HarvestMaster™

BY JUNIPER SYSTEMS

mirus™

GNSS Plugin

USER'S MANUAL

Mirus GNSS Plugin User's Guide

Part Number: 31536-00

Trademarks

Disclaimer

Information is subject to change without notice.

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GNSS Plugin

CHAPTER ONE

Install the GNSS Plugin

1. Install The GNSS Plugin

The Mirus GNSS plugin allows you to apply geospatial technology to a variety of field research programs like field mapping, plot measurement, data collection, and plot navigation. The plugin can be used within Mirus to enhance your research notes or map out your research sections within larger fields. Alternatively, when a GrainGage is connected, the plugin can be used as an attachment in Mirus to add GNSS locations to your harvest data. The Mirus GNSS plugin can be downloaded from *http://harvestmaster.com/support/article/14648*.

1.1 Requirements for GNSS Plugin 2.0.0 or Later

- Mirus 4.2.3 or later
- Mapping or Survey grade GNSS receiver connected to a tablet running Mirus through a serial port or USB port

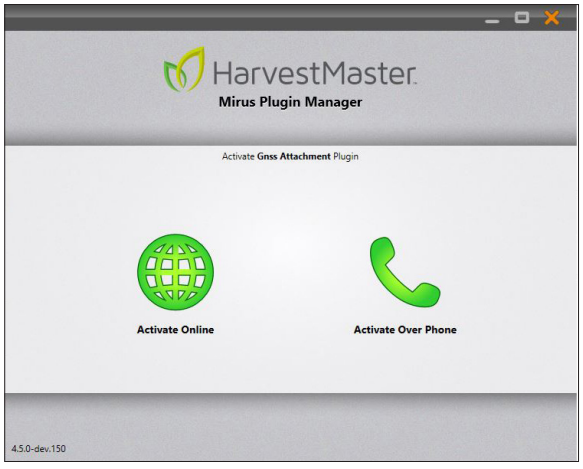
  Note: The accuracy of points in your maps is dependent on the accuracy of the GNSS receiver.

GNSS Version 2.0.0 is compatible with Mirus 4.2.3 or later. The Sprayer/Field Applicator plugin version 1.0.2 requires Mirus 4.1.2 and GNSS plugin 1.1.1.

1.2 Activate the GNSS Plugin

After you have purchased a license for GNSS Plugin,

1. Go to *https://www.harvestmaster.com/support/article/14648*.
2. Tap the download icon for GNSS Attachment 2.0.0 Windows Installer (7, 8, 10).
3. The files will automatically download.
4. Tap the file GnssAttachment-2.0.0.mpb to install the plugin.
5. Follow the installation instructions.

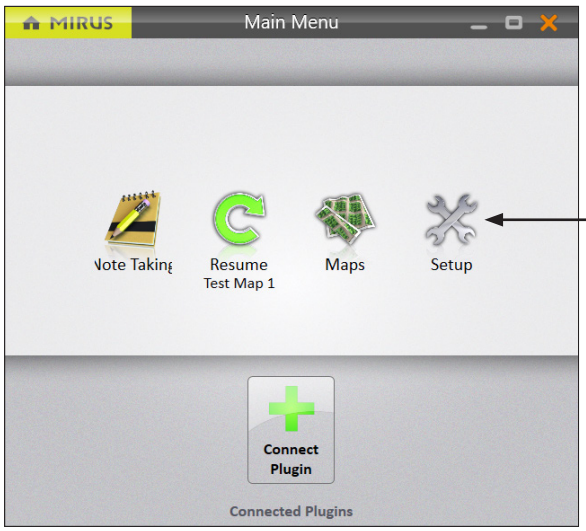


6. When you see the Mirus Plugin Manager Activate GNSS Plugin screen, choose to use the online form or call by phone. In either case, you will need to provide the serial number from your registration card. The registration card was mailed to you when you purchased the GNSS plugin.
   If you choose to activate online, first tap Activate Over Phone and write down the Registration number displayed.

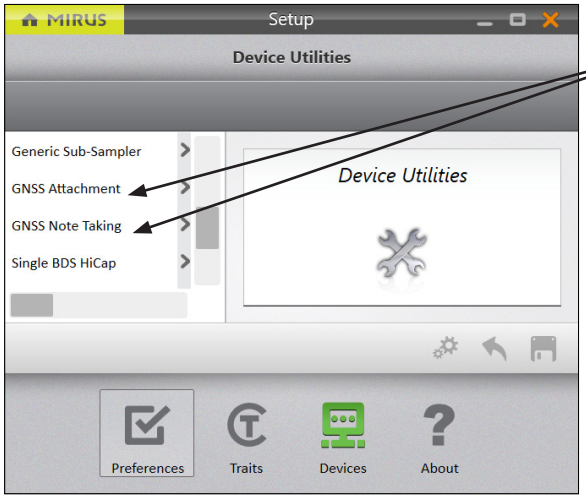
7. HarvestMaster will send the unlock code via email.
8. Return to the Activate GNSS Attachment screen and input the unlock code.

1.3 Connect Your Receiver

1. Double tap the Mirus icon on your Windows desktop. Mirus opens the Home screen.
2. Disconnect any plugins.



3. Tap **Setup**.



4. Scroll and Tap **GNSS Attachment** (if you will be using with a GrainGage, Field Applicator, or Cone Planter) or **GNSS Note Taking** (if you will be using without a GrainGage).
5. Follow the instructions in section 2.3 Use the GNSS Port Detector on page 16.

1.4 Connect the GNSS Plugin

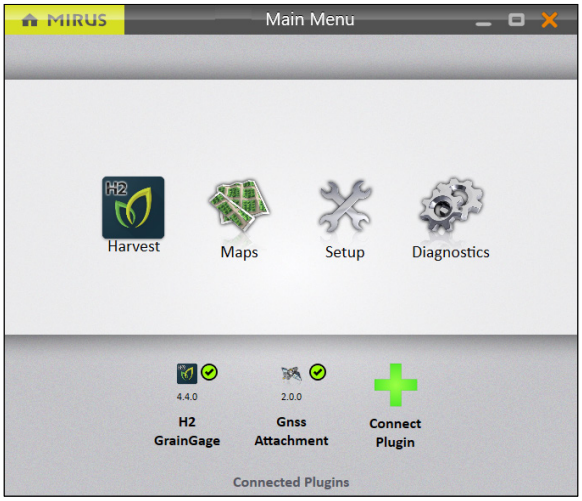
On the Home screen,

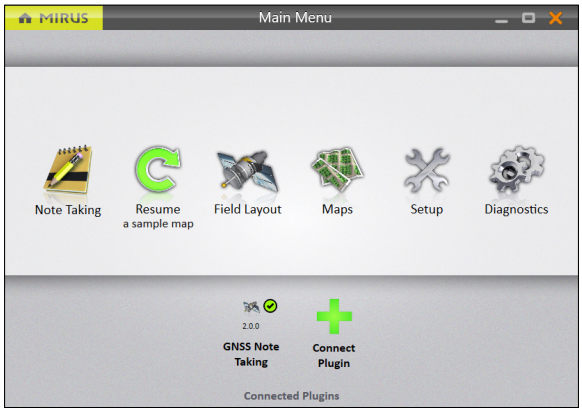
1. Tap **Connect Plugin**.

When you connect the GNSS plugin in Mirus:

- Choose **Attachments** when you have a GrainGage, Field Applicator, or Cone Planter connected and want to use the GNSS locations with harvest applications.
- Choose **Devices** when you do not need the GrainGage, Field Applicator, or Cone Planter to complete your task, e.g. recording research notes or laying out a research section within a larger field.

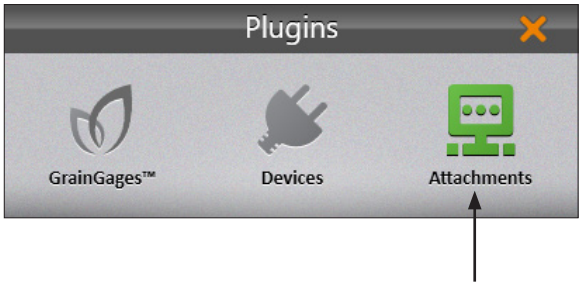
Once the plugin is activated, you will see it on the Main Menu screen with a green check mark.





1.5 Add the GNSS Plugin to Mirus as an Attachment

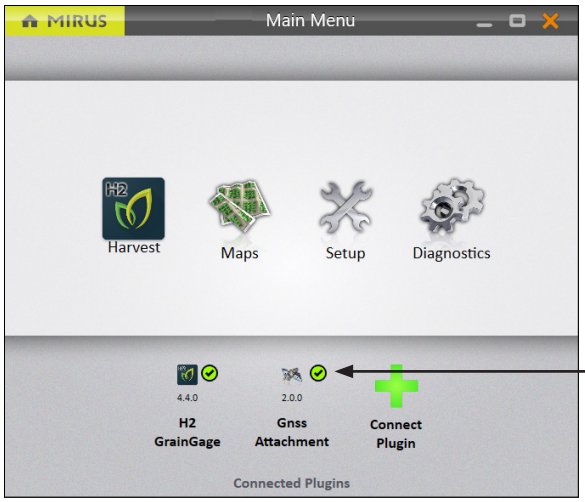
1. Open Mirus.
2. Tap **Connect Plugin**.
   Note: You must have a GrainGage plugin connected.



3. Tap **Attachments**.

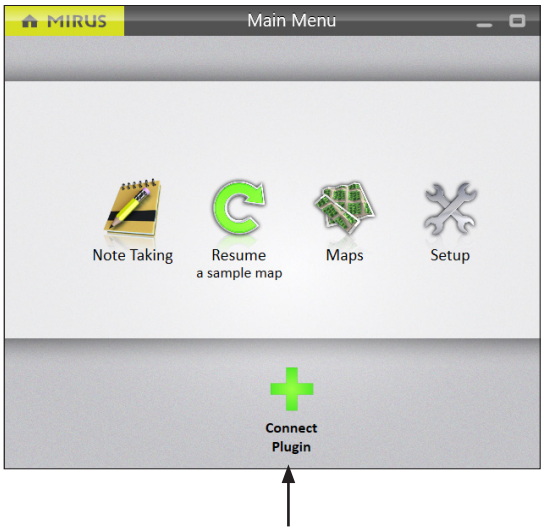
4. Tap **GNSS Attachment**.
5. Tap the check icon .

6.

