interval** are automatically filled. You may override these default settings, if you wish.

When done specifying a Feature Topic for which to collect data, tap on **OK**.

If you need to define a new Attribute for the Feature Topic, tap the **Attribute tab** at the bottom of the screen.

### **Feature Attribution**

If a **Feature List** is active for the Job, the Attributes associated with the Feature will be automatically displayed.

For an Attribute of the **List** type, click on the pull-down button to select the desired value.

For an Attribute of the **Range** type, enter a Value within the allowed range. If the Attribute is not locked, then you may enter any Value.

If the Feature Topic is not from a Feature List, you may manually enter the Values for the Attributes created in the Topic Editor to characterize it.

If you wish to assign a specific symbol or color for the Feature, then click on the **Pattern** button and make the desired choices.

### **Data Logging**

To log GPS data, press the **Store** button from the **Collect** screen. Data will be recorded per the Feature type and the data logging parameters specified for the Feature.

To halt data logging temporarily, tap the **Pause** button. When ready to continue, tap the **Continue** button.

### **Plotting Position Data on Screen**

The Map View is always “North” oriented. If the position moves off the screen, the screen will automatically scroll to show the current position.

### **Storing Static Points**

Each Static Point is a stand-alone Feature.

1. Stay at the feature location and **do not move around** while you are logging data for a Point Feature.




2. Select or enter the description for the Feature.
3. Press the **Store** button to log GPS data.
4. When the time is up, the Point Feature is recorded and the Feature ID advances by 1.

If necessary, you may press the **Stop** button to stop the data logging process at any time. The point will be recorded with fewer coordinate fixes to compute the average position.

5. Go to the next point of interest then select the description, and press the **Store** button to log a second Point for the same Feature Topic.
6. Repeat Step 5 for any additional static points you wish to log.

To start collecting data for a different Point Topic, first tap the **New** button then go to Step 1 above.

If you incorrectly logged a Point Feature and wish to correct it, first select the Point Feature in question from Map View or from Sheet View. Tap the **Feature**

**Properties** icon  then tap the **Update** button. Specify the desired time session then tap the **Start** button to record the correct position.

### Storing Static Line or Area

For a Static Line or Area Feature, you would occupy each vertex (node) for the duration of the Time Session to record its location. And nothing will be recorded while you walk or drive from one vertex to the next. The nodes for the Static Line or Area will be automatically connected by the software.

Go to the beginning node of the Static Line or Static Area Feature. Stay there and **do not move around** while logging data for this node.

Press **Store** from the **Collect** screen to record the Feature descriptions and GPS data for the Feature. The steps are identical to the Static Point data logging procedure described above, except that pressing the **Stop** button will just stop the data logging process for the current node, and will not end the data logging for the Static Line/Area Feature.

When the first node has been collected, move to the next node of the Static Line/Area Feature, then press **Store** again to log data for that point.

Repeat Step 3 until you have finished logging data for all nodes of the Static Line/Area Feature.

Tap **New** if you wish to collect data for another Topic.

### Storing Dynamic Line or Area

For a Line or Area feature logged in Dynamic mode, data will be collected while


you are moving along the Line feature or the perimeter of the Area Feature. There are two options for the dynamic mode.

**Dynamic Time:** Log a position based on the specified time interval.

**Dynamic Distance:** Log a position based on the specified distance interval.

1. Go to the beginning node of the Line or Area Feature for which you wish to collect data. Assign Feature information to the new Feature (Feature name and description).
2. Press **Store** from the **Collect** screen.
3. Start moving (i.e. walking, driving) along the Line Feature or the perimeter of the Area Feature.
4. Press the **Stop** button when you have reached the ending point of the Line feature or the beginning point of the area feature. You may also use this button to abort the data logging process at any other time.

Tap **New** if you wish to collect data for another Feature Topic

To end the GPS data collection, tap the **Exit** button. Tap the **Zoom Fit** icon  at the top to see all the Features displayed on the same screen.

### **Nested Points**

This app allows you to interrupt a Line or Area Feature (without terminating it) to record a nearby Point Feature. This kind of Point Feature is called a **Nested Point**. The procedure for logging a Nested Point is similar to that for logging a regular Point Feature.

1. Begin logging a Dynamic Line or Area Feature.
2. From the **Collect** screen, press the **Nested** button. A list of Point Topics in your Feature List will be displayed.
3. Highlight the appropriate Point Topic or create a new one. When done, press **OK**.
4. Optionally select or enter descriptions for the selected Nested Point Feature.
5. Press the **Store** button. Stay at the Point location and do not move around while you are logging data.

