

RC Mobile AMR Application

User Manual



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AUTONOMOUS MOWING ROBOT

REDEFINING THE BUSINESS OF MOWING

TABLE OF CONTENTS

GENERAL INFORMATION	4
SAFETY	5
APPLICATION SET-UP	6
LOG IN	7
HOME PAGE	8
MOWER CONNECT PAGE	9
MOW PAGE	10
SELECT PLAN PAGE	14
MOWER SETTINGS PAGE	15
MACHINES PAGE	16
PLAN PAGE	17
EDIT PLAN PAGE	18
MONITOR PAGE	20
SETTINGS PAGE	21

GENERAL INFORMATION

The Autonomous Mowing Robot™ is a revolutionary product that directly addresses the labor availability problems in the landscaping industry. With our autonomous mowers, landscape contractors can reduce the number of employees needed to handle mowing jobs. For the AMR and its operator to succeed, use the RC Mobile Application to aid with robotic mode.

TO UNDERSTAND THE USE AND OPERATION OF OUR AMR, PLEASE READ THIS MANUAL IN ITS ENTIRETY.

INTENDED USE AND PRECAUTIONS

The A-Series RCM Robotics Autonomous Mowing Robot™ (AMR) is an industrial/commercial robotic rider mowing machine. The machine can be operated in either robotic mode (without the operator seated) or manual mode (with the operator seated). The RC Mobile application is necessary for running the AMR in robotic mode. One application controls multiple robots and only one user has access to each login.

Do not use this application and paired machines without proper training. Without the proper knowledge, operating the machine may result in death or injury to you or bystanders, or property damage.

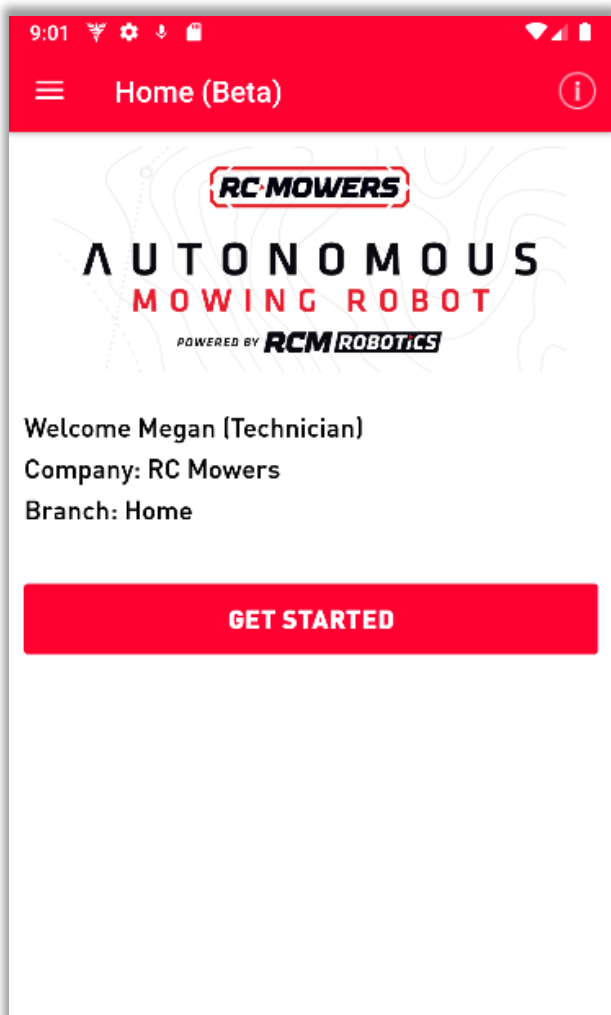
REGISTER YOUR OPERATOR

Before operating your application, a user is registered by a company manager at the RC Mowers Owner portal. The following information will lead you to registering operators correctly:

SAFETY

Refer to the Autonomous Mowing Robot™ Operator Manual to ensure all trained operators are knowledgeable on ALL safety points before continuing with operation.

APPLICATION SET-UP



To use the AMR in robotic mode, any trained operator must have the RC Mobile application on an Android device. This application **MUST** be downloaded from an RC Mowers-approved source. Any RC Mobile application not downloaded from an approved source is not an official RC Mowers product and is not supported by the terms of service and RC Mowers.

Expect support for iOS apps in the coming future.

Users will not be able to use the application if they are not registered operators.

Once the RC Mobile app is downloaded, they need to log in.

LOG IN

When opening the application for the first time, the user is brought to the login page. Enter the operator's phone number and wait for the phone to get a pin sent in a text message. Once the correct pin is entered, the app will log in and bring the user to the home page.

Note: the pin number expires after 5 minutes, at that point the user will have to resend a pin.