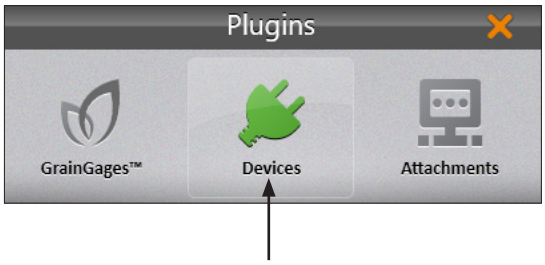


7. Return to the Main Menu. The GNSS Attachment is displayed with a green check mark.

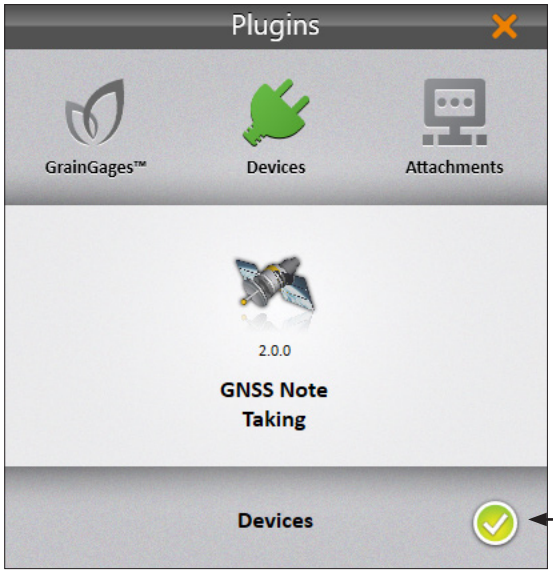
1.6 Add the GNSS Plugin to Mirus as a Device



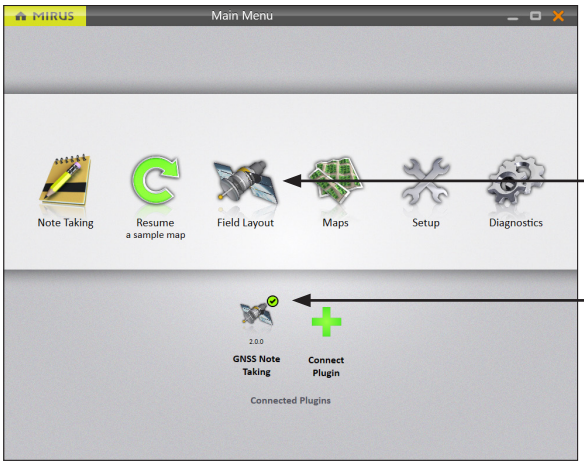
1. Open Mirus.
2. Tap **Connect Plugin**.
   Note: You cannot have a GrainGage connected.



3. Tap **Devices**.



4. Tap **GNSS Note Taking**.
5. Tap the check icon .



6. Return to the Main Menu. GNSS Note Taking is displayed with a green check mark and Field Layout is added to the menu items.

Field Layout

GNSS Note Taking Device

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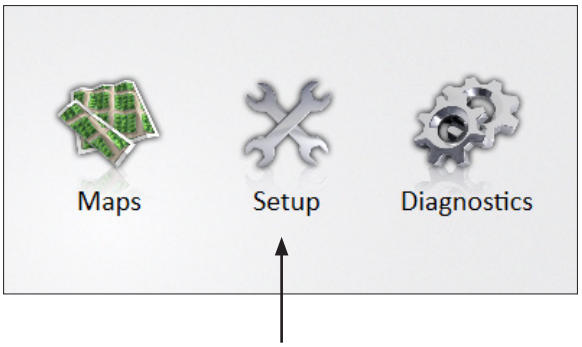
GNSS Plugin

CHAPTER TWO

Adjust GNSS Related Details

2. Adjust GNSS Related Details

Whether you use the GNSS plugin to add location details to your harvest data with the GNSS Attachment or to take notes with the GNSS Note Taking device, each category includes a variety of settings that you can modify.

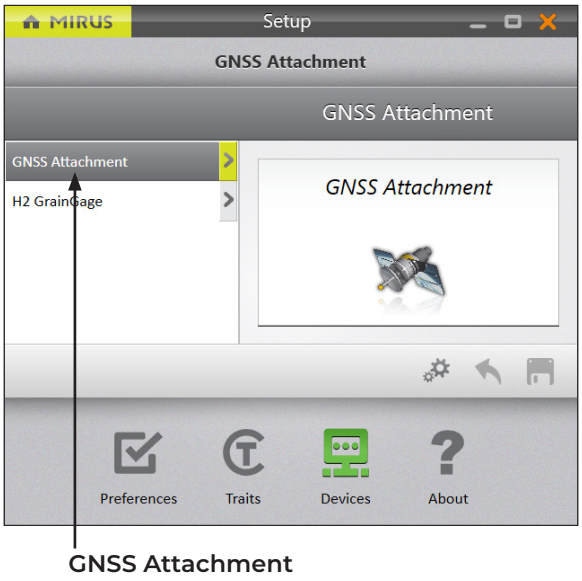


On the Home screen,

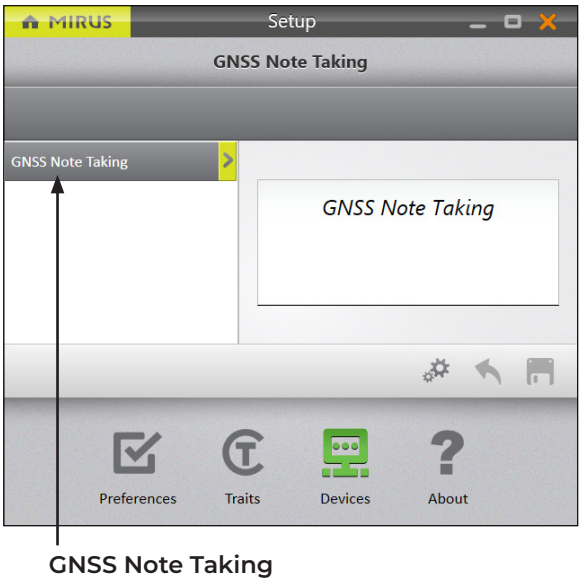
1. Tap **Setup**.

On the Setup screen,

2. Tap **GNSS Attachment** or **GNSS Note Taking**.



GNSS Attachment



GNSS Note Taking

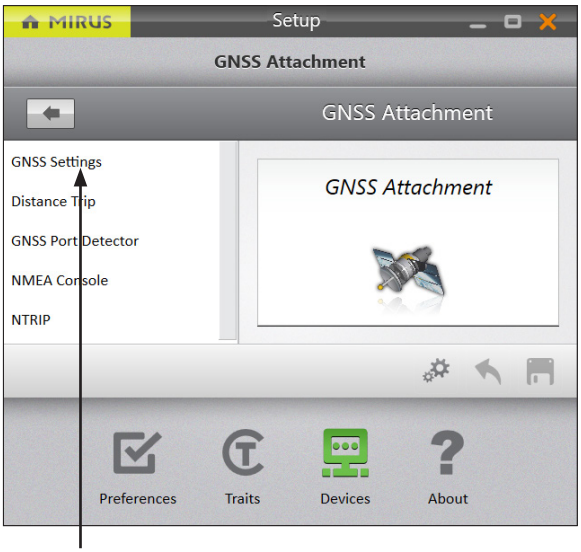
Mirus displays a variety of options to adjust details related to the following categories:

- 2.1 Adjust GNSS Settings on page 13
- 2.2 Turn On Distance Trip on page 15 (only with GNSS Attachment)
- 2.3 Use the GNSS Port Detector on page 16
- 2.4 Access the NMEA Console on page 18
- 2.5 Connect to NTRIP Service on page 19

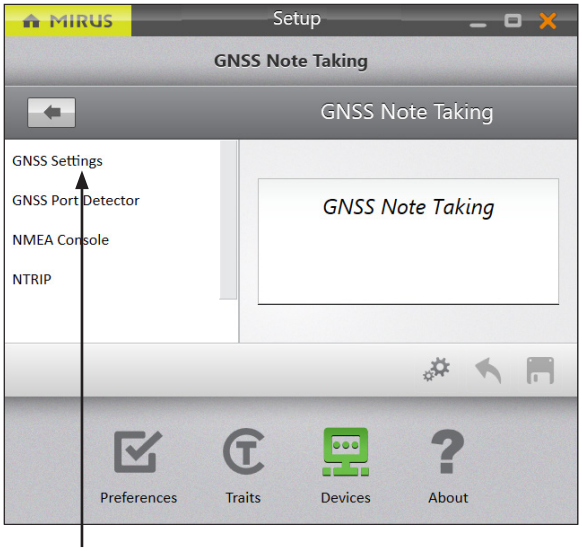
2.1 Adjust GNSS Settings

On the **Setup** > **GNSS Attachment/GNSS Note Taking** screen,

1. Tap **GNSS Settings**.

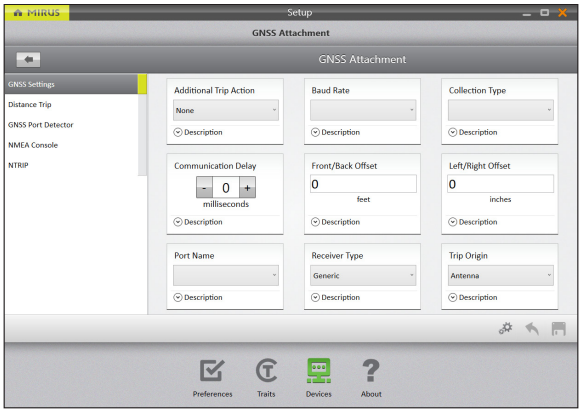


GNSS Attachment

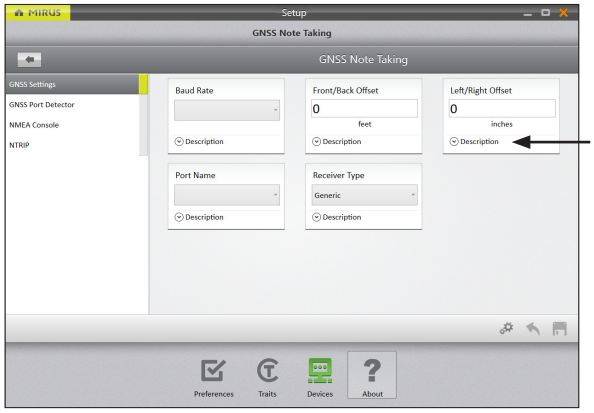


GNSS Note Taking

2. Configure the GNSS Settings as desired.



GNSS Attachment



Tap **Description** for more information about each option.

GNSS Note Taking

The following table explains the details you can control from the **Setup** > **GNSS Settings** screen.

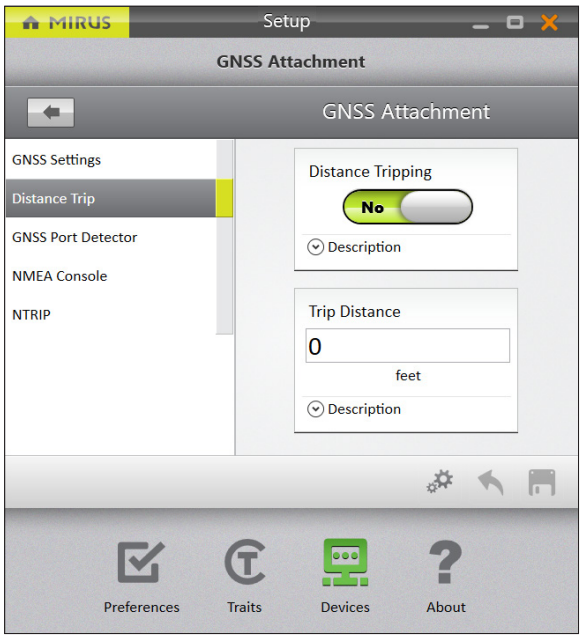
GNSS Settings Screen	
Setting	**Description and Options**
Additional Trip Action*	Set up an additional action performed for an event. • None: Operate normally. • Remote Enter: Mirus adds an enter key press when the combine arrives at the end plot position, so that the operator does not have to manually press the enter to end the plot. • Warn Missed Cycle: Mirus displays a message when an enter key press to end a plot has not been received despite arriving at the end of plot position.
Baud Rate	Define the communication speed, in bits per second, to be used with the serial port. The rate is automatically set when you run the port detection tool (2.3 Use the GNSS Port Detector on page 16). To change the baud rate, select it from the drop-down list.
Collection Type*	Define how or when the GNSS position(s) will be collected for a plot during harvest. • Choose **Plot Events** to collect the GNSS position(s) when each plot cycle occurs. • Choose **Enter Press** to collect GNSS positions for each plot, automatically or manually, with the Enter Press.
Communication Delay*	Under typical conditions GNSS signal, cable, and amplifier delays are negligible. However, if an operator wanted to compensate for a communication delay, this field allows that. The units of measure are in milliseconds.
Front/Back Offset	Enter the distance between the GNSS antenna and the referecne point of the equipment. The reference, such as the deck plates of a corn head, seed tubes of a platner/drill or boom #1 of sprayer. Use positive numbers for equipment placed in front of the GNSS antenna. Use negative numbers for equipment located behind the GNSS antenna.
Left/Right Offset	Enter the distance between the GNSS antenna and the center line (laterally) of the equipment swath. Use positive numbers for equipment to the right of the antenna and negative numbers for equipment to the left of the antenna. Right and left are determined by the driver facing the direction of travel.
Port Name	See the port Mirus uses to make a serial connection to the GNSS receiver. The port is set automatically by the GNSS Port Detector (2.3 Use the GNSS Port Detector on page 16).
Receiver Type	Set the receiver type to Perfomrance NMEA for optimal results.