If necessary, you may press **Stop** to stop the data logging process for the Nested Point Feature.

6. When data has been logged for the Nested Point Feature, you may choose to log another Nested Point or to continue logging the original

Line or Area.

If you need to log another nested point, press the **Nested Point** button.

To continue with logging the Line or Area, depress the **Continue** button and start moving again along that Feature.

### **Offset Mode**

For a Feature that is not directly accessible, you can log data for one that is accessible and record the offset information along with the Feature data.

To access the **Offset** function and enter an offset for a Feature, press the **No Offset** button from the **Collect** screen. (“No Offset” indicates that there is currently no offset associated with the Feature.)

This app provides for two types of offset computations.

### **Left/Right Offset**

You can offset a **Line** or **Area** Feature to the left or to the right.

#### **Slope Distance:**

Enter the horizontal distance from where you are collecting GPS data to the target. This distance should be parallel to the ground, perpendicular to the direction of motion.

#### **Direction:**

Select “Left” or “Right” to indicate whether the target is to the left or right, respectively, of where you are collecting GPS data.

### **Point Offset**

You can offset a **Point Feature** to another point location.

#### **Slope Distance:**

Enter the slope distance from where you are collecting GPS data to the corresponding point on the target.

#### **Azimuth:**

Enter the azimuth of the target.

#### **Slope:**

Enter the slope angle to the target.

After specifying the offset information, tap on **OK** then log the GPS data as described above.

### **Append Coordinates**

If you wish to add GPS data to an existing Line or Area Feature, press the **Existing**

**Line/Area** button from the **Store Feature** screen.

Then click on the pull-down menu under “Name” and choose the Feature Topic that contains the Line or Area Feature to which you want to append coordinates. Next, click on the pull-down menu for the “ID” field then select the ID for the specific Line or Area Feature to which you want to append coordinates.

After you press the **OK** button, proceed to collect data as described above.

### **Traverse Mode**

The **Traverse** function lets you continue mapping **several** Point Features when GPS signal is not available. The application will record the following information that you enter for each traverse leg:

**SLOPE DIST:** The slope distance from the reference position to the location of the new traverse point.

**AZIMUTH:** The direction from the reference position to the new traverse point (0 to 359 degrees).

**SLOPE:** The slope from the reference position to the new traverse point (-90 to 90 degrees).

You may record traverse points in two different modes, as described below.

**Side mode:** Use this method to perform a radial traverse by taking multiple “side shots” from the same reference point. The following diagram refers to a known GPS reference point.

**Traverse mode:** Use this method to traverse to a new point that will then be used as the reference point for the next traverse point. This method can be used for storing lines or area boundaries.


This app will permit you to take multiple side shots from each point on a traverse.

The general steps for using the Traverse function are as follows:

1. Click on the **Traverse** button from the **Collect** screen.
2. In the **Traverse New Feature** screen, select an existing Point Feature as the **Reference Point Feature**.
3. In the **Name** box, enter or select the name of the Point Topic into which the new Point Feature will be stored. The ID will automatically be entered for you. Click **OK**.
4. Choose the method for defining the new point by tapping on **Side (mode)** or **Traverse (mode)** button below the ID field.
5. Optionally enter the descriptions for the newly defined Traverse Point Feature. Optionally assign a symbol for the new Point Feature to

be stored.

6. Click the **Store** button to display the traverse data entry fields.

7. Enter the Slope Distance, Azimuth, and Slope for the point to be created with respect to the reference point. The reference point is shown with a **circle** around its symbol. The target point will be displayed with the temporary symbol .

Click the **OK** button to record the new point.

8. If you are working in the **Traverse mode**, the newly stored Traverse Point will automatically become the next Reference Feature.

If you are working in the **Side mode**, the Reference Feature will stay the same.

To continue working in the same traverse or side-shot mode, repeat the above steps 5 through 7.

To switch to the other mode, first tap on **Side (mode)** or **Traverse (mode)** button below the ID field then repeat the above steps 5 through 7.

**Please note:** If you would like to store the new point to a different Feature Topic, tap the **New** button to call up the **Traverse New Feature** screen then enter or select the new Topic name. Click **OK** then continue with the above steps 5 through 7.

When GPS signal can be received again, you may return to normal GPS data collection mode by clicking the **GPS** button in the data collection screen.

