SinoGNSS®
By ComNav Technology Ltd.

ComNav Technology

AG501 Pro Autosteer System

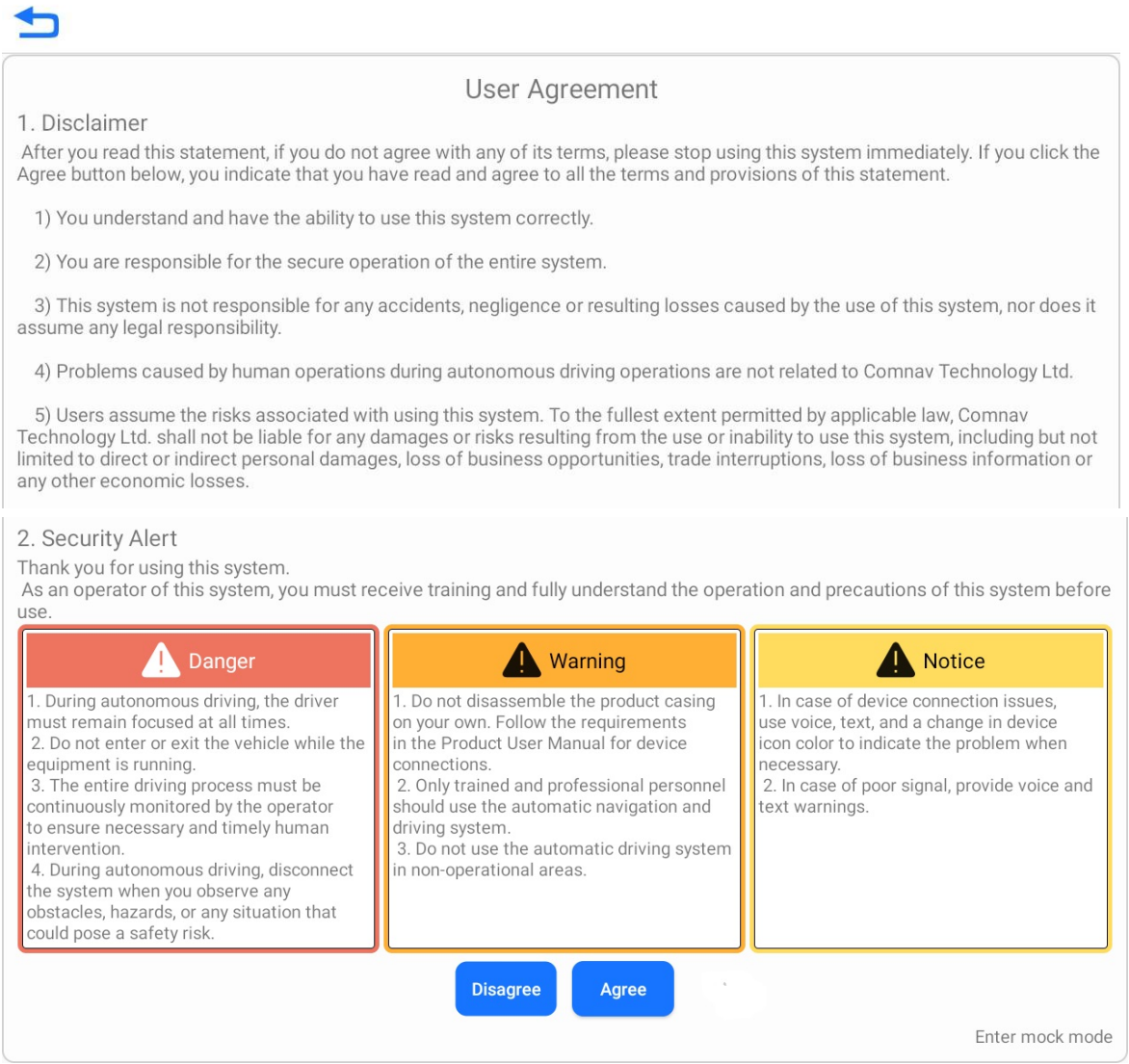
Software User Manual

Model: AG501 Pro

Safety Instructions

Before using the ComNav AG501 Pro Auto Steering System, make sure that you have read and understood all the safety requirements.

After the control terminal is powered on, safety warnings are displayed on the home screen, as shown in the figure below



- **Operator Requirements**

1. Persons under the age of 18 are prohibited from operating.
2. Drunk driving is prohibited.
3. Fatigued driving is prohibited.
4. Drivers must obtain the relevant driving license required by the local laws.

- **Operation Environment**

1. Please drive in an open area far from the crowd and ensure that there are no irrelevant personnel and vehicles in the operation area.
2. Please stay away from people, livestock, obstacles, electric wires, tall buildings, airports,

signal towers, etc. So as not to interfere with the signal and affect the operation.

3. Please work in good weather (not extreme weather such as heavy rain, heavy fog, snow, lightning, strong wind, etc.).

4. When the system is under the testing, calibration, adjustment, or automatic steering, please ensure that there are no people or obstacles near the running track to prevent personal injury or property damage.

- **Operation Rules**

1. During driving or operating, it is strictly prohibited to get on or off the vehicle during driving.
2. The vehicle must be kept under monitoring by the driver to ensure timely intervention.
3. When the vehicle equipped with this system is driving on public roads or public areas, please ensure that the control terminal is powered off.

- **Checking**

1. Make sure to have enough fuel in the driving vehicle.
2. Ensure that the parameters in the kit are calibrated before the automatic driving operation.
3. Make sure the antenna and angle sensor are installed properly. If there is any movement, please calibrate it again before using it.
4. Please do not use worn or damaged cables. Please purchase and replace new cables in time.

- **Others**

1. Do not disassemble the product yourself, or it will affect the warranty service.
2. The equipment damages caused by force majeure (lightning strike, high voltage, collision), are not included in the free maintenance service.
3. Please connect the device strictly according to the instructions in the manual. For cables such as data cables, you need to pinch the root of the plug and insert it gently. Do not pull it hard or even rotate it, which may cause needle breakage.
4. When supplying power to this product (the kit), please pay attention to the power supply requirements of the device (controller and electric steering wheel power rating is 9-36V).Normal voltage is 14V or 24V.

Content

Safety Instructions **2**
Chapter I Product Overview **1**
1 Introduction 1
2 Main Components 1
3 Important notes on installation 1
4 Spline Selection 1
5 Shipping list 2
Chapter II Fast Operation Instructions of Software **5**
1 Overview of main interface functions 5
2 vehicle commissioning 7
2.1 Create Vehicle and Farm Tools 7
2.2 Network Signal configuration 9
2.3 Vehicle Calibration Process 10
Advices 12
3 Fast Workflow 13
3.1 Signal set 13
3.2 Create a Task 13
Chapter III Function Instructions of Software **17**
1 Satellite signals and RTK correction 17
1.1 Satellites 17
1.1.1 sky view 17
1.1.2 SNR (Signal-to-Noise Ratio) 18
1.1.3 Satellite information 18
1.2 GNSS Status 19
1.3 Correction Signal set 20
1.3.1 CORS (Network RTK) 21
1.3.2 Datalink (Mobile base station) 21
1.3.3 PPP 24
1.3.4 Bluetooth RTK 25
1.3.5 Single-point-smoothing 25
2 Menu 25
2.1 Vehicles information 26
2.2 parameter calibration/Parameter 26
2.2.1 Parameter calibration 26
2.2.2 Parameter 28
2.3 Implements /Farm tools 29
3 Operation 30
3.1 Create a task 30
3.1.1 Straight line 31
3.1.2 Curve 31