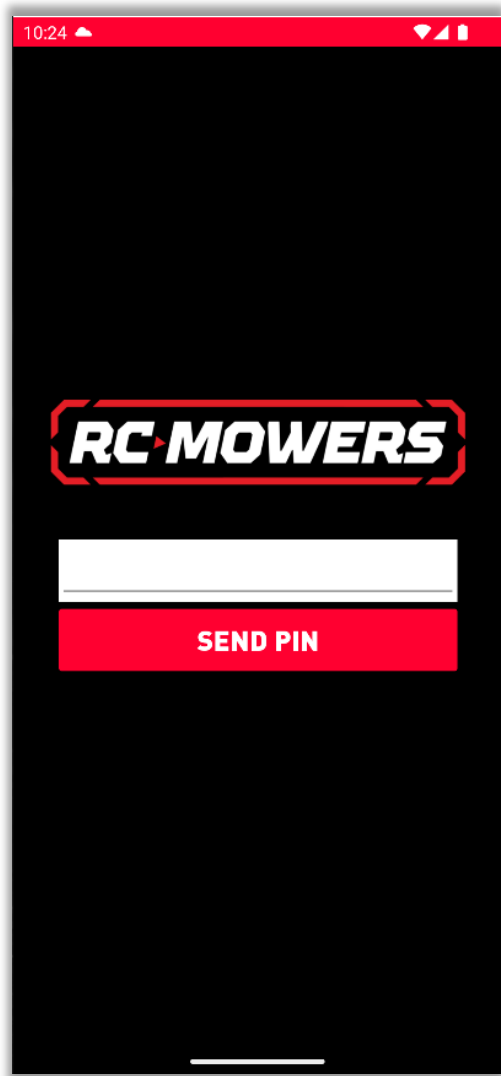


Figure 1: Enter Phone Number

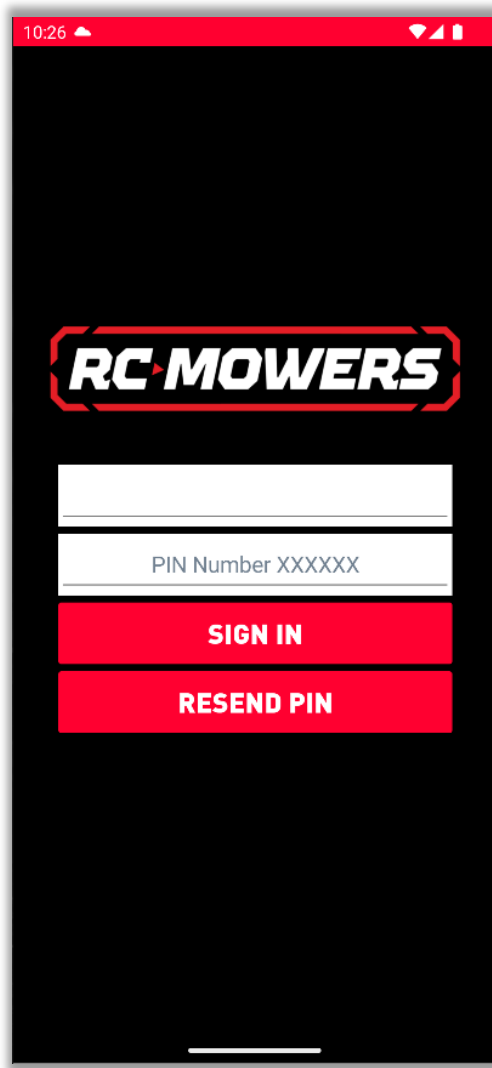
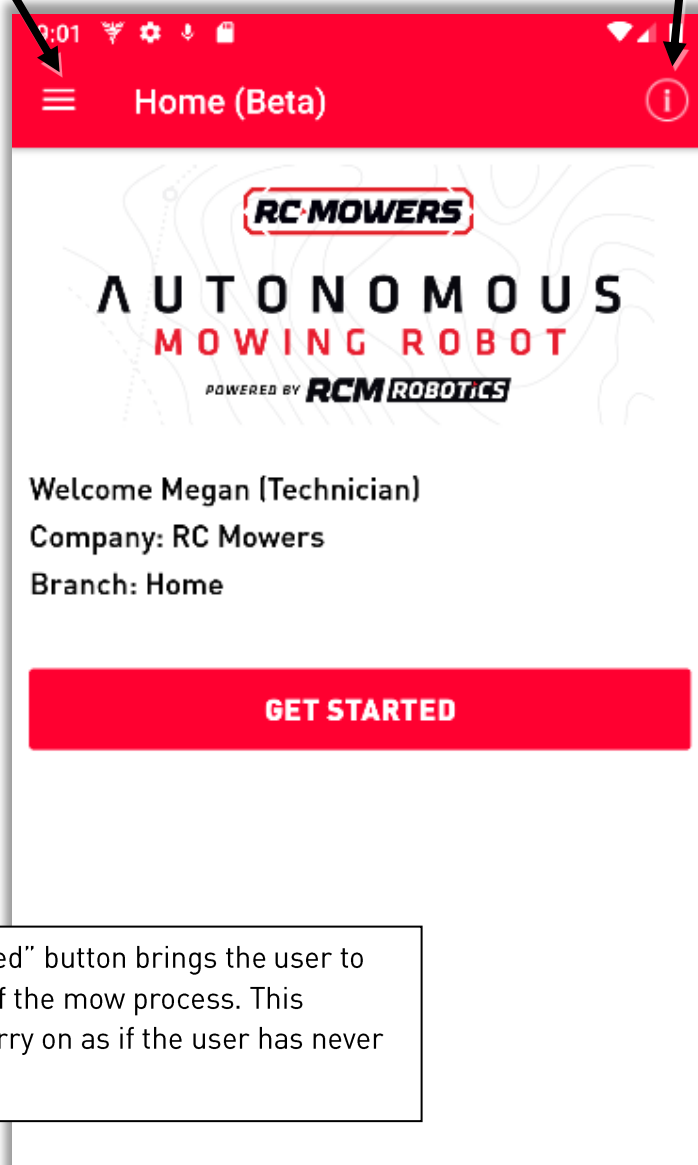


Figure 2: Enter Pin from text message.

HOME PAGE

The top left corner menu icon opens the navigation that brings the user to different sections of the app.

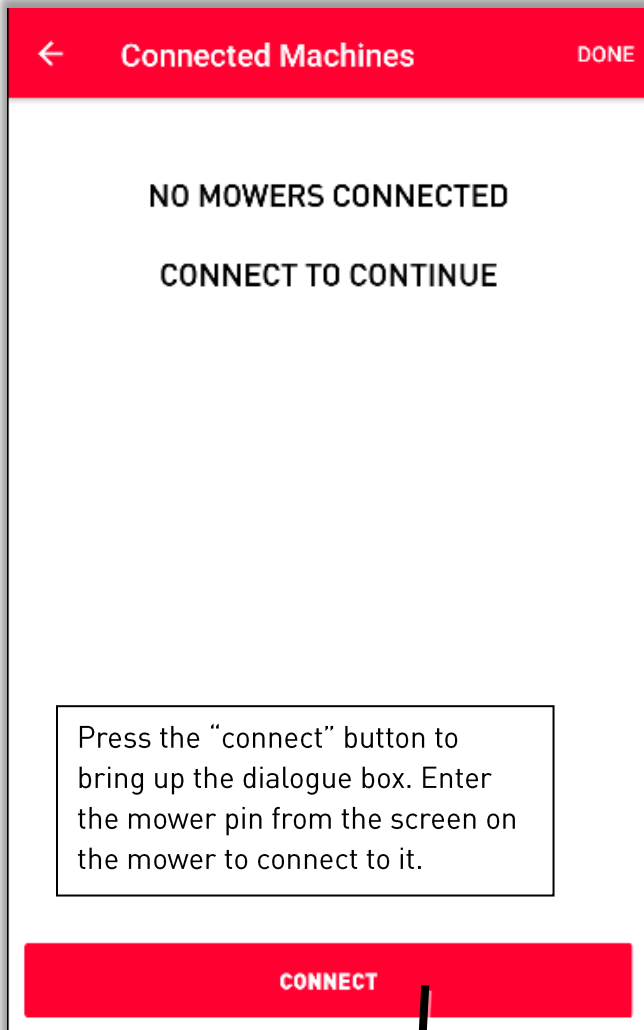
The top right info icon opens the about page, which provides information about the application.