When done with data collection, tap **Exit**.

### **The GPS Track**

If you wish to record your GPS track in the background while performing other tasks in this app, turn on the GPS then select **GPS/Tracklog On**. A dialog will be displayed for you to set the desired **time interval**.

The recorded track will be stored in the **Tracklog Topic**.

To stop recording the track log, select **GPS/Tracklog Off** or turn off the GPS by using **GPS/GPS Off**.

You may record one or more tracks in this manner.

The Tracklog function is available only while GPS is turned on. Also, the logged track becomes a Feature that you can select or zoom (into or out of) only after the data logging has been completed by selecting **GPS/GPS Off** or **GPS/Tracklog Off**.


If you don't see the new Tracklog record in **Sheet View**, please turn the Sheet View off then on. Then the new Tracklog record will display.

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## Point Stakeout

Suppose there is an old survey marker that you need to locate on your farm. You could use the **Point Stakeout** function in conjunction with GPS to help you find it. You could use the same method to locate an old well overgrown by brushes if you have a record of its coordinates. For this reason, it is helpful to use GPS to record the coordinates of important locations or structures for future reference. The Point Stakeout function could also be used to stake out a fence or a boundary line if you are using an accurate GPS device.



You may add the stakeout targets to your job map in one of the following ways:

1. Enter the coordinates to create each point. Please refer to **Add Point by Coordinates** section under **Digitize Features**. If the elevations also matter to you, then include the correct elevation in the target coordinates.
2. Import a DXF file or Shapefiles containing the target shapes. Please refer to **Set up a Job**.
3. Digitize a Point Feature, a Line Feature or an Area Feature.
4. Create Grid Points for an Area Feature.
5. Store GPS Features by using  Pick in the screen for adding a Point, Line or Area Feature. Please refer to **Digitize Features**.

After finding a desired location, you may optionally stake it and store its coordinates. The Point Stakeout function can be used to stake out individual points, or points along a line or area.

The accuracy of the stakeout will depend on the accuracy of the GPS receiver used. Keep in mind, though, that GPS elevation errors are usually twice or three times the horizontal position errors.


You must activate GPS before you can access the Point Stakeout function.

Tap the GPS Menu icon  then select **GPS On** to turn the GPS on. Then tap on  again and select **Point Stakeout**.

With the cursor in the Target Feature field tap on the target **Point, Line or Area Feature** of interest. You may tap the **Browse** button to select a target Feature ID in the active Topic.

If the selected Feature is a Line or Area, you can select which Node you would like to stakeout. Select the the desired Point Feature. Or, for a Line or Area Feature,

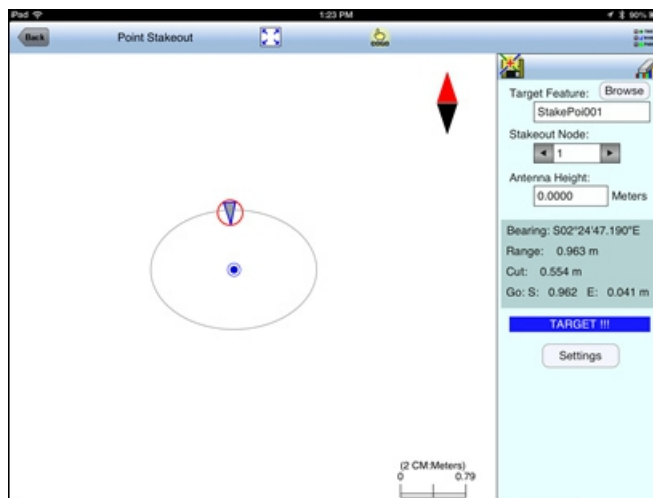
type in the desired Node #, or tap the little right arrow button to change the Node # to another node in the same Feature.

If you have tapped the  icon to disable Feature selection (so as to return to the normal touch screen mode), make sure you tap this icon again to turn it on before selecting a Feature for a data field.

In the **Antenna Height** field, enter the height of your antenna above the ground.

Click the **Settings** button to set up or change the settings for stakeout. The **Stakeout Setting** screen is described in the sub-section titled **Set up Stakeout** under **Set up a Job**.

If you mark the checkbox for **Display Message**, then when you are inside the target Tolerance range, the "Target!" message will flash on the screen.



If you mark the checkbox for **Target Beep**, then when you are inside the target Tolerance range, beeps will be sounded.