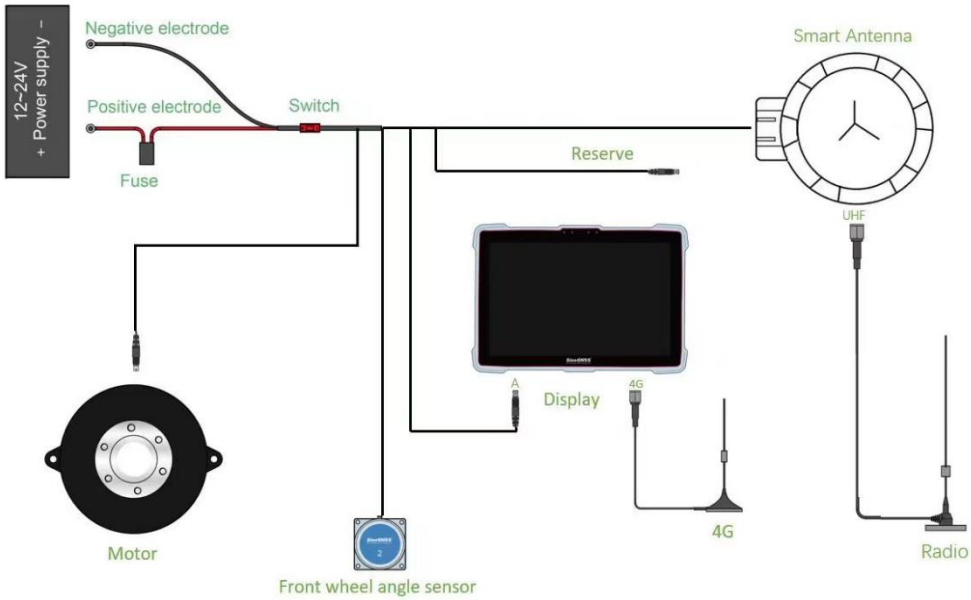
3.1.3 Automatic U-Turn 32
3.1.4 A+ Heading 33
3.1.5 Diagonal Rake 34
3.1.6 Free track 35
3.1.7 Concentric circle 35
3.2 Nudge 36
3.3 Quick Handover adjust (Handover) 37
3.4 Project list (Mission) 39
4 system setting and others 40
4.1 System 40
4.1.1 Software Registration 40
4.1.2 Language 41
4.1.3 Theme 41
4.2 APP settings 42
4.2.1 APP settings 42
4.2.2 Warning 44
4.2.3 Regional restrictions 44
4.2.4 Data output 45
4.3 hardware 45
4.3.1 Firmware 45
4.3.2 Upgrade 46
4.3.3 Rate Gyro 47
Appendix 1 49

Chapter I Product Overview

1 Introduction

For details of Installation and use, please refer to AG501 Pro Autosteer System on the Comnav official website: https://www.comnavtech-ag.com/

2 Main Components



1 Display: Provide autosteer system operating software for vehicle control and communication.
2 Smart Antenna: A100 Pro GNSS receiver built-in 4G, Datalink, GNSS modules and GYRO. ComNav Technology's DP-filter performance can reach under20cm pass-to-pass accuracy.
3 Motor: Automatic control of steering wheel rotation.
4 Sensor: Install front wheel sensor to provide higher operating precision.

3 Important notes on installation

1 Please install the smart antenna perpendicular to the central axis of the vehicle, with the indicator light pointing towards the front of the vehicle.
2 Please choose the appropriate spline model to match the tractor to avoid slipping
3 The front wheel angle sensor can be installed on both the left and right wheels and needs to be installed on the place can rotate left and right with the tire. Please ensure it is installed horizontally.

4 Spline Selection

Please refer to **Appendix 1** for spline shape parameters.

Spline	Tractor brand

Spline45-18-36	Lovol, YTO, Yanmar, Case IH, John Deere, Kubota, AGCO Challenger, DEUTZ and so on
Spline45-18-36S	Yanmar, mitsubishi
Spline45-22-36	John Deere, Case IH, New Holland, Caterpillar, Lamborghini, Ford and so on
Spline45-16-36	ISEKI, mitsubishi, Massey Ferguson, New Holland, VALTRA, CLAAS, Case IH
Spline45-15-18	Yanmar, Kubota, ISEKI, New Holland, mitsubishi, KIOTI
Spline45-15-30	Xingyueshen, WORLD GROUP
Spline45-18-40	New Holland, ISEKI, Case IH, Yanmar, Maruyama and so on
Spline45-21-36	Deutz, Kubota, IH CVX, MCCKORMIK, Fendt
SplineTN25	ch-ironbull
SplineNHL18	
SplineWMD	VALTRA
SplineXQB	Kubota, small drive seeder
Gasketϕ14	Equipped with 15-18, 16-18 splines
Gasketϕ16	Equipped with 18-36, 18-36S, 18-40 splines
Gasketϕ18	Equipped with NHL18, WMD, XQB splines
Gasketϕ20	Equipped with 21-36, 22-36 splines

For more details, please consult sales or technical personnel

5 Shipping list

Figures	Name	Account
	P300 Plus Tablet	1
	A100 Pro GNSS Receiver with Bracket	1
	Motor	1

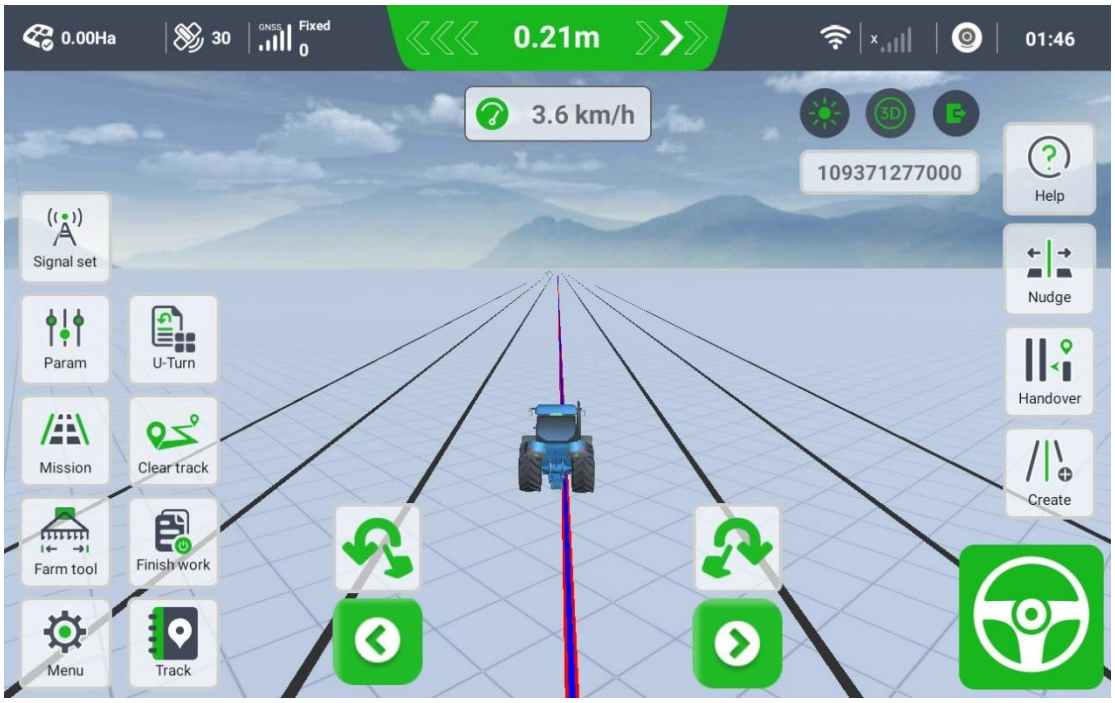
	Steering Wheel	1
	Motor Bracket	1
	Power Cable	1
	Motor Cable	1

	Tablet Cable	1
	Front wheel angle sensor	1
	Sucker antenna (Datalink)	1
	4G antenna	1
	Screw Suit	1

Chapter II Fast Operation Instructions of Software

In order to make it easier for users to understand the operation and use of the software, this document describes the operation procedure and related auxiliary functions of the operating workflow of the system from a new user's perspective. A new user needs to complete the installation, configuration and preparatory operations before using the system for the first time and smoothly entering the autosteering driving.