The "Get Started" button brings the user to the next step of the mow process. This manual will carry on as if the user has never used it before.

Figure 3: Home Screen

MOWER CONNECT PAGE



This button enables after at least one mower is connected.

Press the "connect" button to bring up the dialogue box. Enter the mower pin from the screen on the mower to connect to it.

Figure 4: Connect page while no mowers connected.

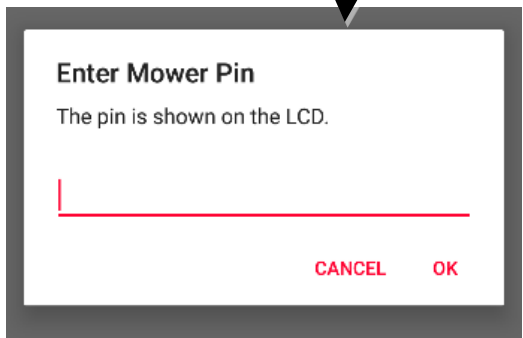
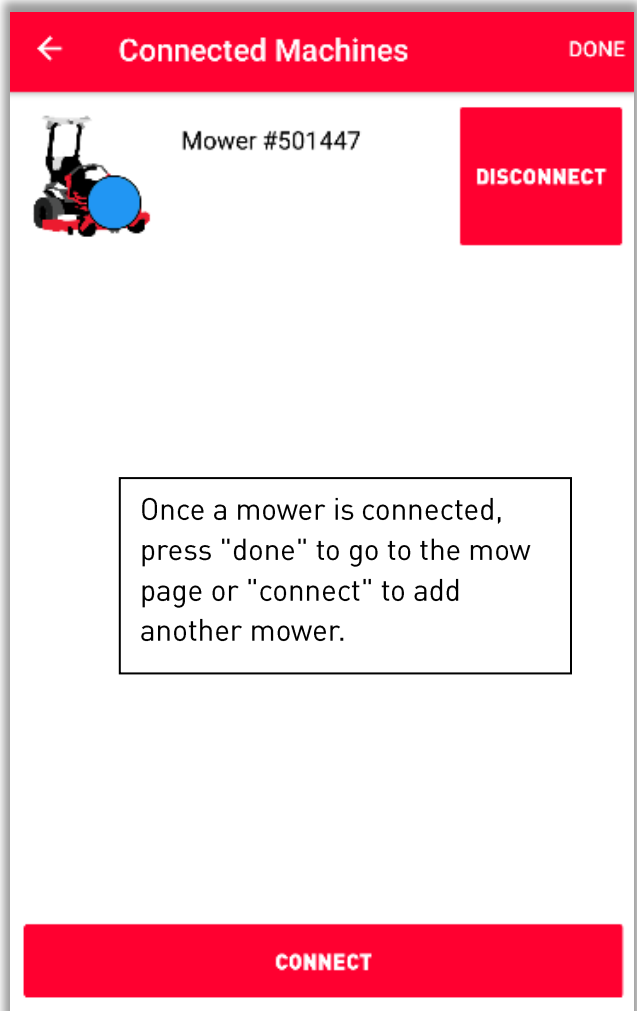


Figure 5: Mower pin dialogue box



Once a mower is connected, press "done" to go to the mow page or "connect" to add another mower.

Figure 6: Connect page while a single mower is connected.

MOW PAGE



Figure 7: Mow Page toolbar

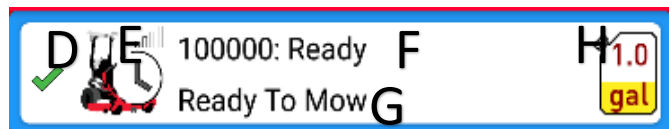
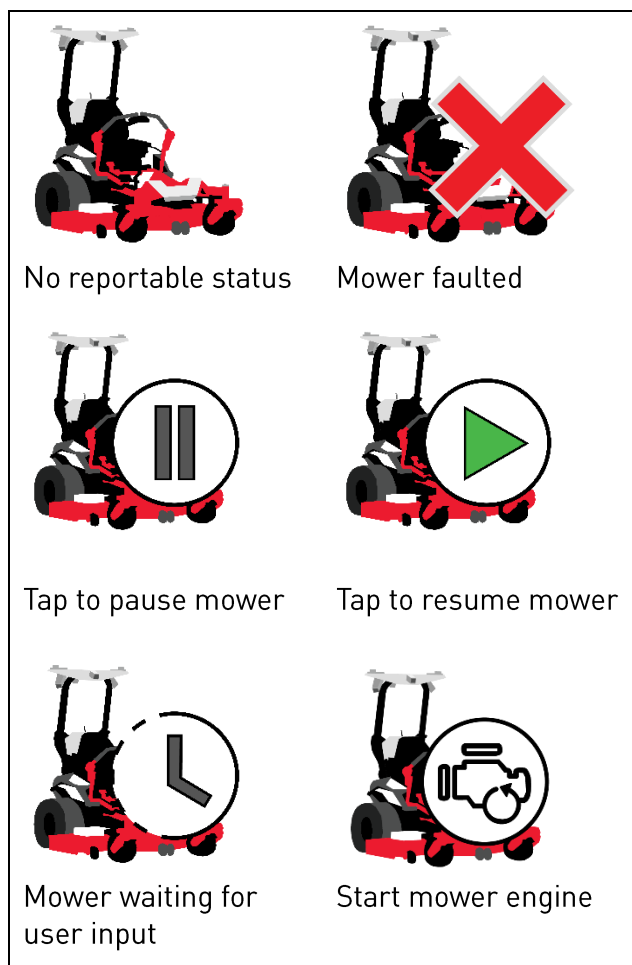


Figure 8: Mow page Mower tab



The mow page is where the majority of mower work happens. Here is where a user sends plans, edits mower settings, and maintains the status of all connected mowers.

The toolbar at the top of the screen has three interactable buttons. The leftmost button (a.) is the menu button that navigates the user across the application. The (b.) opens the "Status Light Guide," a reference for what the Status Indicating Lights on the machine mean. The "connect" button (c.) will take the user to the mower connect page.

The mower tab is the tab across the screen that displays information about the mowers. On the left, the checkmark (d.) lets the user know if they have selected that mower and can change its settings, send plans, etc. The mower image (e.) reflects some statuses of the mower: if it is waiting on input from the user, if it has faulted, and if it can be paused or resumed (reference table on left).

The labels reference the mower status. The top text (f.) describes WHAT the mower is doing. The bottom text (g.) conveys HOW the mower is running.

The gas can (h.) relates to the amount of gas within the machine.