GNSS Settings Screen	
Setting	**Description and Options**
Trip Origin*	Set the trip origin to Offset Position for normal operation. Mirus will record the beginning of a trip or trip point if using distance trip when the GNSS receiver crosses the point identified in the center of the alley. In Offset Position will begin the trip when the attachment (e.g., cone planter, sprayer head, combine cutter bar) crosses the center of the alley or trip point if using distance trip. The Antenna setting will begin the trip when the antenna of the GNSS receiver crosses the center of the alley or trip point if using distance trip.

**GNSS Attachment only*

2.2 Turn On Distance Trip

The Distance Trip screen is only available with harvest applications using the GNSS Attachment. You will not see this option if you are taking notes.



On the **Setup** > **GNSS Attachment** screen,

1. Tap **Distance Trip**.

Mirus opens the Distance Trip screen. Enable the Distance Tripping and configure the Trip Distance, if needed.

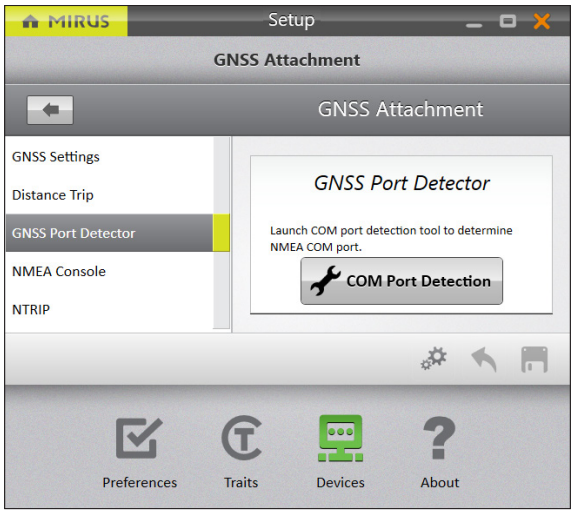
Note: When using a GrainGage, set the trip distant to trip before the trip point of the GrainGage. This will ensure an accurate weight per distance measurement.

The following table explains the Distance Trip settings.

Distance Trip Screen	
Setting	**Description and Options**
Distance Tripping	By default the Distance Tripping slider shows "No". When it shows "Yes," Mirus will start a new cycle after the GrainGage has traveled a specific distance. Each cycle will record the GNSS location. Use Distance Tripping to trigger a cycle using the GNSS attachment and position data while in Strip Mode.
Trip Distance	Enter the distance that the combine will travel before the new cycle begins. (Distance Tripping must be set to "Yes.")

2.3 Use the GNSS Port Detector

The GNSS Port Detector will automatically detect the serial COM port the attached GNSS receiver is using to transmit NMEA data.

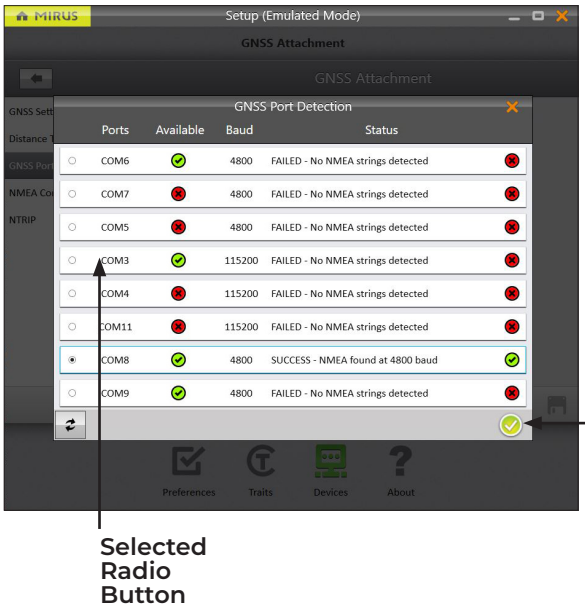


On the **Setup** > **GNSS Attachment/GNSS Note Taking** screen,

1. Tap **GNSS Port Detector** > **COM Port Detection**.

Mirus opens the GNSS Port Detection box and detects the ports.

When the COM port detection is completed, you will see the name of each port, its availability, the baud rate through each port, and the status of NMEA messages. The port in use is indicated by the selected radio button. If you want to use a different port,

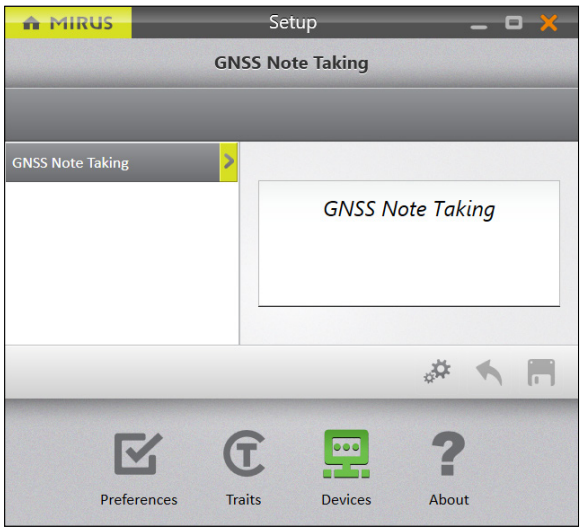


2. Select a port for the receiver to use.
   Note: The first time you use the GNSS plugin, you will select the receiver that you want to use.

3. Tap the check icon to apply the selected port.

2.4 Access the NMEA Console

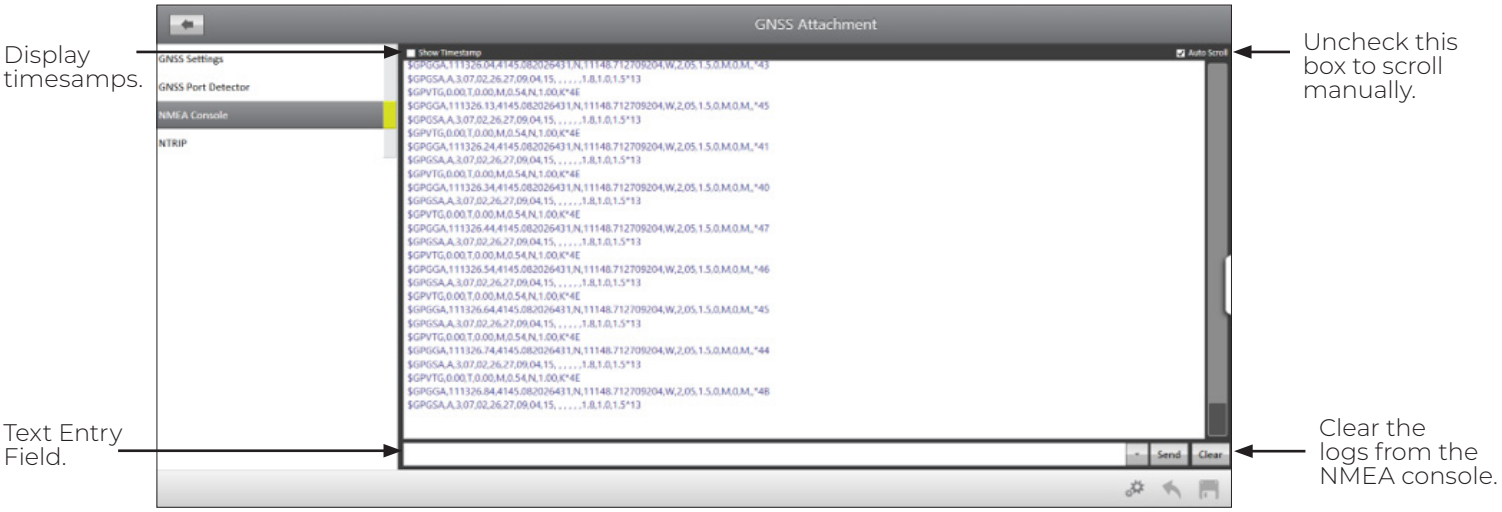
You can view the incoming NMEA messages from the NMEA Console screen.



On the **Setup** > **GNSS Attachment/GNSS Note Taking** screen,

1. Tap **NMEA Console**.

Mirus displays the NMEA Console.



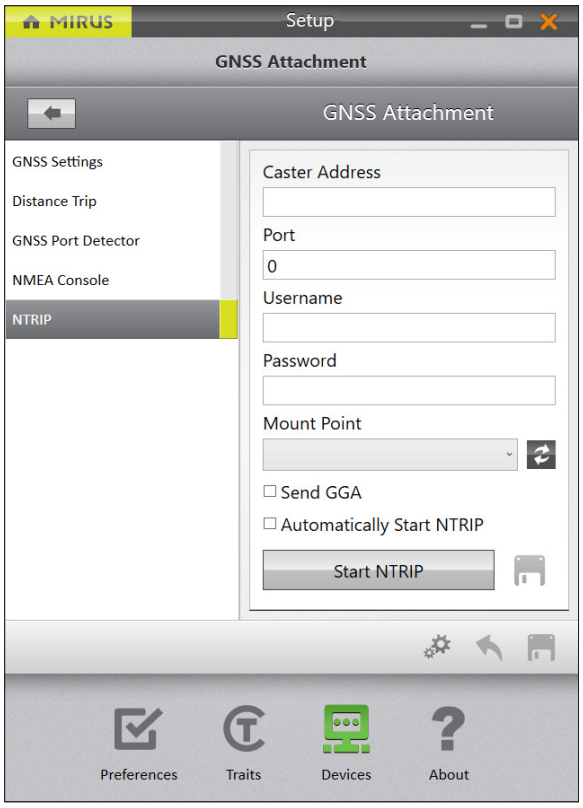
Use the text entry field to send commands or messages to the GNSS receiver. For a comprehensive list of commands and messages that can be used to configure your GNSS receiver, please refer to the technical documentation provided by the manufacturer of the receiver.

There are two commands available within the drop down menu:

- HIDE LOG will cause the incoming messages to stop being displayed and clear your screen making it easy to see the response to a message.
- SHOW LOG will display the incoming messages.

2.5 Connect to NTRIP Service

NTRIP (Networked Transport of RTCM via Internet Protocol) is used to increase the accuracy of GNSS positioning. It uses the internet to fine tune positioning by comparing the known location of a base station with the moving location of a rover. Using an NTRIP service will allow you to achieve a much higher level of accuracy in your GNSS locations.



If you have a subscription with an NTRIP service, use the NTRIP screen to enter the address, port, and credentials necessary to connect to the NTRIP caster. On the **Setup** > **GNSS Attachment/GNSS Note Taking** screen,

1. Tap **NTRIP**.
2. Enter your service provider information.
3. Tap **Start NTRIP**.

Note: To begin NTRIP every time Mirus starts, check the box next to "Automatically Start NTRIP."