1 Overview of main interface functions



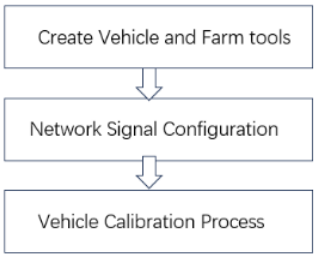
NO.	Function	Shortcut Icon	description
1	**Working area**		The area cultivated by the farm tools will continue to be recorded, which is the green area. Units include acres, square meters, acres, etc.
2	**Satellite status**		View the number of satellites searched, signal quality, and satellite distribution map
3	**GNSS status**		Reflects the received satellite quality and show current positioning status
4	**Lateral Deviation**		Vehicle lateral deviation in real time
5	**WIFI**		WIFI signal
6	**SIM card network**		3G/4G/5G signal
7	**Camera**		USB camera

8	**Local Time**	01:46	Local time
9	**Vehicle speed**	3.6 km/h	Driving Speed and driving status
10	**Display Brightness**		Adjustable brightness, day, night, and balanced
11	**Perspective Switching**	3D	Support 2D and 3D images
12	**Exit**		Exit software
13	**Signal setting**	Signal set	RTK configuration, Cors/Radio/PPP
14	**SN**	109371277000	Device SN
15	**Help**	Help	Remote assistance, Video help
16	**Parameter Settings**	Param	Control steering wheel rotation parameters
17	**U-Turn**	U-Turn	Automatically turn around configuration
18	**Job line Nudge**	Nudge	Move all the job lines
19	**Mission**	Mission	Historical job list, job sharing, fields.
20	**Clear track**	Clear track	Clear the green recording track
21	**Handover Row**	Handover	handover row calibration
22	**Farm Tools**	Farm tool	Implement width and handover row width
23	**Finish Job**	Finish work	End current job
24	**One-click U-Turn**		Make a U-turn directly to the left from your current position
25	**Create New Task**	Create	Create new job, including straight line, curve line, A+ course line etc.
26	**Menu**	Menu	Software, Hardware and System Setup
27	**Recording Track**	Track	Manually recording the job track—Green
28	**One-click Nudge**		Move all the guidance line slightly to the left

29	**Autosteer**		Turn on/off autosteer

2 vehicle commissioning

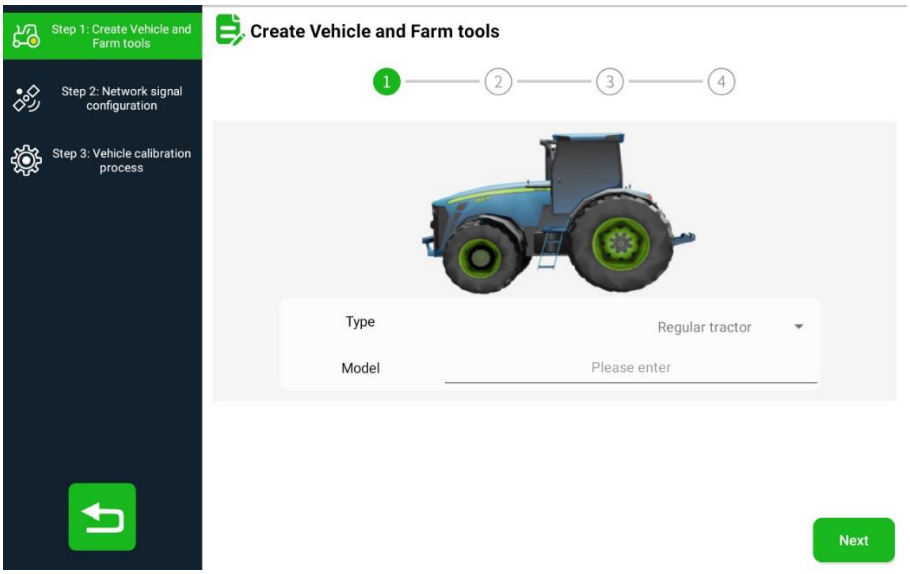
After ensuring that the installation is correct, when you start the software for the first time, you will be given guidance on the workflow and Commissioning, which is mainly divided into three steps. You can also press the return key to exit the first boot.



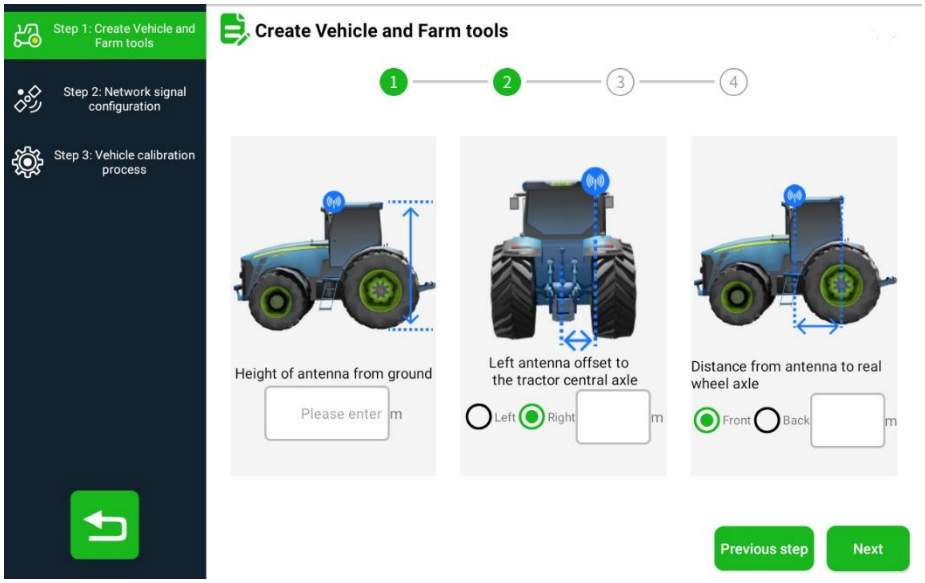
2.1 Create Vehicle and Farm Tools

The autonomous driving system needs to create a vehicle model and save it in the system. Test according to the prompts and enter approximate values.

Step 1 Custom tractor model name. The type you can choice 'Regular tractor' or 'Articulated tractor'.