The screenshot shows the 'Mow: #14' screen. At the top, there's a red header with a menu icon, 'Mow: #14', an info icon, and 'CONNECT'. Below this is a status bar showing a green checkmark, a mower icon, '100000: Manual', 'System Good', and a fuel gauge at '1.0 gal'. The main area is a map with a blue and yellow spiral mowing path. A red 'STOP' sign icon is on the left. On the right, there are icons for centering the map, clearing polygons, and zooming. At the bottom, a white bar contains the text 'Load A Plan To Continue' and six red buttons: 'GO HOME', 'SEND PLAN', 'SETTINGS', 'SPLIT PLAN', 'EDIT', and 'SELECT PLAN'. Arrows from callout boxes point to these elements.

This button pauses all mowers regardless of what they are doing.

On the map, we illustrate the mower as a triangle and its path using linework.

This button sends the selected mower to its home location.

This button opens the split plan, where the user can pick the amount of splits to send to the plan. Refer to page 12.

This button opens the plan page. refer to page 16.

This button sends plans to the mower after it's open in the app.

This button centers the map on an active mower or the user.

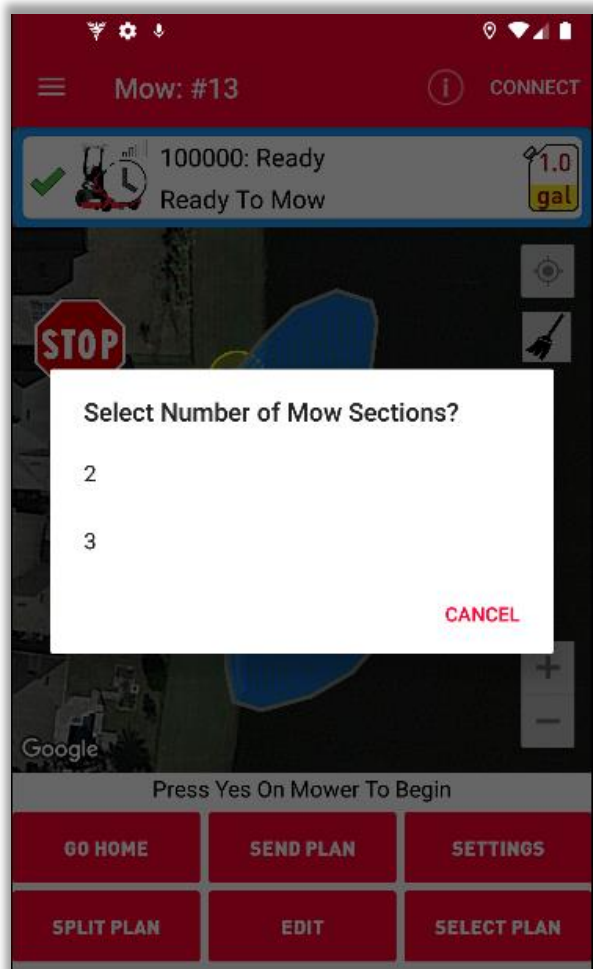
This button clears polygons (light blue drawings) from the map.

Press and hold on any point within the plan to bring up options for moving the mower.

This button opens the settings page for the mower. refer to page 13.

This button opens the select plan page (page 12), where the user can select a plan to send to the mower.

Figure 9: Example of Mow Page



This dialogue box allows the user to split plans into two or three evenly separated sections.

Figure 11: The dialogue box immediately after tapping the split plans button.

By selecting the desired mower and then tapping on the mow section, a user can send the section as a plan to that mower.

NOTE: The mower must be inside the MOW SECTION in order to begin mowing.

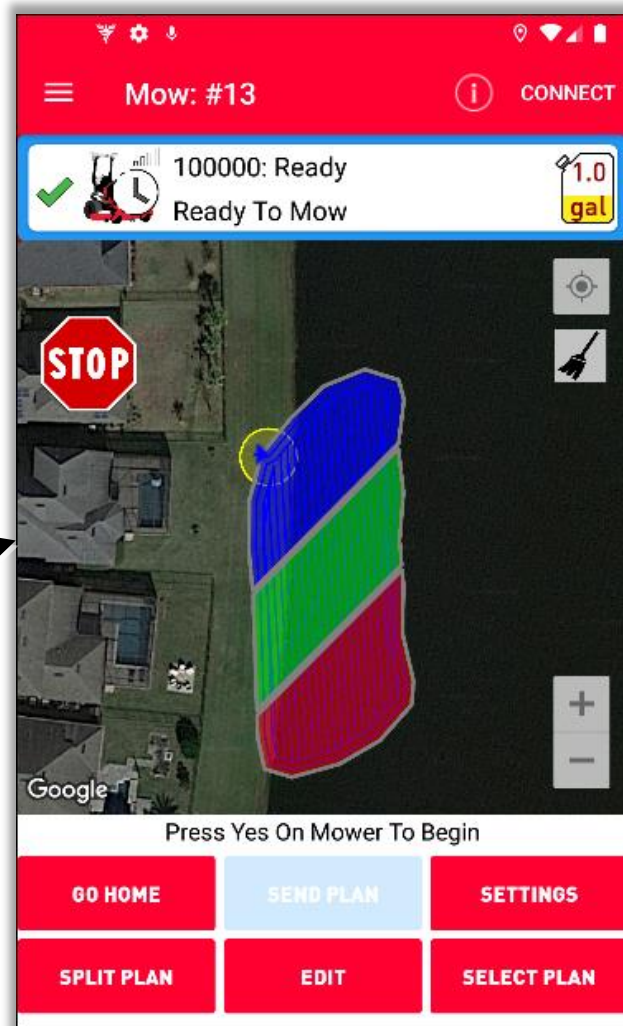


Figure 10: A view of a split plan

STATUS LIGHTS QUICK GUIDE








SOLID WHITE	NOT LOGGED IN
 PULSING WHITE	COMPUTER TURNING ON/OFF
 FLASHING WHITE	UPDATING
SOLID GREEN	SYSTEM READY
 PULSING GREEN	READY TO MOW/LOCAL PAUSE
SOLID BLUE	FAULT/ERROR WHEN NOT MOWING / NOT PAUSED
SOLID AMBER	PAUSED (ROBOTIC)
 PULSING AMBER	STOPPED FOR OBJECT (ROBOTIC)
 STROBING AMBER	OPERATING (ROBOTIC)
SOLID RED	ERROR WHILE MOWING (AUTO-RESUMES WHEN CLEAR)
 FLASHING RED	FAULT WHILE MOWING (NO AUTO-RESUME)
 PULSING RED	E-STOP