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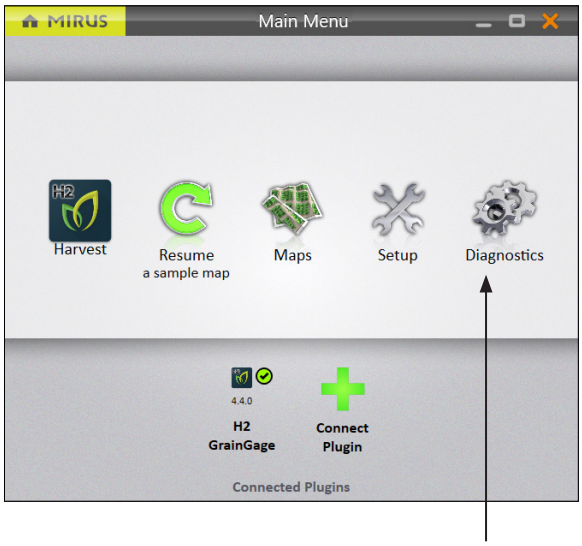
GNSS Plugin

CHAPTER THREE

View Live GNSS Information

3. View Live GNSS Information

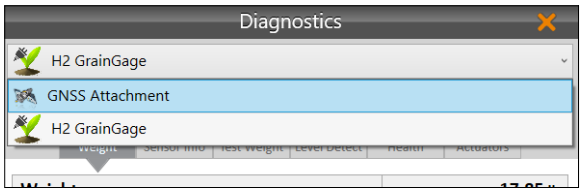
You can see the live information being reported by the receiver from the Diagnostics screen.



To access the Diagnostics screen from the home screen,

1. Tap **Diagnostics**.

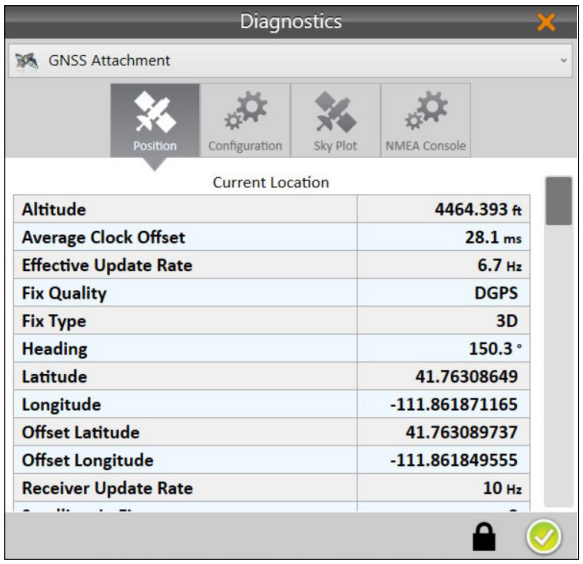
Mirus opens the Diagnostics dialog box.



2. If you are using the GNSS attachment, choose **GNSS Attachment** from the drop-down list.

Note: If you are using the Note Taking device, you will skip this step.

3.1 Position Diagnostics



On the Position Diagnostics screen, the position is shown live.

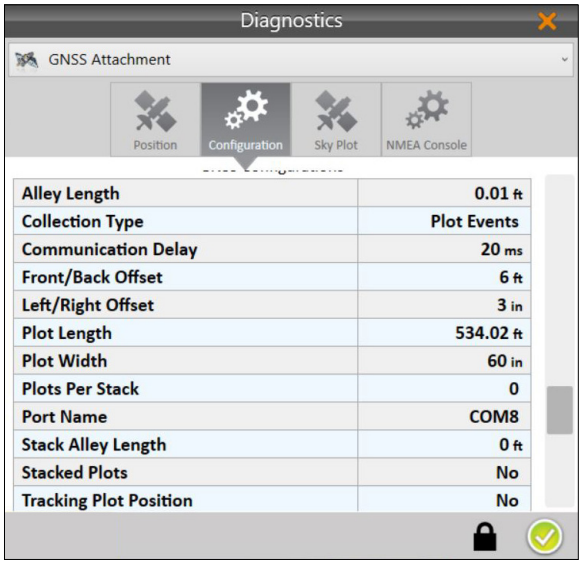
Position Diagnostics	
Item	**Description**
Altitude*	The vertical elevation of your GNSS receiver above sea level.
Average Clock Offset	The measurement of the synchronization error between the satellite's autonomous clock and the receiver's clock.
Effective Update Rate	The rate at which the GNSS receiver is updating its position.
Fix Quality	The type of positioning data being used by the receiver to determine the location. • SPS is the standard GPS positioning and timing data. • DGPS (Differential GPS) uses fixed ground locations in addition to satellite provided positioning data. • RTK (Real Time Kinetic) corrections are provided by a single reference station. • FRTK (Float Real Time Kinetic) skips the initialization phase of the RTK providing greater speed but less accuracy.
Fix Type	The type of reference points (and calculations) being used to determine the position. • 3D uses four or more satellite to determine locations and altitude. • 2D uses fewer than four satellites to determine locations and altitude.
Heading*	The compass direction you are driving. It is measured in degrees from the north magnetic pole.
Latitude*	The coordinate that specifies your north-south position on the Earth.
Longitude*	The coordinate that specifies your east-west position on the Earth.
Offset Latitude*	The latitude with offsets applied at the time the GrainGage cycle started (after the countdown time) when Distance Tripping is turned off.
Offset Longitude*	The longitude with offsets applied at the time the GrainGage cycle started (after the countdown time) when Distance Tripping is turned off.
Receiver Update Rate	The frequency at which the GNSS receiver calculates and reports its position.
Satellites In Fix	The number of satellites the receiver is using to calculate the position.

Position Diagnostics	
Item	**Description**
Speed*	The rate the GNSS receiver is traveling.
Threshold Heading	The last heading received above the speed threshold.
Accuracy	
The position of GNSS satellites in the sky affects the accuracy of the location(s) reported by the GNSS receiver. The following values can help to ascertain greater positional precision.	
EHE	Estimated Horizontal Error is provided by your GNSS receiver based on the number of reliable connections to GNSS satellites.
HDOP	Horizontal Dilution of Precision A value between 1 – 20. One is an ideal connection. Ten is a moderate connection. Twenty is a poor connection.
PDOP	Position (3D) Dilution of Precision A value between 1 – 20. One is an ideal connection. Ten is a moderate connection. Twenty is a poor connection.
VDOP	Vertical Dilution of Precision A value between 1 – 20. One is an ideal connection. Ten is a moderate connection. Twenty is a poor connection.

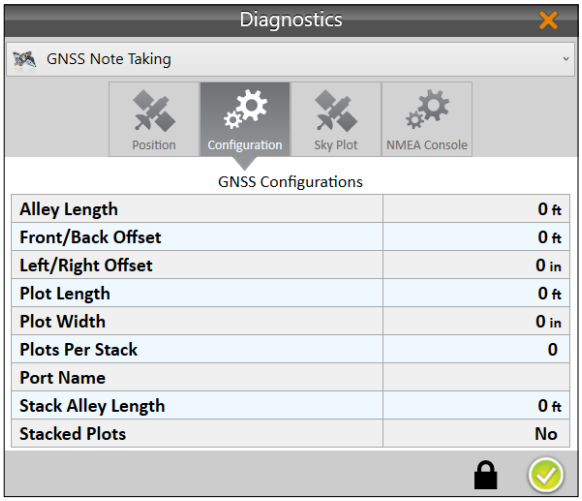
*Also in the backup log.

3.2 Configuration Diagnostics

The Configuration Diagnostics screen, shows the currently applied values.



GNSS Attachment



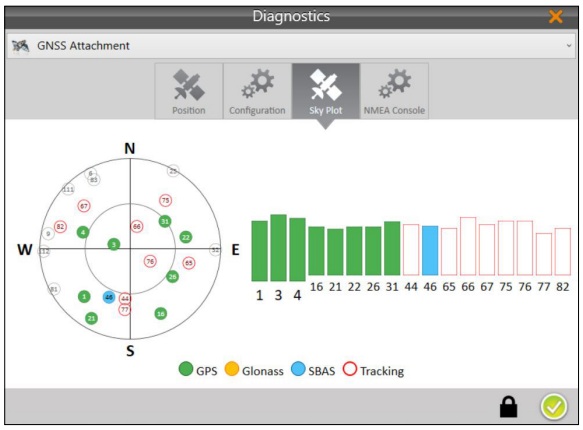
GNSS Note Taking

Configuration Diagnostics	
Item	**Description**
Alley Length	The length of the empty space where there are no plants between two plots. Set in the AB line wizard Field Dimensions. See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.
Collection Type*	The method, a plot event or enter press trigger, used to start the flush cycle of the GrainGage. See 2.1 Adjust GNSS Settings on page 13.
Communication Delay*	Under typical conditions GNSS signal, cable, and amplifier delays are negligible. However, if an operator wanted to compensate for a communication delay, this field allows that. It is measured in milliseconds.
Front/Back Offset*	The value you entered as your front/back offset. (See 2.2 Turn On Distance Trip on page 15.) The default value is 0.
Plot Length	The value you entered in the AB Line Wizard for plot length. See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.
Plot Width*	The value you entered in the AB Line Wizard for plot width. See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.

Configuration Diagnostics	
Item	**Description**
Plots Per Stack	The number of plots grouped together to make one stack. Only used when Stacked Plots is on. See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.
Port Name	The port used by Mirus to make a serial connection to the GNSS receiver. The port is set automatically by the GNSS Port Detector. See 2.3 Use the GNSS Port Detector on page 16.
Stack Alley Length	The longer distance between a group of stacked plots See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.
Stacked Plots	Several plots grouped together. See step 3 of Section 7. Harvest with the GNSS Attachment on page 39.
Tracking Plot Position*	A record of the averaged plot position is kept when "Yes" is displayed. It is not recorded when "No" is displayed.

* GNSS Attachment only.

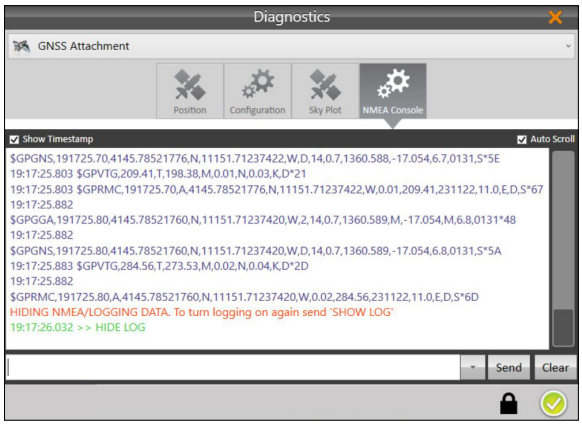
3.3 Skyplot Diagnostics



The Sky Plot Diagnostics screen shows the satellites used in the positioning solution and where they are in the sky.

On the Skyplot page, each satellite is identified by a space vehicle number (SVN) and color for its constellation. The location of each satellite on the Skyplot indicates where it resides in the sky overhead relative to true north. The outside ring is 0° elevation (horizon). The inside ring is 45° elevation—halfway above the horizon from the Geode's present location. The intersection of the two lines indicates directly overhead.

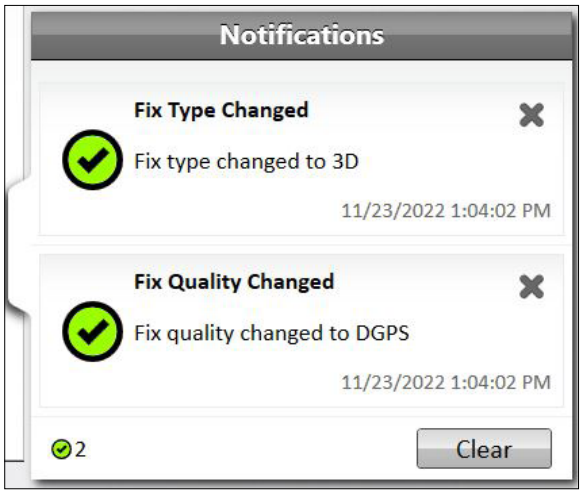
3.4 NMEA Console Diagnostics



The NMEA Console is explained in 2.4 Access the NMEA Console on page 18.