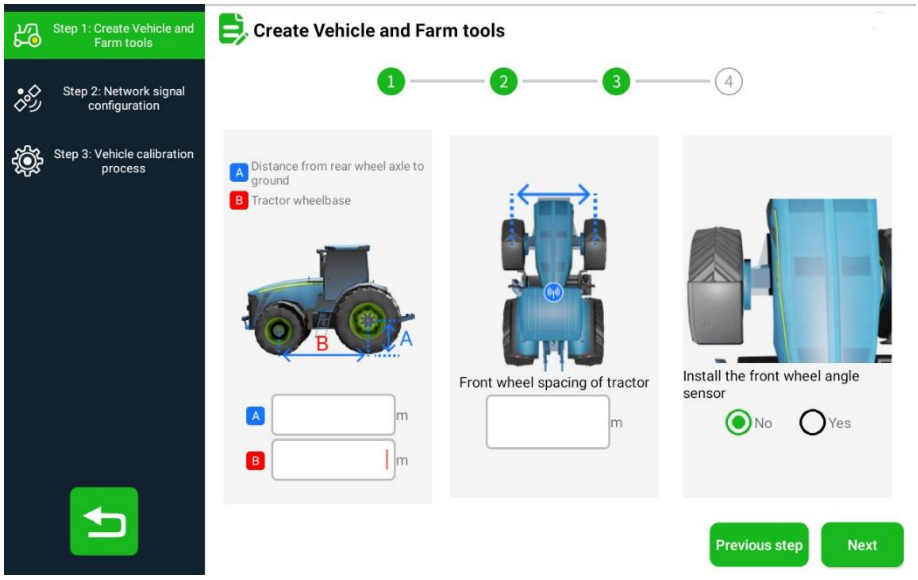


Step 2 Use a ruler to measure the antenna installation location



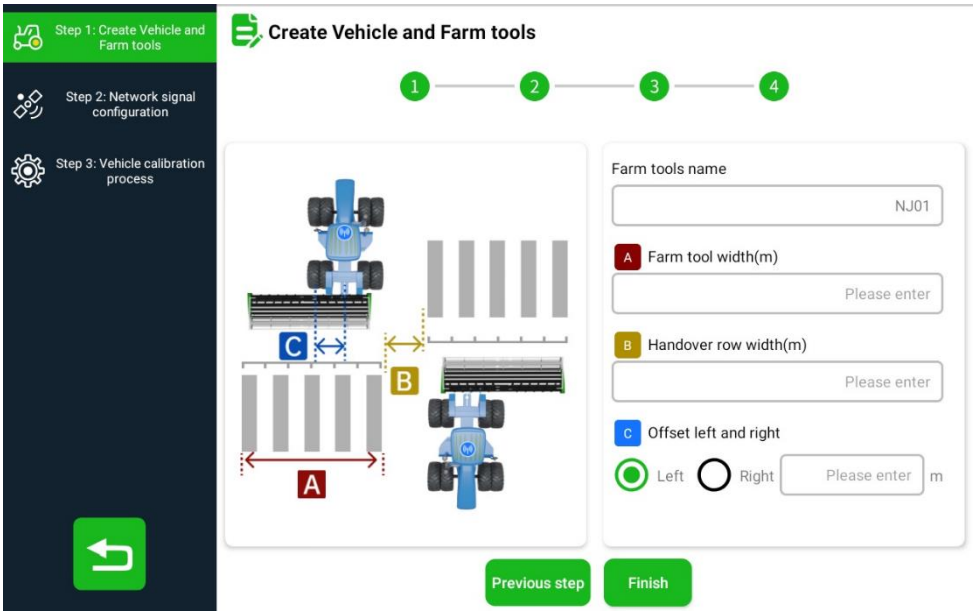
Step 3

Pay attention to whether the front wheel angle sensor is installed. If the front wheel angle sensor is not installation, please do not select. When not selected, the tractor cannot perform adaptive calibration to obtain steering wheel rotation parameters and needs to be adjusted manually.



Step 4

Custom farm tool name. Enter the right values of farm tool width and handover row width. Pay attention to choosing the correct offset direction of your farm tool and enter the value.

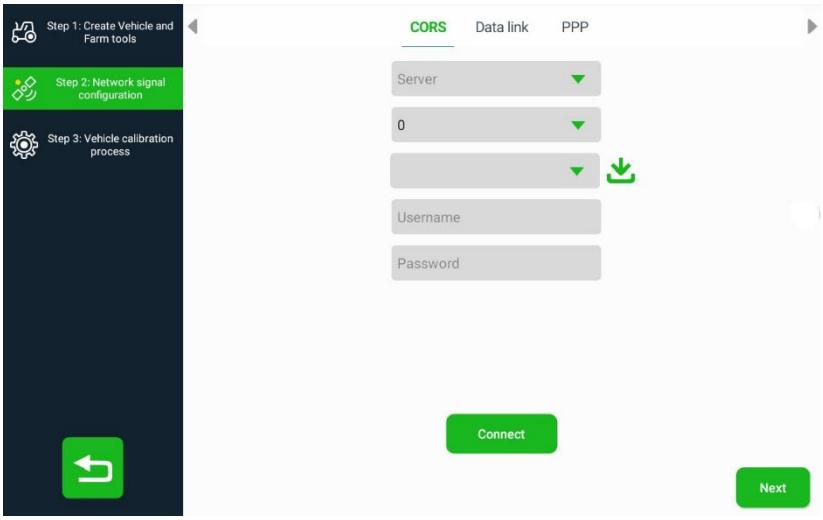


2.2 Network Signal configuration

The autosteer system needs to obtain the differential data from the agricultural base station to achieve an accuracy of 2.5cm. Comnav provides three methods to obtain differential sources

1) CORS (Network)

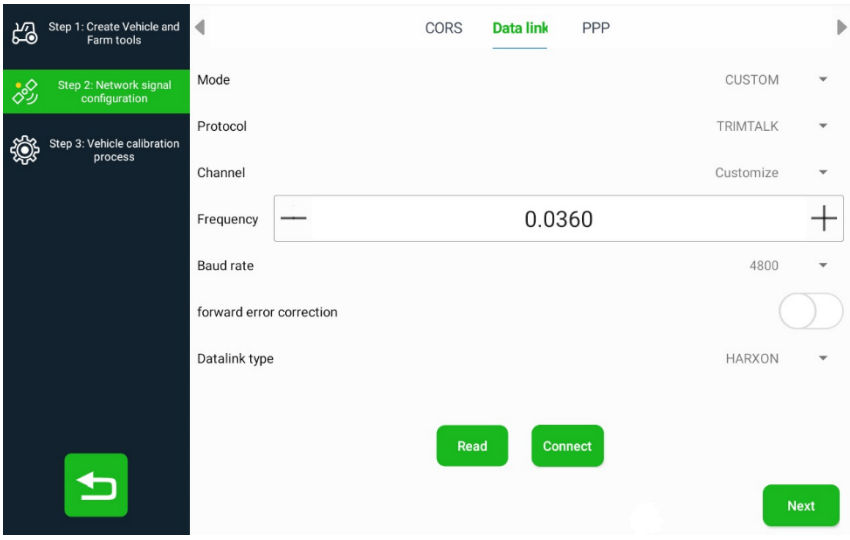
A100 Pro has a built-in 4G module, which can be inserted a SIM card to obtain 4G signals. Therefore, the system can obtain differential data from the local CORS station. Please contact your dealer for more details on IP, port account and password.



2) Datalink

We offer differential datalink transmission, which requires a physical base station. We are compatible with multiple base station type, such as SINO, SATEL, ADL, etc. You can also use Comnav base station N5 specially customized for agriculture to provide simpler connection operations and longer working distance.