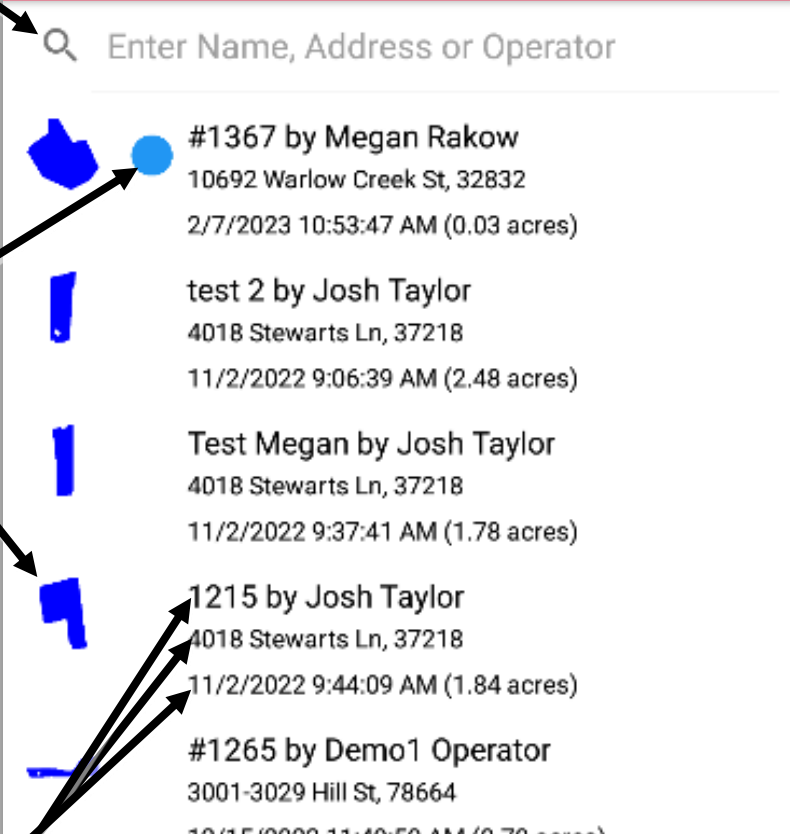
Figure 12: A guide for the status indicating lights. The guide can be accessed from the mow page through the info icon on the toolbar.

SELECT PLAN PAGE

Use the search bar to bring up a specific plan.



This button can change the way the plans sort. Including Location (closest to mower), Name, Date (newest), Date (oldest), and recently mowed.



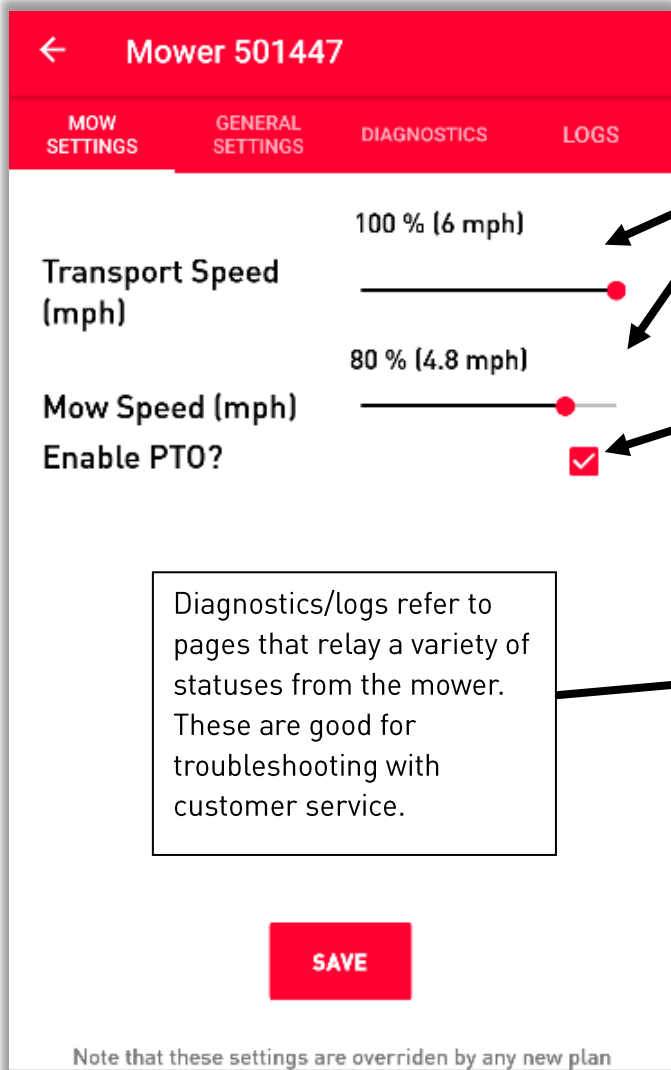
The blue shape relays the shape of the plan. When a mower is selected, the circle shows up next to the plans the mower is inside. The color of the image matches the color of the mower.

The labeling for the plans is as follows:

- The top line is the name of the plan plus the name of the operator who created it.
- The second line is the street address closest to the plan.
- The bottom line is date, time, and size (acres).

Tapping on one of these plans sends it to the previous page.

MOWER SETTINGS PAGE



Mow settings determine the speed the mower has when it is mowing (mow speed) versus when it is not (transport speed).

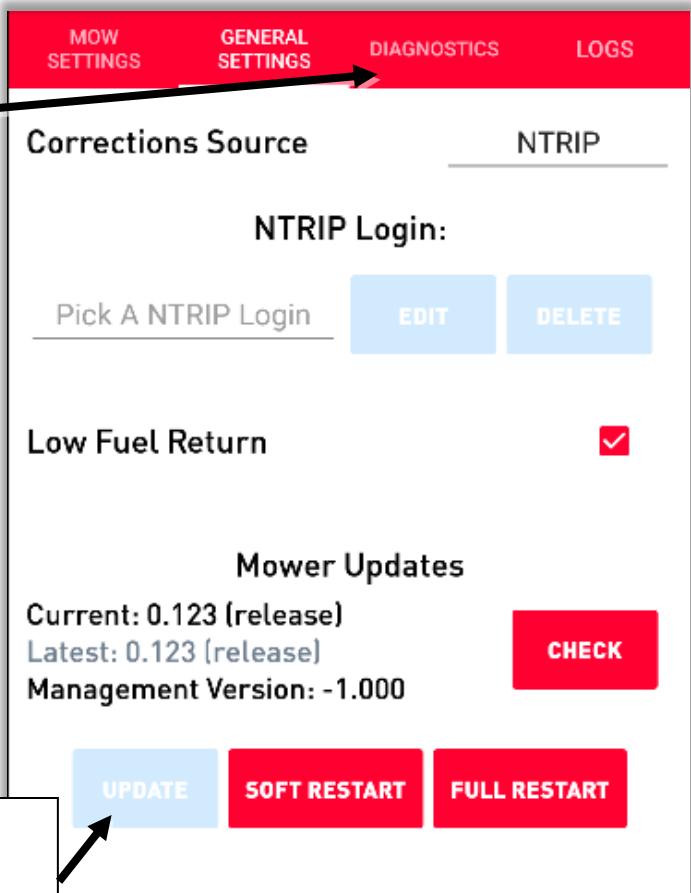
This checkbox enables/disables the PTO.