Your position is represented by the GPS marker on the screen. The app will report your GPS position in relation to the target location.

**Bearing** or **Azimuth** is the direction from your GPS location to the specified Target Stake Point or Node.

**Range** is the direct distance from the GPS location to the Target Stake Point or Node.

**Cut** or **Fill** is the difference in elevation from the current location to the Target Stake Point or Node. "Cut" indicates that your current position is higher than the Target. "Fill" indicates that your current position is lower than the Target.



You may use the values displayed in the **Go** field to help you reach the target. On the GPS marker, the solid grey arrow points in the direction you are moving, and the hollow blue arrow points in the direction of the Target. When you are moving in the right direction, these two arrows will coincide.

After you have successfully reached your target location, you can drive a stake into the ground at this location. Tap the **Save Result** icon  to store the GPS position as a stake point.


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## Line Stakeout

You may use **Line Stakeout** to find your position relative to a **Line Feature** or the boundary of an **Area Feature**, and to optionally stake and/or store the location. This function will come handy when you need to blaze a trail across thickets or to layout pipelines where landmark references are lacking. The accuracy of the stakeout will depend on the accuracy of the GPS receiver used.

You must activate a GPS Receiver before you can access the Line Stakeout function. Tap the GPS Menu icon  then select **GPS On** to turn the GPS on. Then tap on  again and select **Line Stakeout**.

With the cursor in the Target Feature field tap on the target **Line** or **Area Feature** of interest. You may tap the **Browse** button to select a target Feature ID in the active Line or Area Topic.

If you have tapped the  icon to disable Feature selection (so as to return to the normal touch screen mode), make sure you tap this icon again to turn it on before selecting a Feature for a data field.

Select or enter the **From Node** and **To Node** on the target Line or Area Feature.

If you are interested in the direct line between the beginning and ending nodes, then select **Direct** for the **Mode** field. On the other hand, if you are interested in the line segment on the Line or Area Feature, then select **Path**.

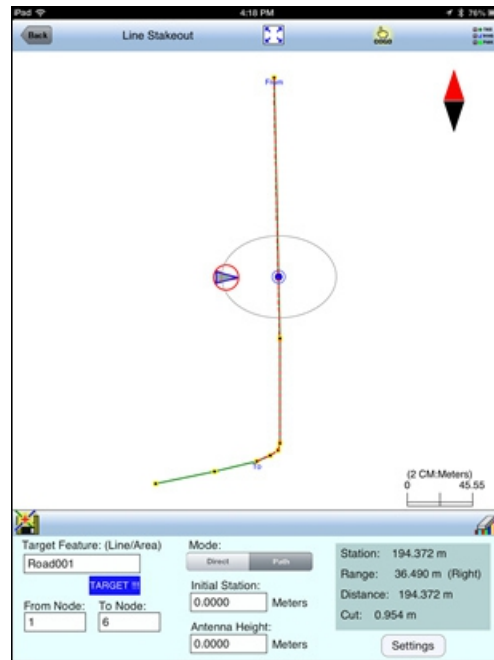
Your position is represented by the GPS marker on the screen. The **Target** for Line Stakeout is the projection of your GPS position on the selected line segment. As you move along in the vicinity of the line or area feature, you will see information displayed about your position relative to the target line segment. Such information will not be displayed if your position cannot be projected onto the target line segment.

In the **Antenna Height** field, enter the height of your antenna above the ground.

Click the **Settings** button to set up or change the settings for stakeout. The **Stakeout Setting** screen is described in the sub-section titled **Set up Stakeout** under **Set up a Job**.

If you mark the checkbox for **Display Message**, then when you are inside the target Tolerance range, the "Target!" message will flash on the screen.





If you mark the checkbox for **Target Beep**, then when you are inside the target Tolerance range, beeps will be sounded.


The first stakeout location on the target line segment is called the **Initial Station**. Enter the distance of this initial station from the From Node.

The **Range** field shows your perpendicular distance from the line segment, ie. the distance between your GPS and the Target. Therefore, you could use the Line Stakeout function to help ensure that you are always moving parallel to a line or boundary at the desired distance.

**Station** is the distance between the From Node and the Target.

**Distance** is the distance between the Initial Station and the Target.

**Cut** or **Fill** is the difference in elevation from the GPS location to the target. "Cut" indicates that your current position is higher than the target. "Fill" indicates that your current position is lower than the target.

To store the GPS position as a stake point, tap once on the **Save Result** icon .

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