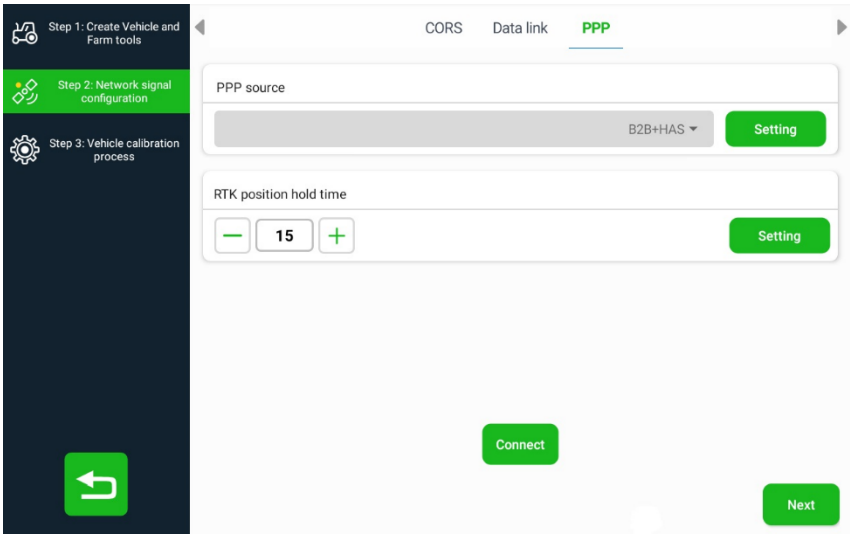
Make sure the frequencies and protocols of the base station and the software are consistent and that both radio antennas are connected.



3) PPP

We provide free PPP service, no additional physical base stations and networks are required. You could use Beidou B2B or Galileo HAS high-precision service directly.

The accuracy of PPP usually completes convergence after 15-20 minutes, reaching an accuracy of 10cm-15cm. It may take longer in some areas. Please contact our technical personnels for more details. For area covered by Galileo, Has performs better.

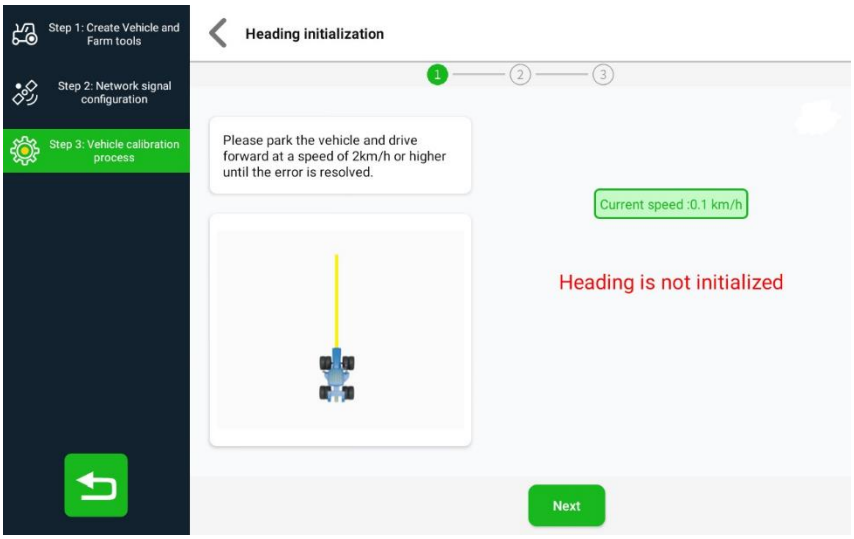


2.3 Vehicle Calibration Process

After ensuring that the equipment is installed correctly and the difference is obtained to get a fixed solution, perform the initial calibration of the tractor.

Step1 Heading initialization

When the prompt shows that the **Heading is not initialized**, please stop the car first and then drive forward at a speed greater than 2km/h until the prompt changes to the **Heading initialization**.

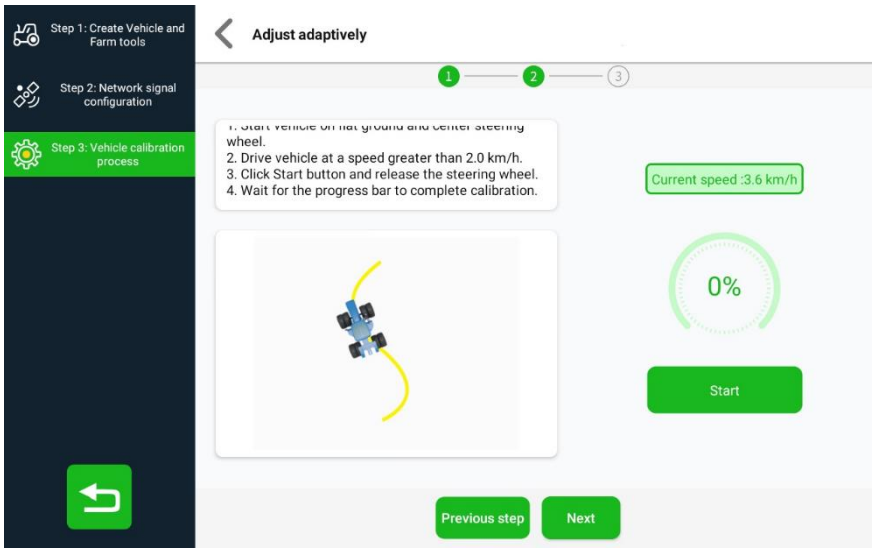


Step2 Adjust Adaptively

Different tractors have different horsepower, and the strength of the motor control steering wheel is also different. Calibration is required to obtain appropriate parameters.

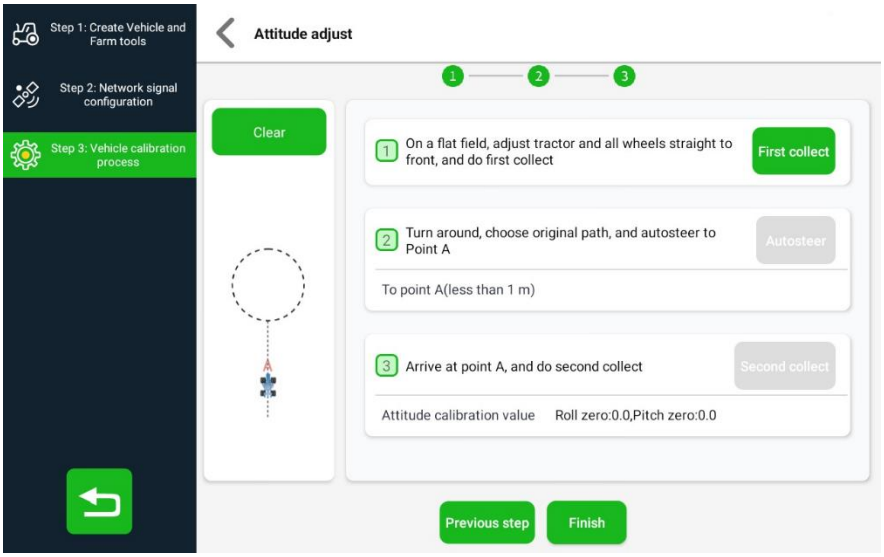
If the front wheel angle sensor is installed, automatic calibration can be performed; otherwise, manual adjustment must be performed.

Please start the vehicle and turn the steering wheel facing forward. On a flat road with no obstacles directly ahead. Keep the vehicle driving stably at 3km/h-4km/h, then click ***"Start"***, The vehicle starts to drive automatically and completes the collection.