Diagnostics/logs refer to pages that relay a variety of statuses from the mower. These are good for troubleshooting with customer service.

SAVE

Note that these settings are overridden by any new plan

Figure 13: Mow settings page

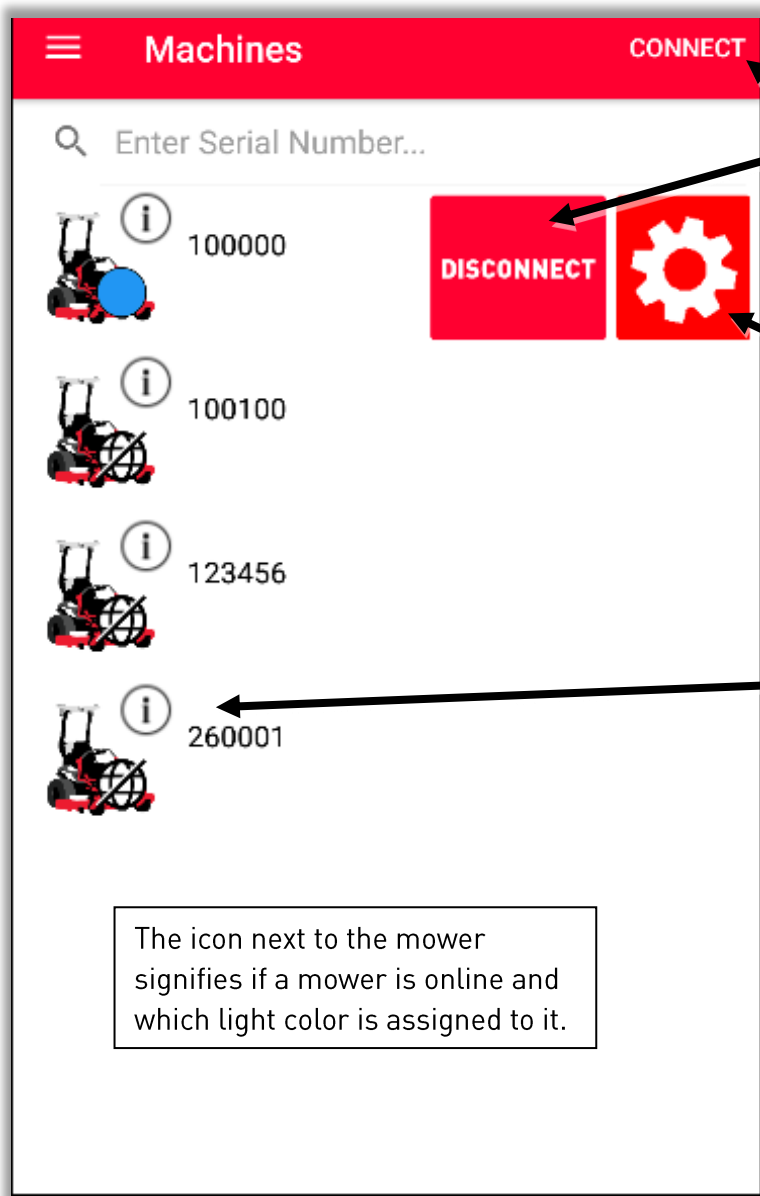


General settings refer to a mower's corrections settings, whether it returns when it has low fuel, and an option for sending an update to the mower if it needs it.

How to know if the mower needs an update? Depress the check button.
 Notice: If there is an update, your mower will be out of service during the update process. This process could take hours.

A user has to be a technician to access Diagnostics/Logs and change the NTRIP Login.

MACHINES PAGE



Use the "connect" button to open the dialogue box to connect to a machine. Use the "disconnect" button to disconnect from the corresponding mower.

This button brings you to the mower settings page. Only an operator connected to a mower, or a technician may configure a mower. Refer to page 15.

The information icon brings up the machines serial number, last time the machine was online, current software version, and total amount of hours of the machine.

The icon next to the mower signifies if a mower is online and which light color is assigned to it.

Figure 14: Machines page with one machine active

PLAN PAGE



Figure 15: Plan page with no plan selected.

Tapping "select plan" opens the select plan page. Refer to page 14.

Opens the edit plan

Sends the plan to the mow page, where it can be assigned to a mower and performed. Refer to page 10.