3.5 Alerts

When the fix type changes, you will see a green notification message for a good fix and yellow for a not good fix.



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GNSS Plugin

CHAPTER FOUR

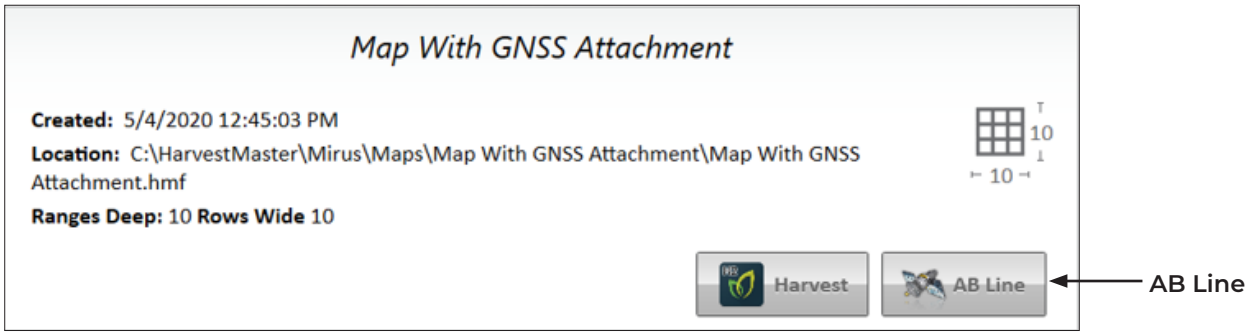
Create the AB Line

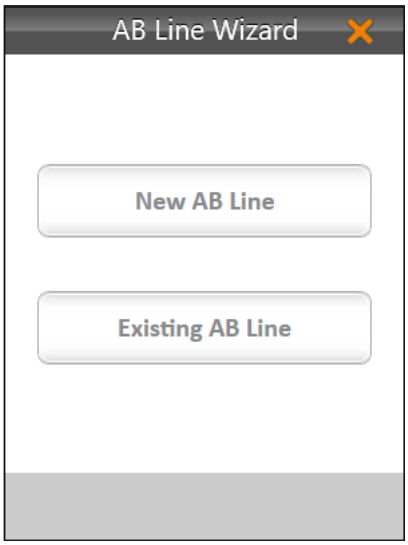
4. Create the AB Line

You can use the GNSS receiver to provide real world reference locations for Mirus to use in creating the map of your field. Mirus creates a map based on a reference line, called the AB Line. Follow the steps below to create an AB line that corresponds to one side of your physical field.

On the **Maps** > **select a map** screen,

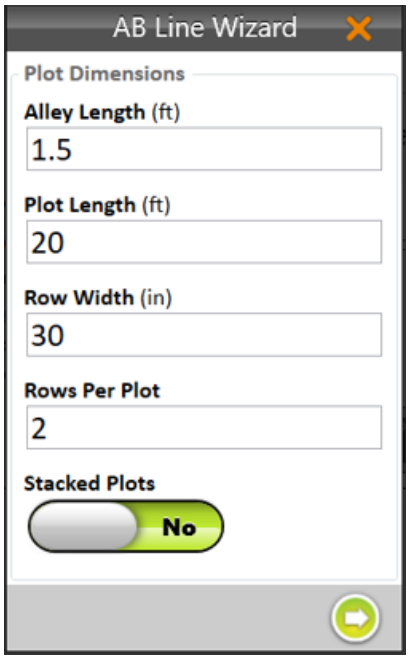
1. Tap **AB Line**.





2. In the AB Line Wizard, tap **New AB Line**.

   Note: If you want to edit an existing line, choose Existing AB Line and then select the map file that contains the AB line you want to copy.



3. Set the Plot Dimensions.

   - **Alley Length**: The alley is the empty space between ranges.

     Note: The minimum Alley Length is 0.1 ft, which creates a field with no alley.

   - **Plot Length**: The length of the space allotted for the plants to grow.

   - **Row Width**: The width of the space allotted for each row of plants to grow.

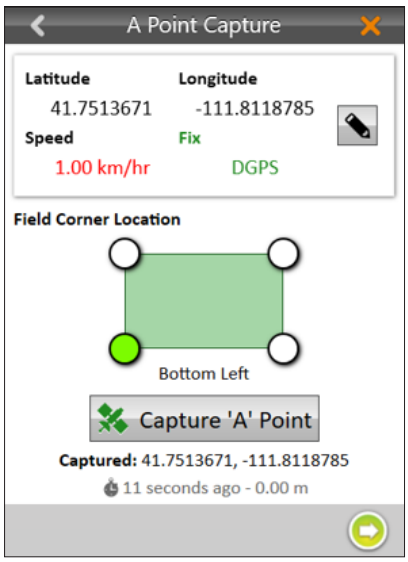
   - **Rows Per Plot**: The number of plant rows to be grouped together to create a plot.

     Note: The row width and rows per plot should equal the effective swath width.

   - **Stacked Plots**: A group of plots separated from other plot groups by a larger alley. This option defines a longer alley after a specific number of smaller alleys between plots. If you are using stacked plots, enable Stacked Plots and define the number of plots per stack and the stack alley width.

4. Tap the next arrow.

5. Move your GNSS receiver to the location you want displayed in Mirus as the lower left corner of the field. When using the GNSS attachment with a GrainGage and the correct offsets entered, position your combine in front of the first plot with the first plant contacting the cutter bar or deck plates.



6. In Mirus tap **Capture 'A' Point**.

   Note: You can manually edit the latitude and longitude of the 'A' point before capturing it.

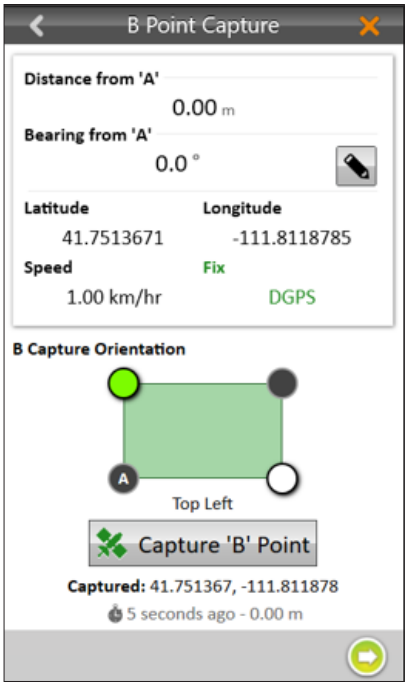
7. Tap the next arrow.

8. Move your GNSS receiver to the location you want displayed in Mirus as the upper left corner of the field. For example, position your combine, pointing the same direction, at the end of the first row of the first plot with the last plant touching the cutter bar or deck plates.

Note: If it is not feasible to drive exactly along your row as you would to harvest, you can drive the combine parallel to your row to the side of the plot, and then reset the corner(s) using an offset distance in Mirus once the AB line has been created.

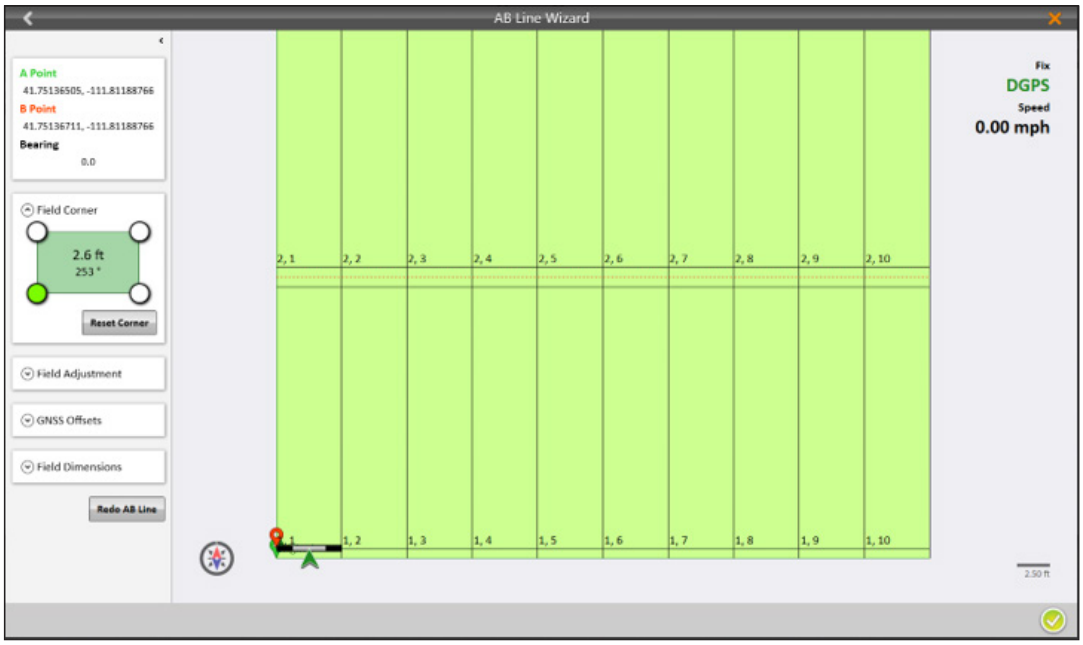
To improve the accuracy of the map with the AB line you are defining,

- Drive the entire length of the field between capturing the 'A' and 'B' Points.
- Use the pencil button to enter the distance from your first corner A and the bearing in degrees from A to B.



9. In Mirus tap **Capture 'B' Point**.
10. Tap the next arrow .

Mirus will display the Map View of the field calculated from the AB Line.

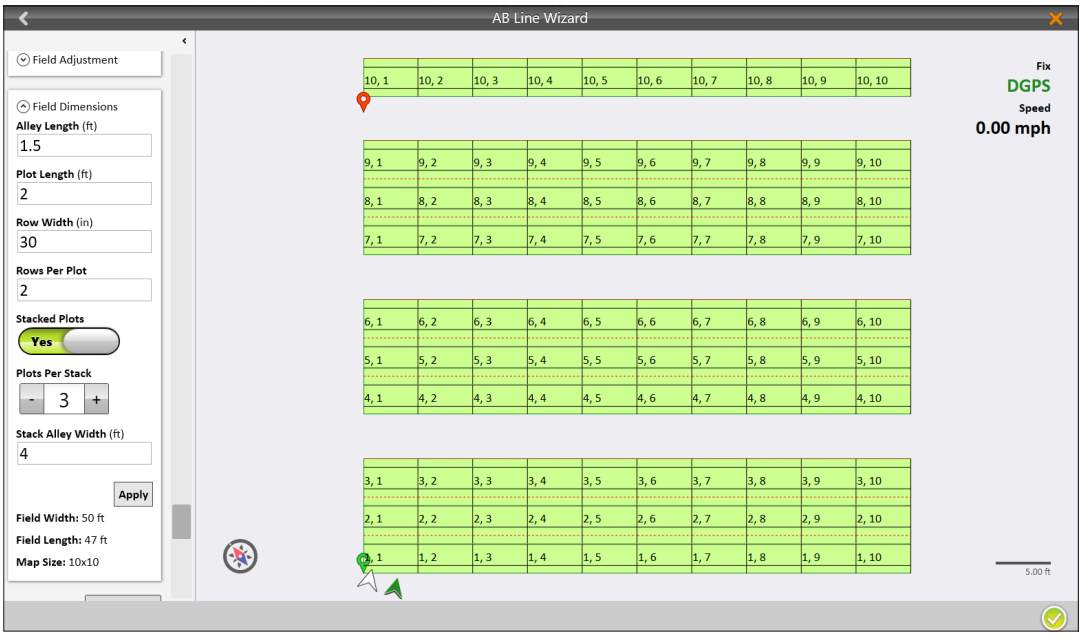


All of the field parameters are displayed on the left side of the screen. Several of them can be edited from there.