Step3 Attitude adjust

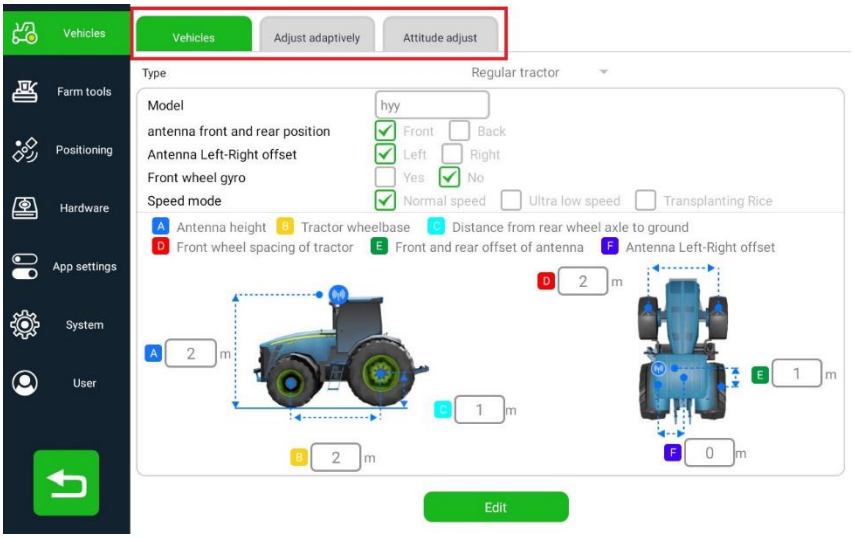
After the vehicle is stationary and click '**First collect**' to collects point A, manually drive forward and make a U-turn at the appropriate location. After the U-turn is completed, click '**Autosteer**' and the vehicle will automatically drive to point A. Follow the prompts and apply the brakes within one meter of point A. Click '**Stop**' and then click the '**Second collect**' to complete the attitude calibration and obtain the value.

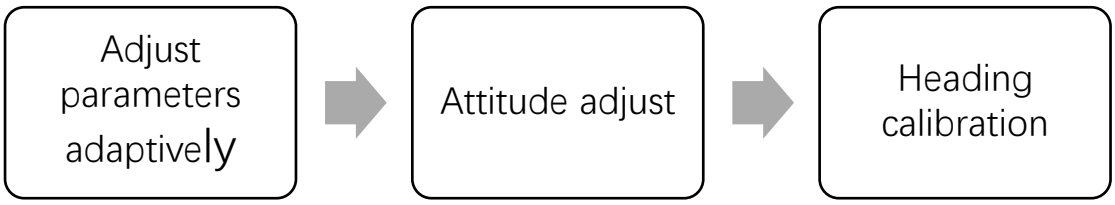


After calibration, click ***FINISH.***

Advices

If the entered vehicle parameters are inaccurate or you are not satisfied with the calibration results, you can go to ***"Menu-Vehicle"*** to modify and calibrate again.





3 Fast Workflow

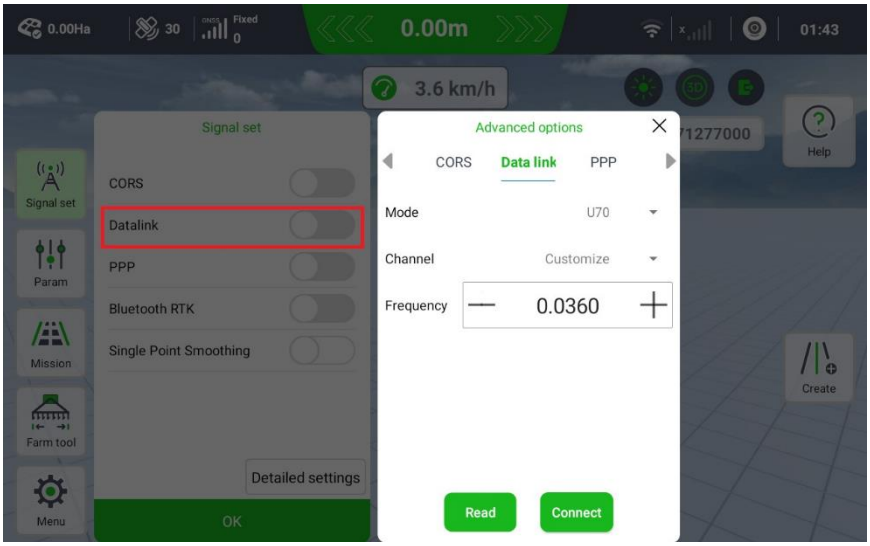
After the initial vehicle commissioning is completed, subsequent switching on and off does not require re-debugging. You can directly follow the following process to quickly operate.

3.1 Signal set

When selecting the physical base station, click to open "***Datalink***" to ensure that the frequency of the physical base station and the software are consistent. The frequency of the software can be adjusted and viewed in the ***Detailed settings***. Then Make sure the status is ***fixed*** and it is normal.

After you complete the configuration, the configuration will be automatically saved when you shut down, and this mode will be automatically used next time you turn on.

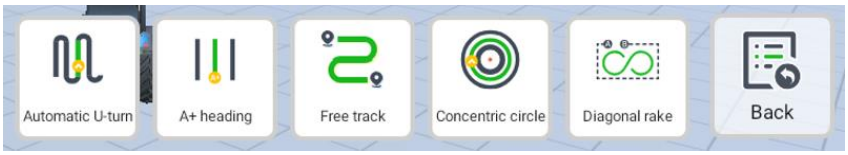
If you want to use other brand's receivers as the base station, we provide A100 Pro with different hardware, and you can configure it on this interface. Please select the right Protocol, Frequency and Baud rate. Then Make sure the status is ***fixed*** and it is normal.



3.2 Create a Task

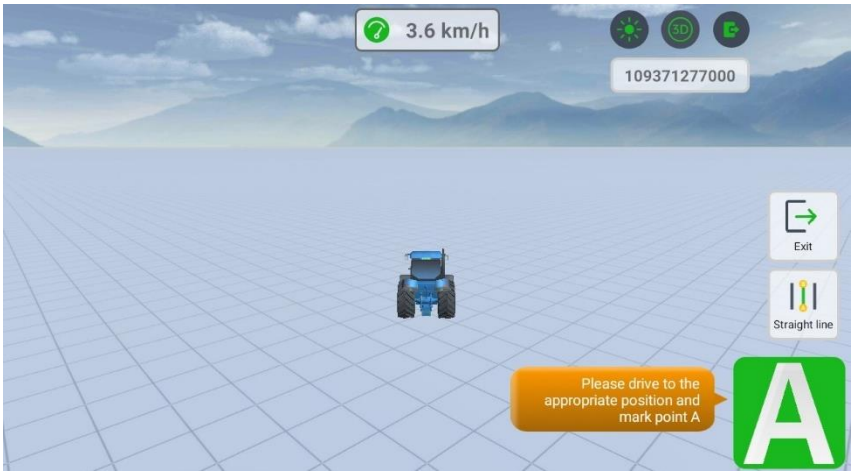
After the signal meets the requirements, the operating line can be created. Comnav provides a

variety of operating methods, click ***more*** to choose the method you need. And the most commonly used is the ***Straight line*** mode.