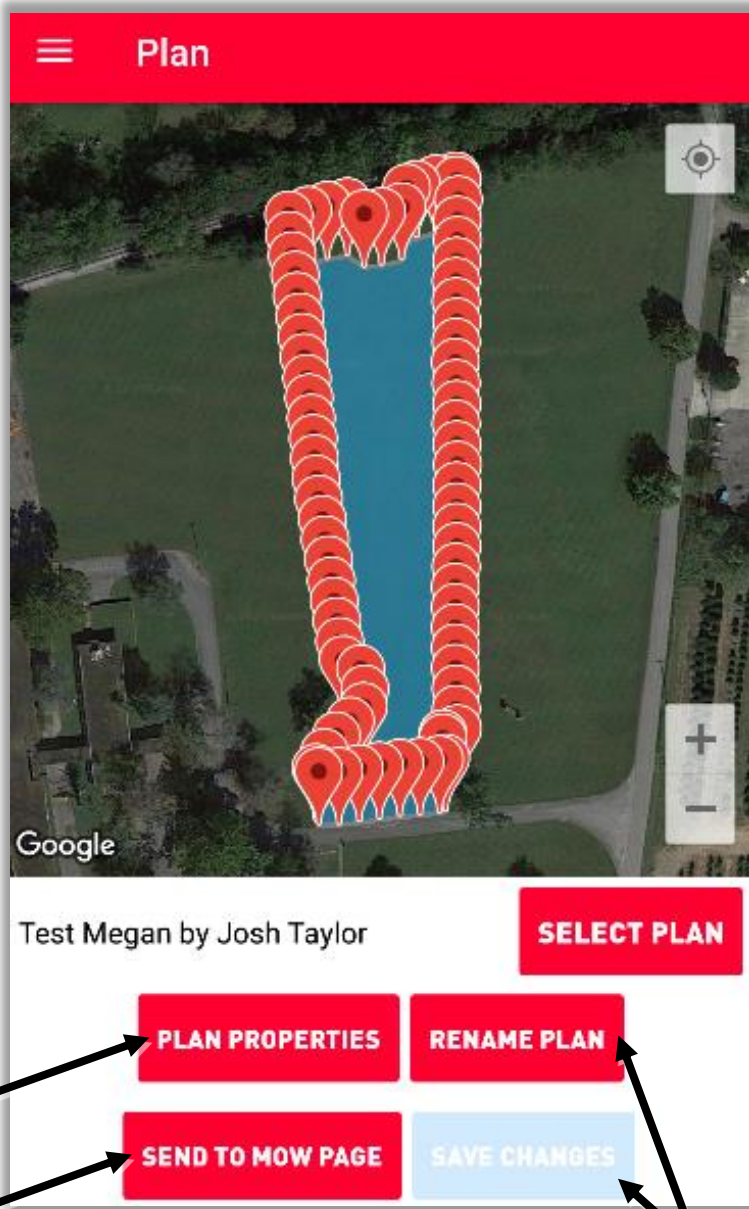


Figure 16: Plan page with a plan selected.

A user can rename the plan using the "rename plan" button. Any changes won't save until the "save changes" button activates successfully.

EDIT PLAN PAGE

The edit plan page has many properties.

- The speed of the mower
- The overlap of the striping
- The stripe pattern of the cut

←
Plan Properties

Speed (mph) 60 % (3.6 mph)

Overlap Distance (in) 20.0

Cut Pattern Cross-hatch

Stripe Angle: 45° EDIT

Return to Start?

Perimeter Mode Mow Perimeter First

Re-mow Outer Perimeter?

Enable PTO?

Sleep When Finished?

CANCEL
DONE

Note that these are temporary changes until saved

Cancel all changes or tap "done" to apply changes and go back to the plan page (page 15), where you can save your work.

- Return home when finished.
- Mow perimeter first, last, or skip it?
- Re-mow the perimeter of the plan or begin inside the headline?
- Enable the PTO when mowing?
- Go into sleep mode when finished?

Figure 17: Edit plan page.

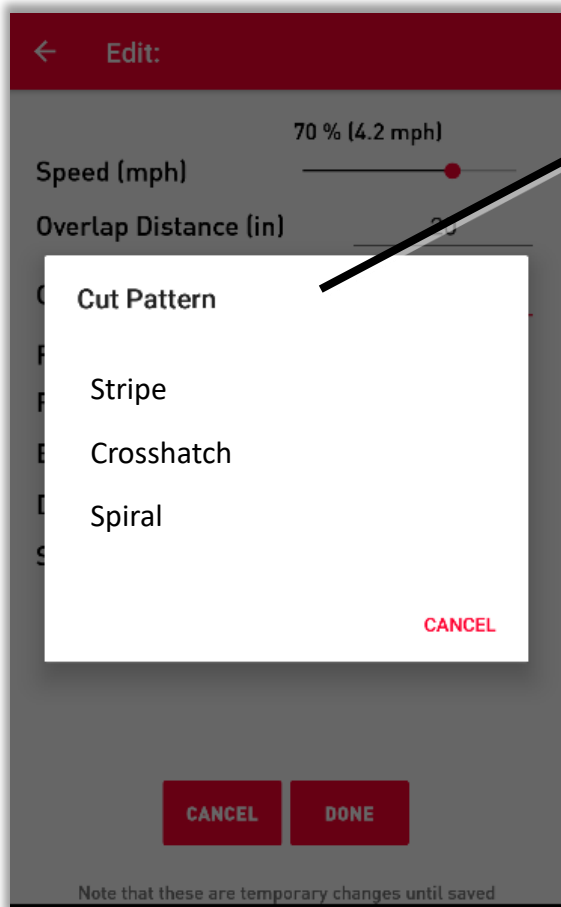
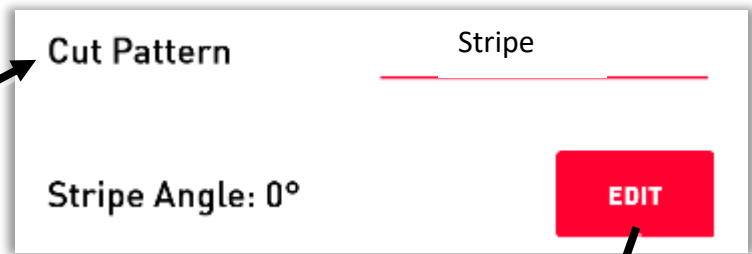
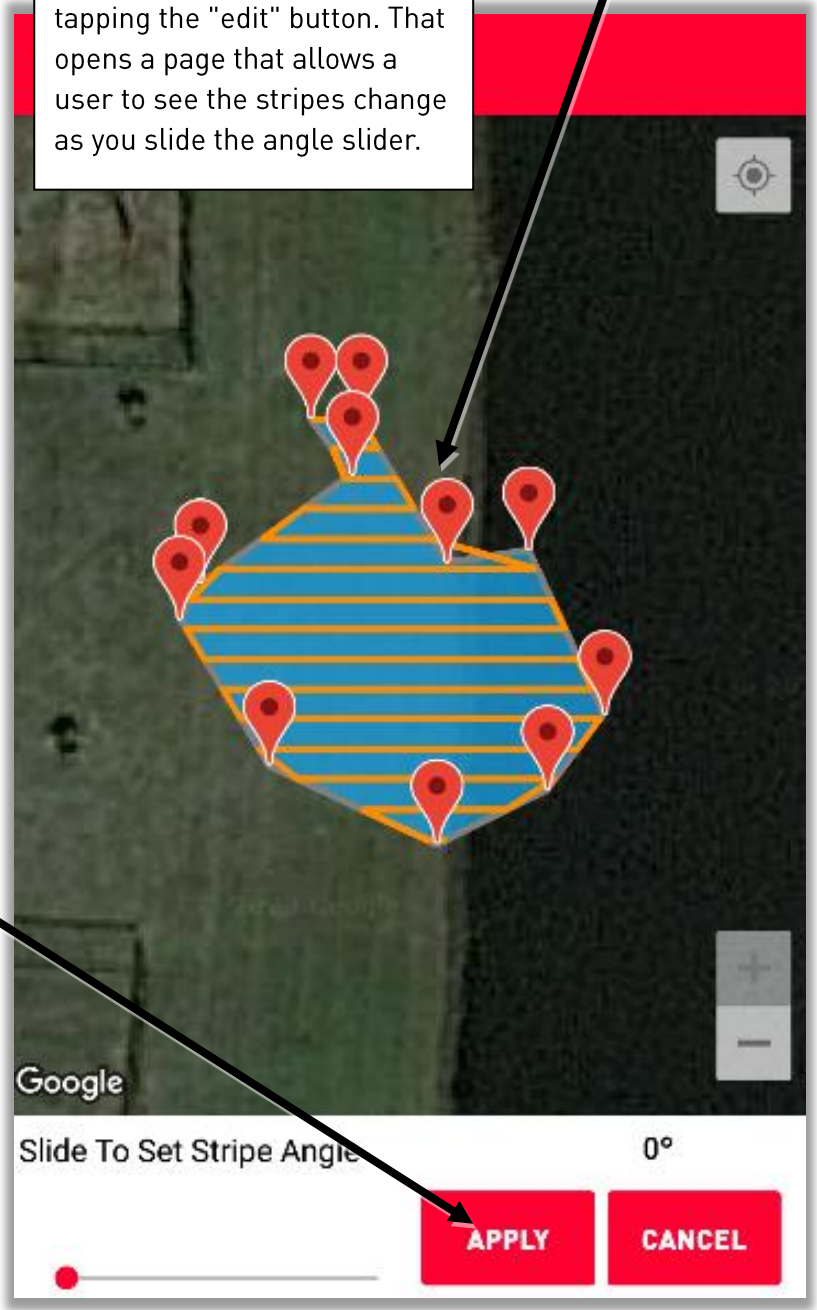