AB Line Wizard Final Screen

Setting	Description and Options
A Point B Point Bearing	View the A and B coordinates and the bearing entered.
Field Corner	Reset the corner to reposition the AB line based on your new position.
Field Adjustment	Change the vertical or horizontal width of your field.
GNSS Offsets	View the currently set offsets. To change them, use the directions in 2.1 Adjust GNSS Settings on page 13.
Field Dimensions	Adjust the Alley Length, Plot Length, Row Width, Rows Per Plot, and choose Stacked Plots.
Redo AB Line	Recapture the AB line.

The following Map View shows a field of stacked plots where groups of three plots are separated by a 4-foot stack alley. Within each group, the three plots are separated by 1.5-foot wide alleys.



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GNSS Plugin

CHAPTER FIVE

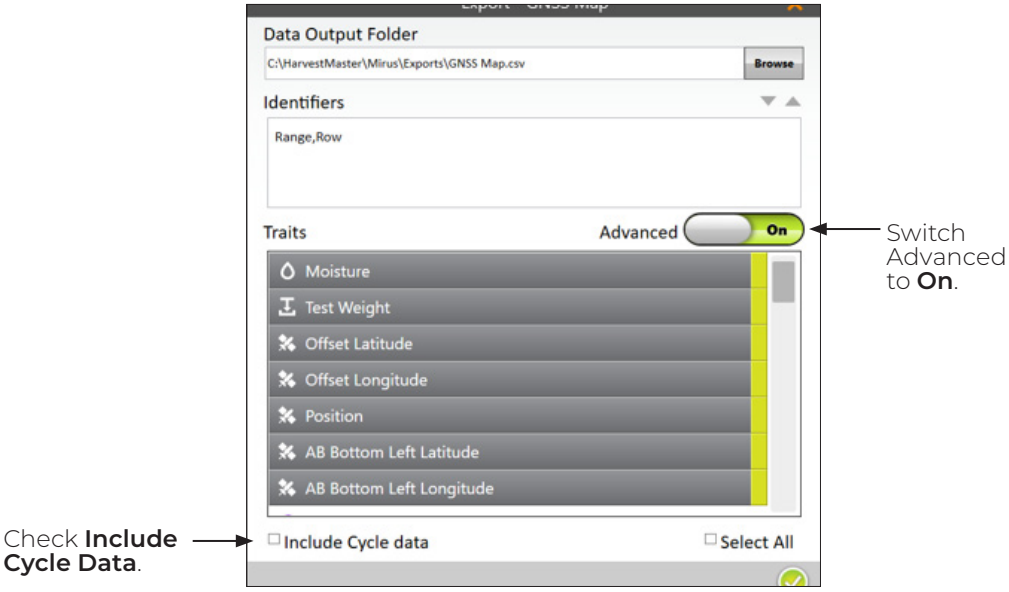
Export GNSS Harvest Data

5. Export GNSS Harvest Data

The map export utility in Mirus will automatically include all of the GNSS traits with the weight, moisture, and test weight data. You do not need to take any additional actions after harvest to include the GNSS data.

To export data, please see the Export Map Data section in the appropriate *Mirus Manual*.

If needed, you can switch **Advanced** to **On** and check the box to Include Cycle Data.



Exported data is in CSV format, so it can easily be viewed in Excel and imported into analysis software such as AgroBase or Prism. The following is an example of the exported data with GNSS data for each cycle.

Date/Time	Range	Row	Cycle	Weight	Moisture	Offset Latitude	Offset Longitude	Position	Harvest Sequence
7/12/2019 13:57	1	1	T	27.33	1.3	41.76216494	-111.8622119	41.762163827, -111.862199761	1
7/12/2019 13:57	1	1	1	5.09	1.27	41.7621345	-111.8619736	41.762137287, -111.861959814	1
7/12/2019 14:03	1	2	T	17.67	1.41	41.76216074	-111.8620596	41.762161798, -111.862071770	2
7/12/2019 14:03	1	2	1	3.1	1.41	41.76218637	-111.8622635	41.762183296, -111.862277148	2
7/12/2019 14:07	1	3	T	29.46	2.72	41.76218322	-111.8621941	41.762181990, -111.862182028	3
7/12/2019 14:07	1	3	1	5.08	2.72	41.76215117	-111.8619635	41.762155624, -111.861950547	3

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GNSS Plugin

CHAPTER SIX

Define Research Boundaries with Field Layout

6. Define Research Boundaries with Field Layout

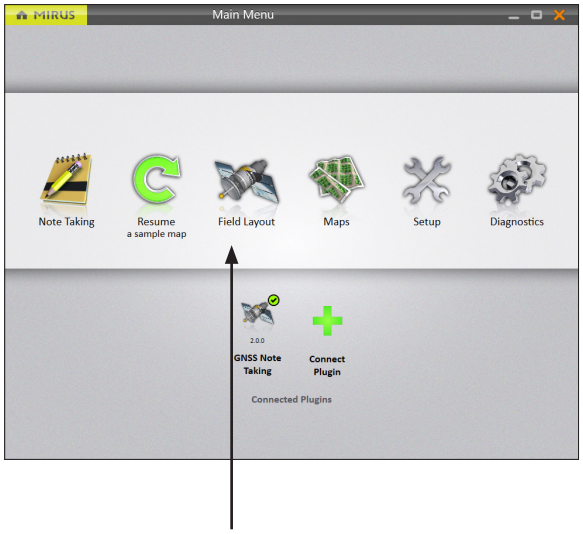
Note: The Field Layout menu option is only available when the GNSS plugin is connected to Mirus as the GNSS Note Taking device.

Field Layout is designed to assist researchers in defining the location of a research section within a larger field. Field Layout combines your width and length measurements and GNSS locations to generate a field layout map. Use the field layout map to navigate to each corner of the research section so it can be physically marked.

Field Layout can measure distance between any two points to verify location and accuracy. Once a field map has been generated, Field Layout creates individual plots within the defined field boundary.

When necessary, you can offset the field layout so that the base line of a field can be projected a set distance from a known boundary such as a road or fence.

Note: The accuracy of the defined field layout is determined by the accuracy of the GNSS receiver.



On the Mirus Home screen,

1. Tap **Field Layout**.

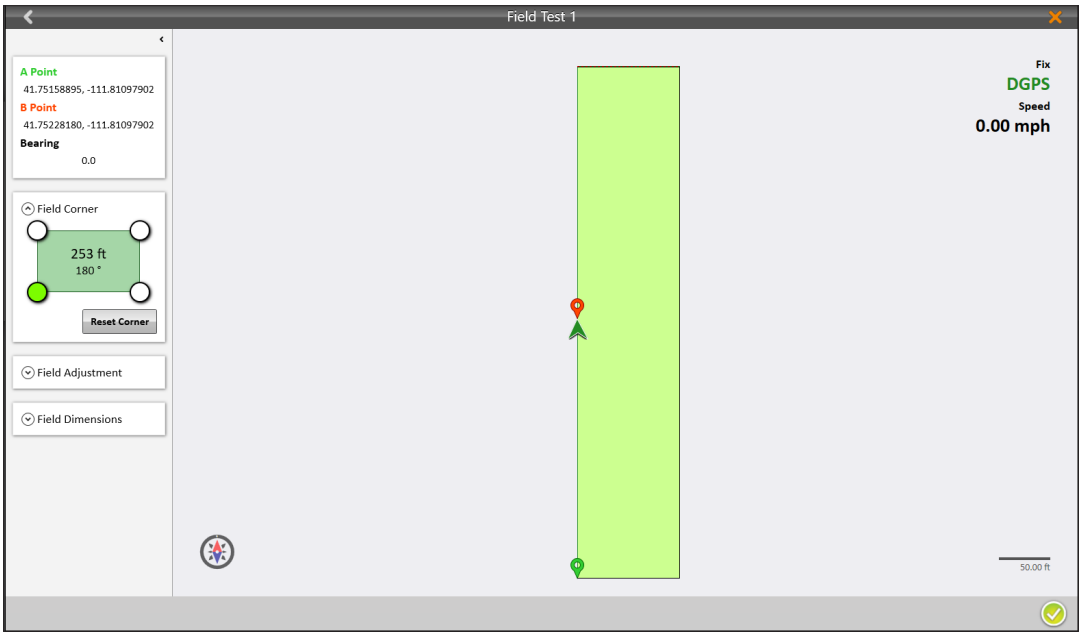
If you have not previously defined a field layout, Mirus will display the AB capture box.

If you have previously defined a field layout, Mirus will display the last field layout that was used as well as any other defined field layouts.

2. Name the map and enter the width and length of your field.
3. Tap the next arrow .
4. Capture the AB Line. See 4. Create the AB Line on page 28.

Mirus displays field layout in Map View.

If you were moving along the road when capturing the GNSS corner locations, use the Field Adjustment drop-down to move your captured locations into the field.



Place physical field markers corresponding to your field layout to identify the research area.

Note: Field layout maps are accessed from Field Layout on the home screen, not the Map menu item.

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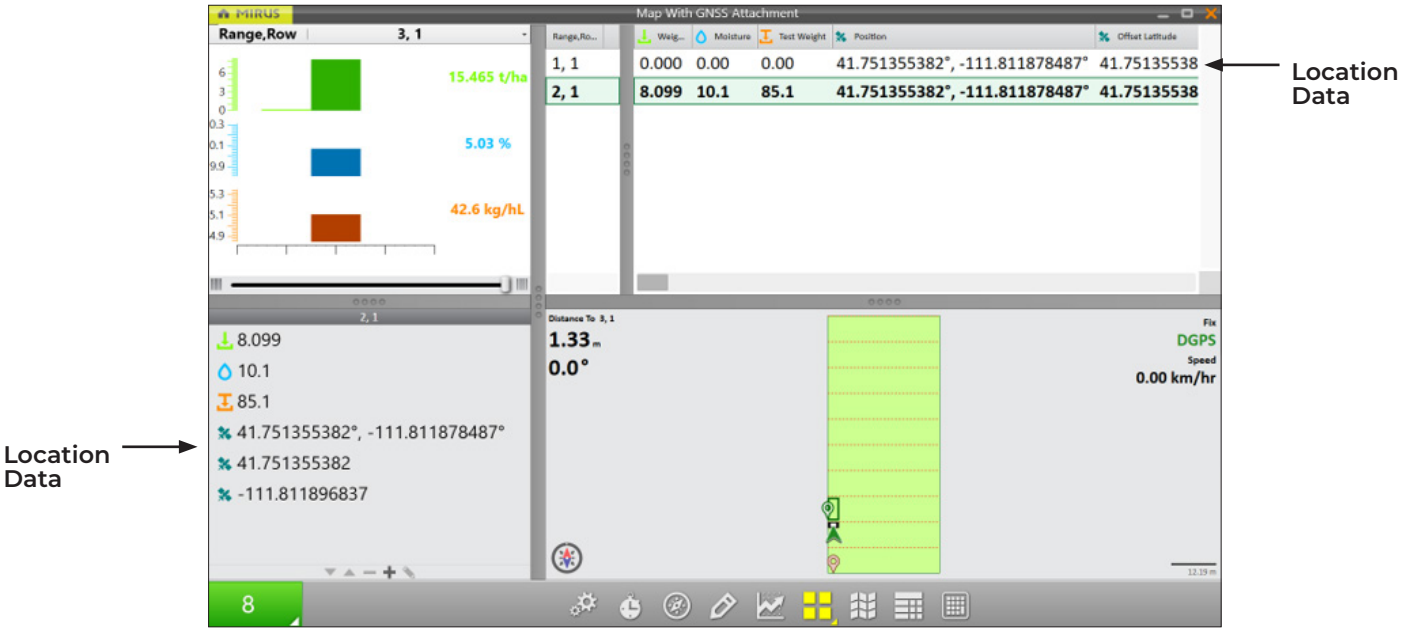
GNSS Plugin

CHAPTER SEVEN

Harvest with the GNSS Attachment

7. Harvest with the GNSS Attachment

When Mirus is connected to the GNSS Plugin Attachment, the location will be displayed with the cycle data on the Harvest screen as your combine moves through the field. Data collection will begin as you harvest. For directions on using Mirus to harvest, refer to the Harvest Mode section in the appropriate *Mirus Manual*.