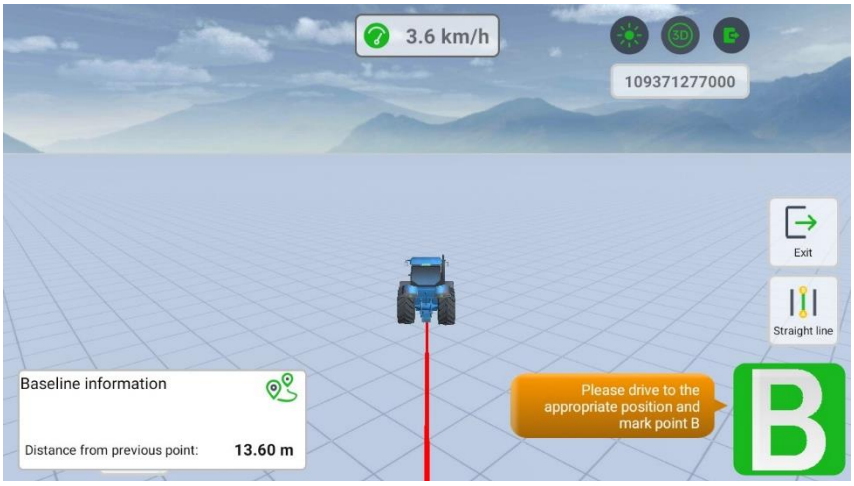


Straight Line:

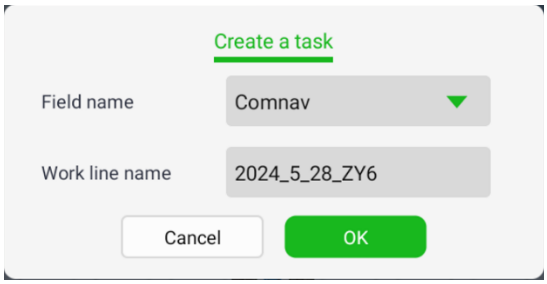
Please drive to the appropriate position and click ***A***



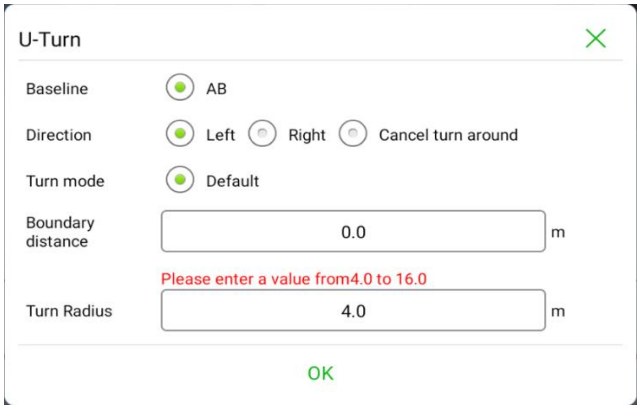
After that, drive to ***Point B,*** and the distance from A to B should greater than 10 meters

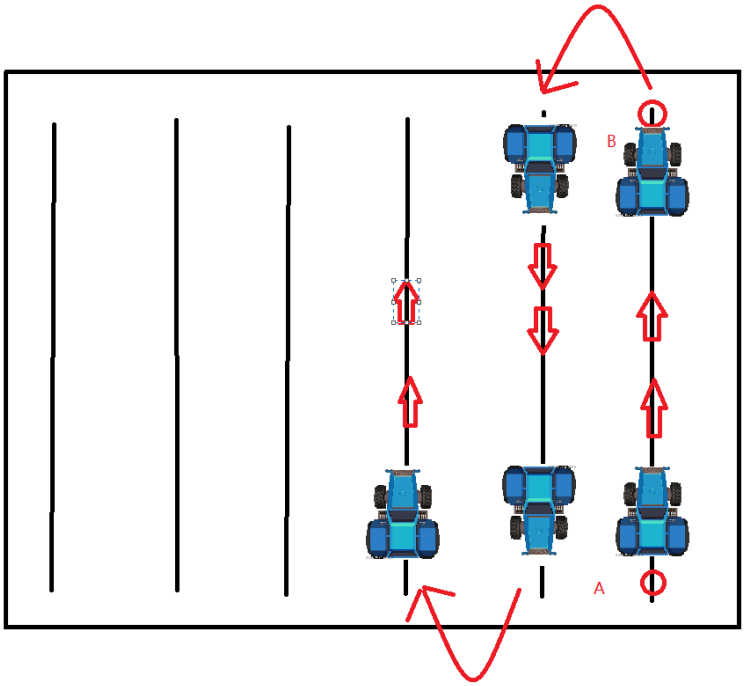


Input field name and select proper way to turn around, then you can start your work

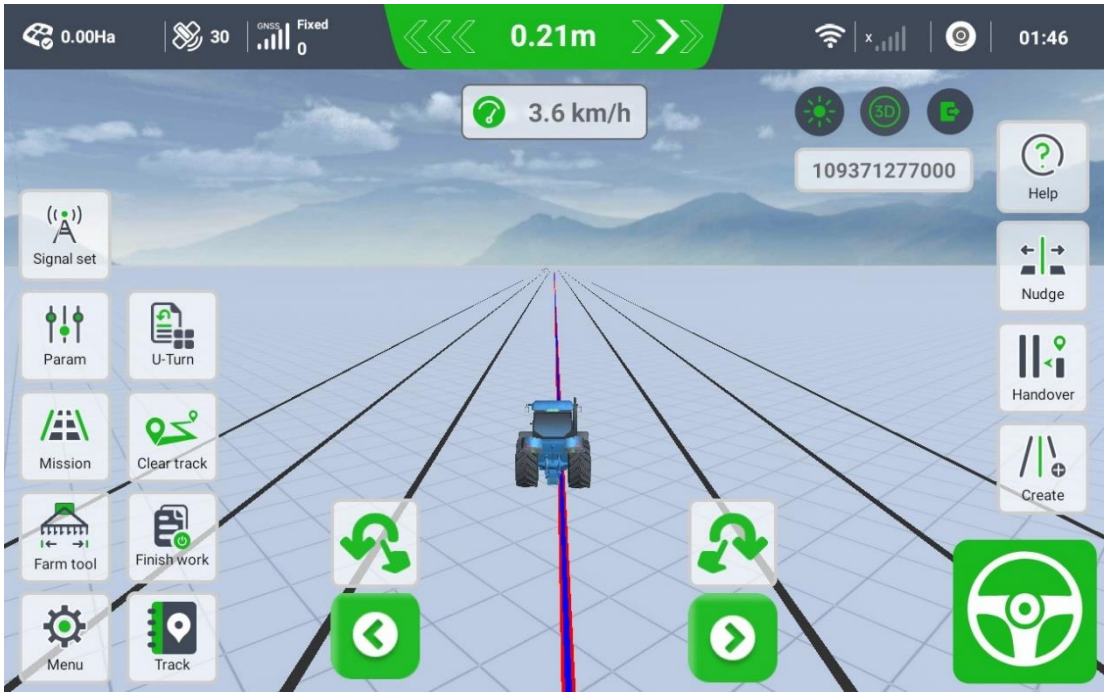


When it is about to reach point A or point B, it will automatically turn around in sequence at the end of each line according to the default light bulb U-turn mode. You can change the effect of the turn by adjusting the turn radius and boundary distance. If users do not enter a turn radius, the value defaults to twice the tractor wheelbase or implement width, whichever is smaller. (Use twice the relatively small number)