Figure 18: Selection for cut patterns.



Edit the stripe angle by tapping the "edit" button. That opens a page that allows a user to see the stripes change as you slide the angle slider.



Once the user enters the desired stripe angle, the "apply" button will apply it to the plan, but you MUST save changes to make them permanent.

Figure 19: Stripe angle modifier page

MONITOR PAGE

The monitor page gives the user viewing access to all mowers within a company. They can view the following details about each mower when selected.

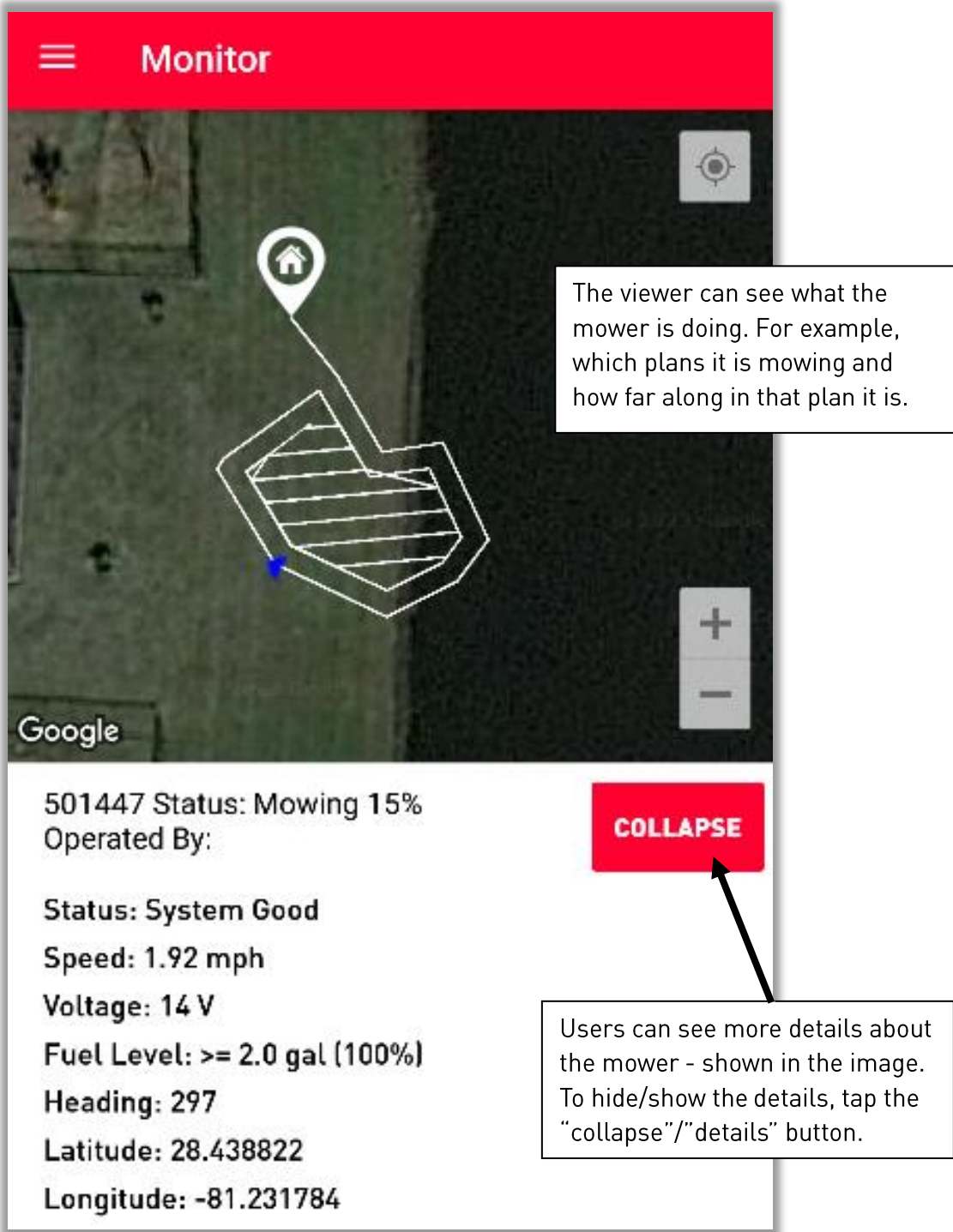


Figure 20: Monitor page focused on a mower mowing a plan.

SETTINGS PAGE

Settings

Simple Mow Settings

Cut Pattern Stripe

Automatic Stripe Angle

Stripe Angle (°) 0

Overlap Distance (in) 10

Mow Speed (mph) 80 % (4.8 mph)

Perimeter Mode Mow Perimeter First

Other Settings

Enable Technician Mode

DISCARD **SAVE**

Simple mow settings refer to the settings that apply to plans created during Simple Mow. These settings apply to ALL Simple Mow plans created by all connected mowers.

“Enable Technician Mode” refers to settings only accessible by technicians. If a user is not assigned the technician role, they do not have access to this setting.



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