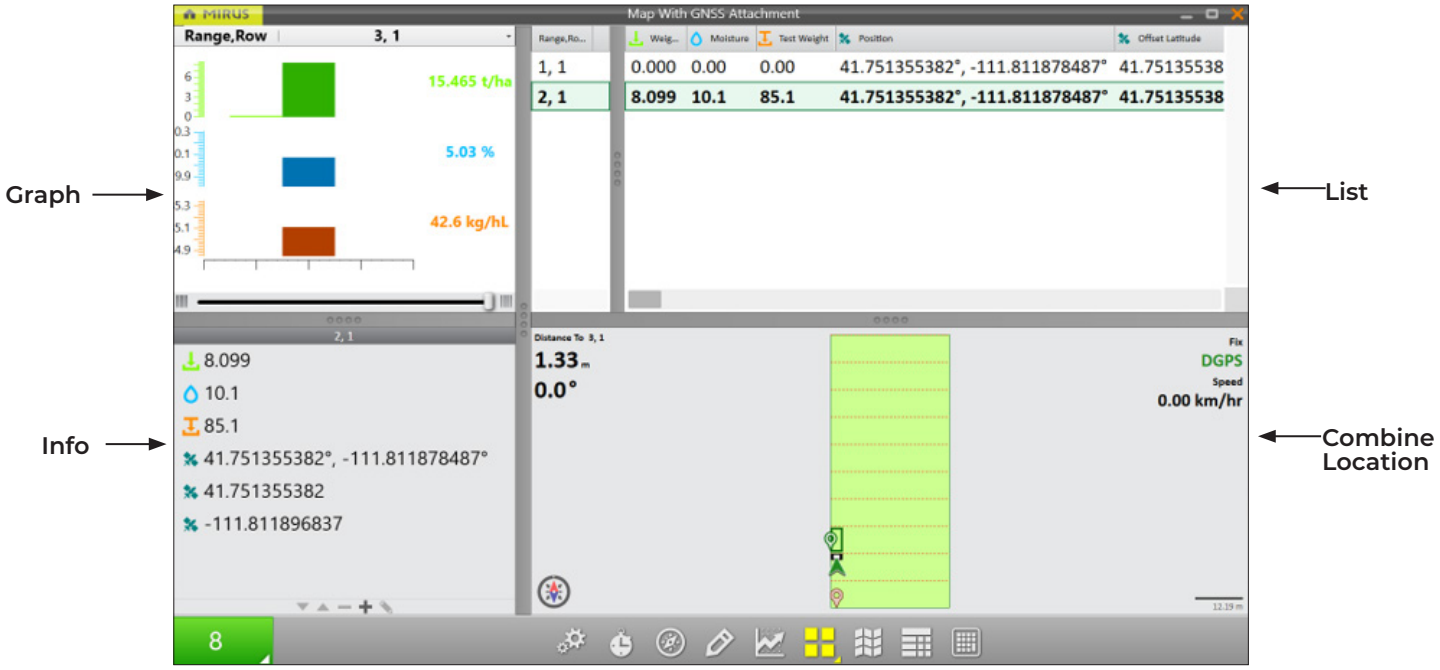


When harvesting, ensure the GrainGage has completed cycling before you arrive at the next trip point. If you drive too fast, you will loose some GNSS data points on the trip. To approximate how fast you are driving, divide the Trip Distance by the cycle time (the time between the isolation door closing and opening) of the GrainGage.

Speed Estimates Examples

Trip Distance	Average Cycle Time	Estimated Speed
10 ft	8 seconds	1.25 ft/sec or 0.85 mph
10 ft	7 seconds	1.43 ft/sec or 0.975 mph

In the Quad View, you can see the combine location, GNSS speed, and distance traveled. For an explanation and instructions on configuring the Quad View, please view the appropriate *Mirus Manual*.



7.1 Countdown Timer

The distance trip feature harvests with the countdown timer. (For directions see the Harvest with Countdown Timer section in the appropriate *Mirus Manual*.)

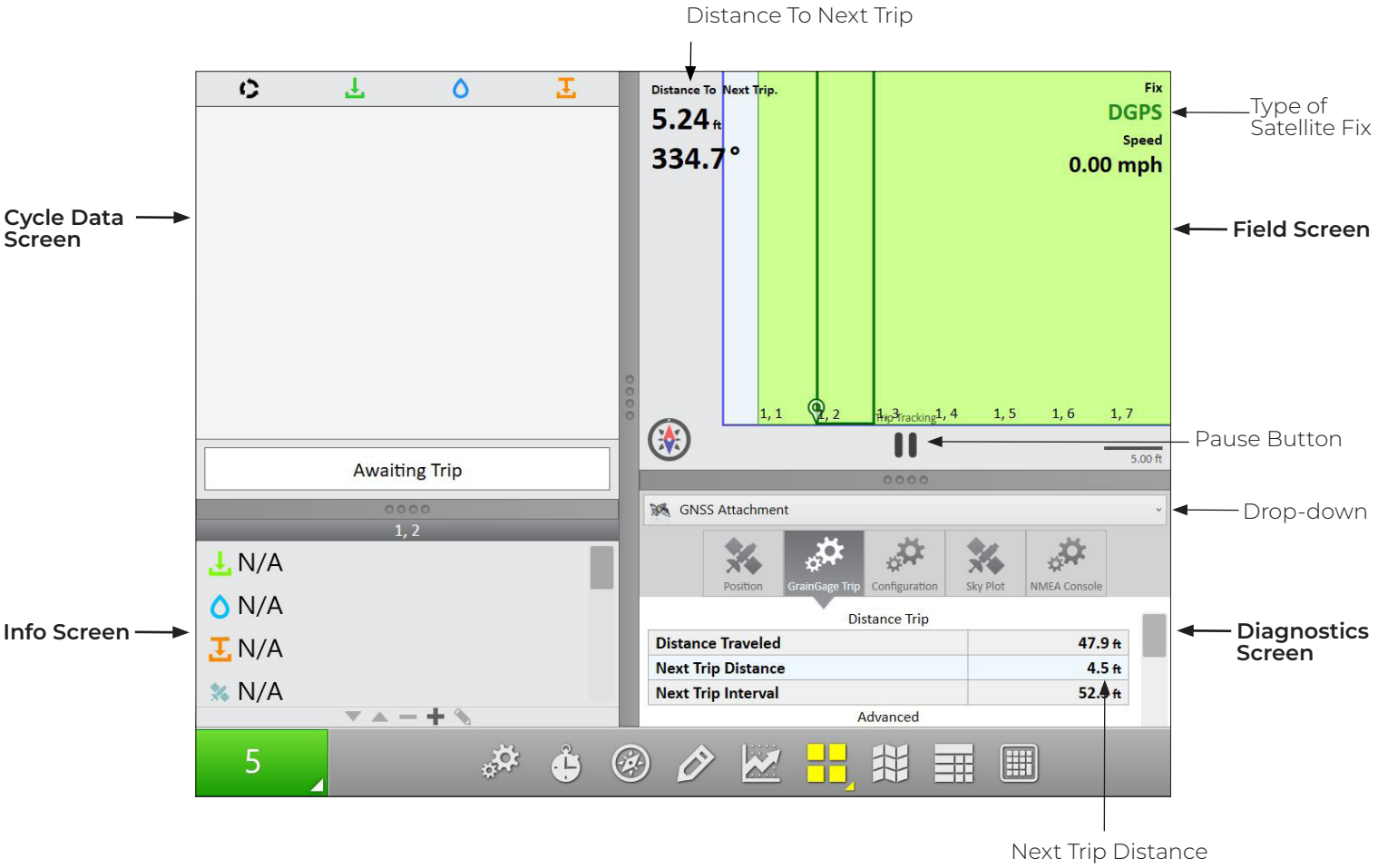
For positioning the harvested data correctly in the field, the countdown timer in Mirus must be synced with your combine.

To sync the countdown timer with your GrainGage,

1. Harvest a short distance.
2. Stop.
3. Time how long it takes for all of the grain to arrive in the GrainGage.

Note: If the timer is too short, not all of the grain from the preset distance will be in the GrainGage. If the timer is too long, data from the next distance trip will be mixed in with the data collected from the previous trip.

To see the system cycles and data collection, set your Quad View to display Cycle Data, Field, Info, and Diagnostics screens.



On the Field screen,

- Tap **Distance to Next Trip** to see the distance to next trip.
- Tap the distance and bearing numbers to toggle between seeing the distance to the end of the plot where the flush cycle will occur and the distance to the next/previous plot.
- Use the pause button when you need to turn around or back up.

On the Diagnostics screen, select **GNSS Attachment**. Use the Next Trip Distance to count down to the next trip point so that you can stop at your intended trip distance.

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GNSS Plugin

CHAPTER EIGHT

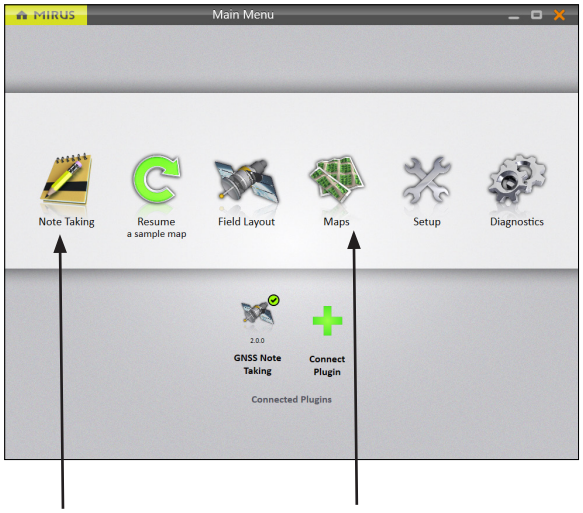
Take Notes with the GNSS Plugin

8. Take Notes with the GNSS Plugin

The GNSS Note Taking Device only needs to be enabled if you are using it while taking Mirus Notes. The GNSS Note Taking Device is not used with the harvest applications. To connect the device follow the directions 1.6 Add the GNSS Plugin to Mirus as a Device on page 9.

8.1 Take Notes

Note Taking requires a map. There are two ways to choose the map to take notes with the GNSS plugin,

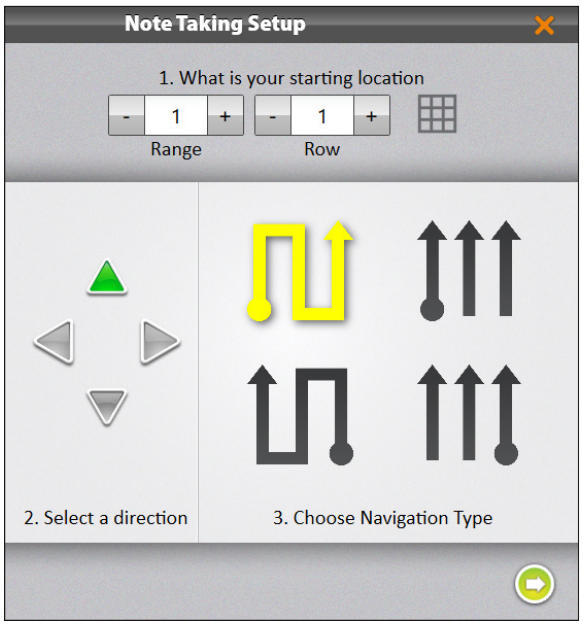


- Tap **Note Taking**.
- Pick the map to use.

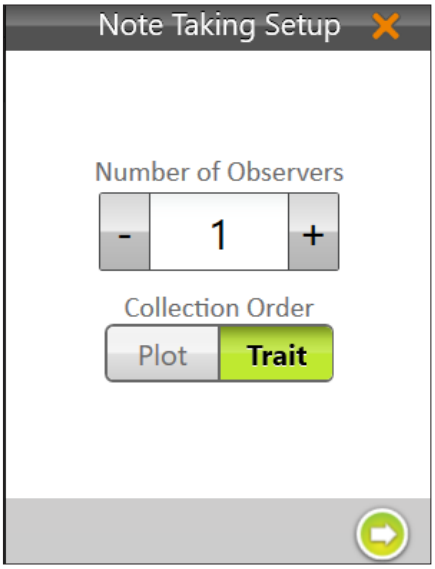
Or

- Tap **Maps**.
- Pick the map to use.
- Tap **Note Taking**.

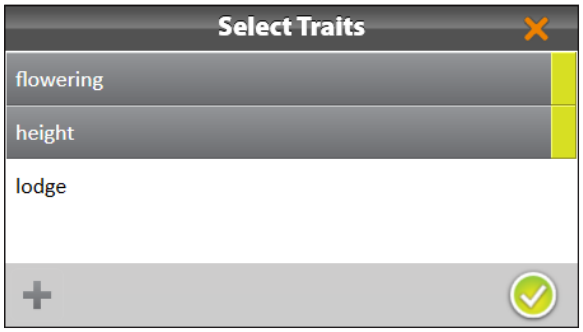
Note: On the Main Menu tap **Resume** *to continue with the map and notes you were using last.*



1. Enter the starting location.
2. Select the direction.
3. Choose the navigation type.
4. Tap the next arrow .



5. Enter the number of observers.
6. Choose the collection order (plot or trait). Notes are most often taken according to trait. Increasing the number of observers, will cause Mirus to display additional spaces to enter your notes.
7. Tap the next arrow.

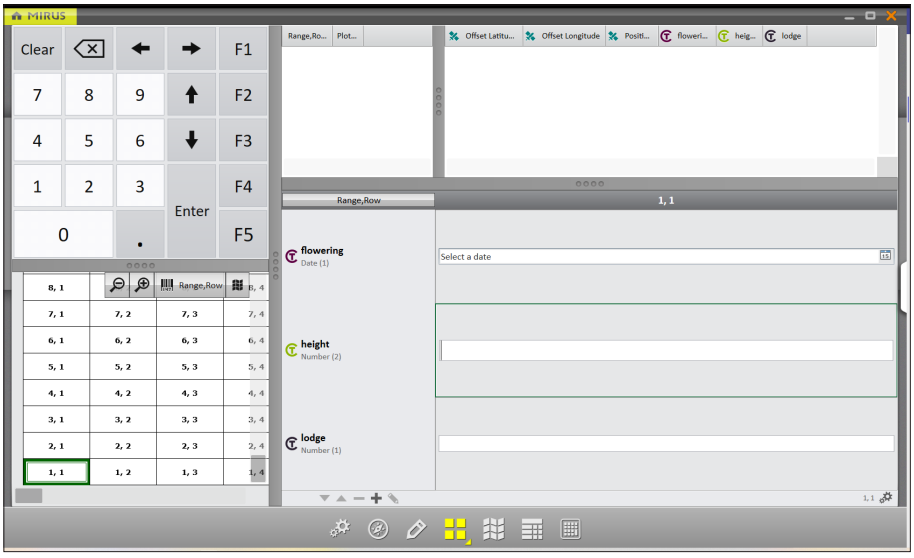


8. Tap all the trait(s) you want to record notes about.

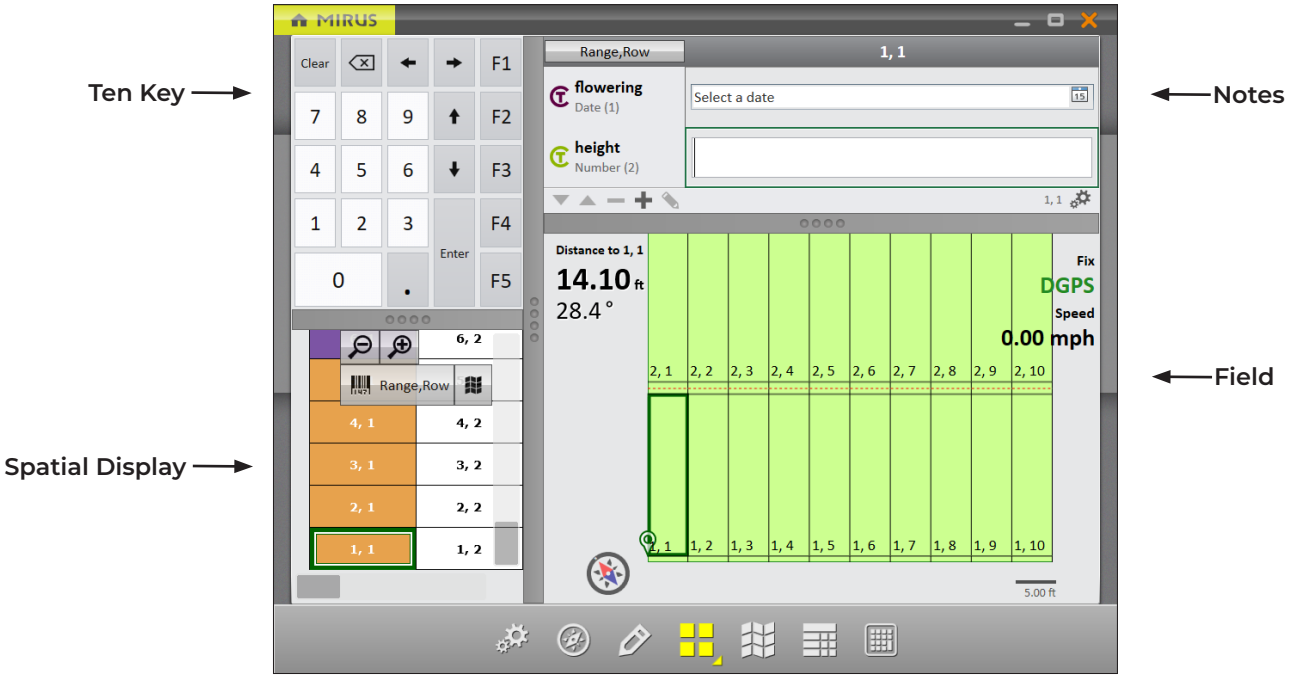
   Previously defined traits will be listed. Use the plus button to add new traits.

   Note: For more information, see Mirus Manual section 2.3.11 Create and Record Traits.
9. Tap the check icon to see the Observation screen.

You will see the selected trait(s) with space to enter your notes. Use the ten key to enter your note. Once you enter a value, the cursor will move to the next trait or plot.



When taking notes, the Quad View can be configured to show the ten key for quick data entry, the notes spaces for recording observations, the spatial view to orient your observation, and the field view to see your location.



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GNSS Plugin

CHAPTER NINE

The Backup Log

9. The Backup Log

A backup log is created when Mirus activates a map for Harvest or Note Taking. The backup log will include GNSS information when you use the GNSS Attachment plugin.

Note: The backup log is a CSV file stored at C:\HarvestMaster\Mirus\Backups\.

Each category of GNSS specific data is described below.

Backup Log	
Field Name	**Definition**
Offset Latitude Offset Longitude	The latitude/longitude with offsets applied at the time the GrainGage cycle started (after the countdown time) when Distant Tripping is turned off.
Position	The location of the GNSS antenna at the time the GrainGage cycle started with Distance Tripping turned off. There are no offsets included in this value when distance tripping is turned off.
Trip Type	The point where the system triggers the isolation door to close and the cycle to start.
AB Bottom Left Latitude* AB Bottom Left Longitude*	Coordinates of the bottom left corner of the plot as projected by the AB line. They are not captured in real time by the GNSS receiver.
Altitude	The vertical elevation of your GNSS receiver above sea level.
Distance From Last Trip	The distance traveled since the last trip point.
End Altitude*	The vertical elevation of your GNSS receiver above sea level when your harvest ended.
End Heading*	The compass direction you were driving when the harvest ended. It is measured in degrees from the north magnetic pole.
End Latitude* End Longitude*	The coordinates of your position as determined according to the Plot Tracking Mode. • Enter Press Mode captures the location at the previous enter press. • Plot Event Mode captures the location when the GrainGage or planter finishes the plot.

Backup Log	
Field Name	**Definition**
EndOffsetLatitude* End Offset Longitude*	The coordinates captured plus the offset value (see 2.1 Adjust GNSS Settings on page 13) at the time the plot was exited.
End Speed*	The rate at which the GNSS receiver is traveling, i.e. your combine is driving, at the end of the harvest.
Estimated Horizontal Error	Represents the accuracy of the GNSS position being received. It will only show when a receiver is configured to output either a GST or an RRE NMEA message.
Estimated Plot Position*	The letter and number indicating the range and row of the plot where the GNSS receiver is located at the time the position data was captured.
Front/Back Offset*	The value you entered as your front/back offset. (See 2.2 Turn On Distance Trip on page 15.) The default value is 0.
Heading	The compass direction you are driving. It is measured in degrees from the north magnetic pole.
Latitude	The coordinate that specifies your north-south position on the Earth.
Left/Right Offset*	The value you entered as your left/right offset (see 2.1 Adjust GNSS Settings on page 13.) The default value is 0.
Longitude	The coordinate that specifies your east-west position on the Earth.
PlotWidth*	The value you entered in the AB Line Wizard for plot width. See step 3 of Section 4. Create the AB Line on page 28.
Speed	The rate the GNSS receiver is traveling.
Start Altitude*	The vertical elevation of your GNSS receiver above sea level when your harvest began.
Start Heading*	The direction of the compass when the harvest begins. It is measured in degrees from the north magnetic pole.

Backup Log	
Field Name	**Definition**
Start Latitude * Start Longitude*	The coordinates of your position determined according to the Plot Tracking Mode: • Enter Press Mode captures the location at the previous enter press. • Plot Event Mode captures the location when the GrainGage or planter starts the plot.
StartOffsetLatitude StartOffsetLatitude	The coordinates captured plus the offset value (see 2.1 Adjust GNSS Settings on page 13) at the time the plot was entered.
Start Speed*	The rate at which the GNSS receiver is traveling at the beginning of the harvest.
Trip Latitude Trip Longitude	Only shown when distant tripping is turned on. The value in the backup log is the GNSS position captured at the time the offset position crosses the trip interval boundary. Use these values when plotting a yield map.

**Plot Trip Type*