B
A

Chapter III Function Instructions of Software



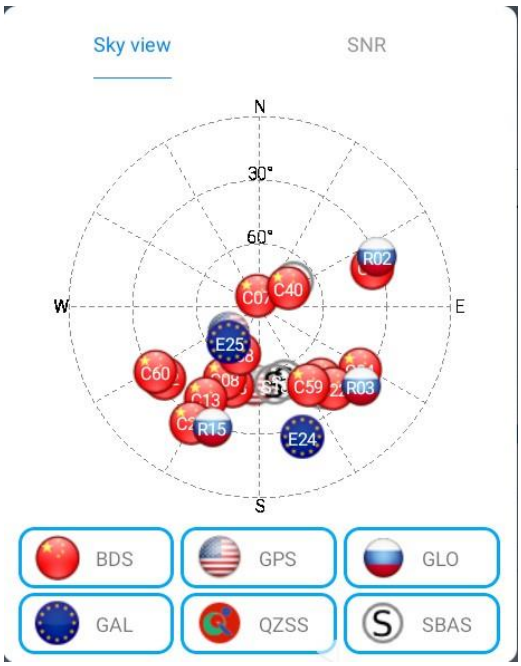
1 Satellite signals and RTK correction

1.1 Satellites

Display satellite number, quality and sky view
Click the icon, it will show as below

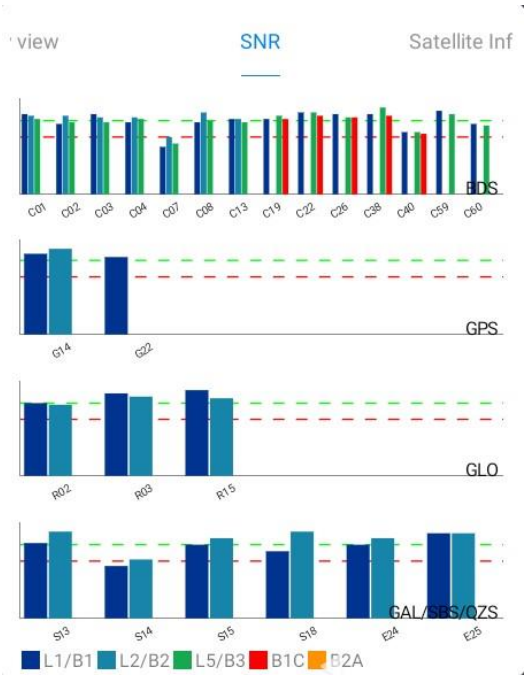
1.1.1 sky view

Comnav self-driving system supports receiving full-constellation multi-frequency satellite signals, including BDS, Glonass, GPS, Galileo, QZSS, and SBAS.



1.1.2 SNR (Signal-to-Noise Ratio)

Displays real-time satellite quality as a bar chart

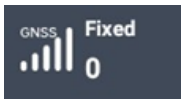


1.1.3 Satellite information

Displays the parameter values of each frequency point of the satellite in the form of data, which is beneficial to the judgment of areas with severe signal interference.

		SNR			Satellite Information			
No.	Sat	Azi	Ele	L1	L2	L5	B1C	B2A
1	G14	184	53	49	52	0	-	-
2	G22	229	71	47	0	0	-	-
3	S13	161	54	46	53	0	-	-
4	S14	52	70	31	36	0	-	-
5	S15	143	42	45	49	0	-	-
6	S18	169	53	40	53	0	-	-
7	C01	140	46	49	48	46	0	0
8	C02	234	34	43	48	45	0	0
9	C03	200	51	49	47	43	0	0
10	C04	122	35	44	46	46	0	0
11	C07	347	84	31	34	31	0	0

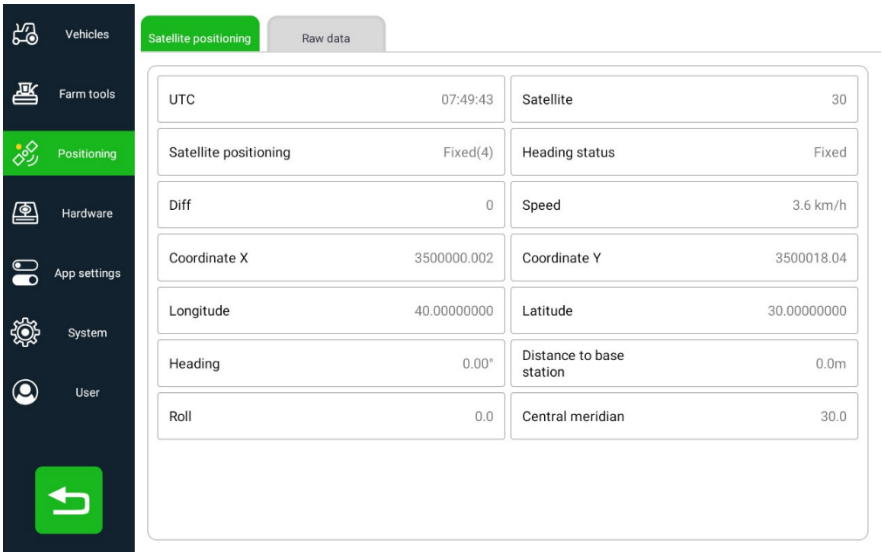
1.2 GNSS Status



After accepting the differential data from the base station, the software solves and obtains a fixed solution. 0 represents differential delay, usually 0 and 1 represent normal.
If the number continues to increase, which means the differential data is disconnected and the fixed solution is exited. Additionally, floating or single-point solutions can occur after poor signals or after disconnecting differential connections.
Autosteer can be turned on after successful intervention of signals that meet the requirements.

Click the icon, it will show as below:

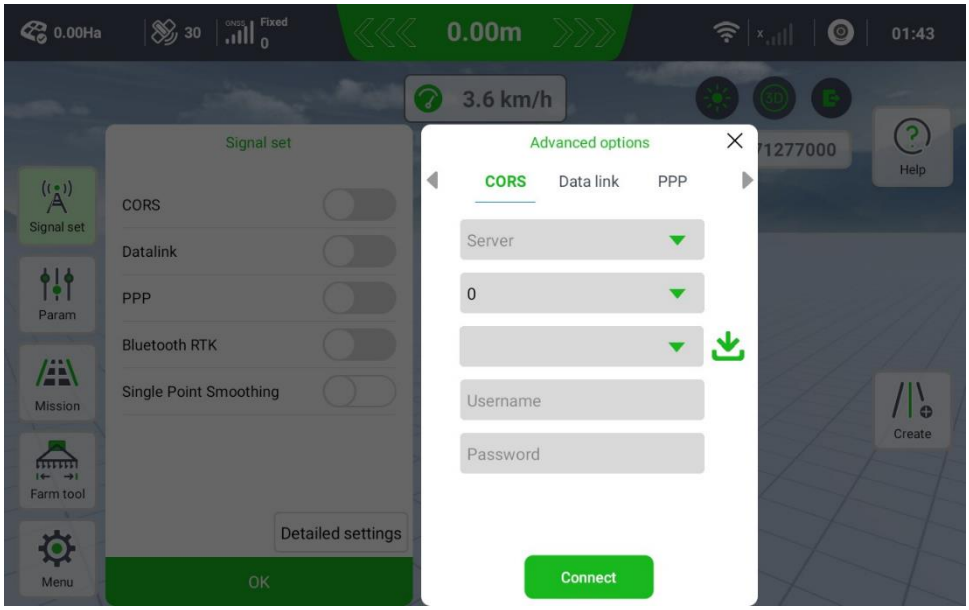
The positioning information provides position information under the WGS84 coordinate system, positioning status, vehicle attitude parameters, distance from the base station, etc.



1.3 Correction Signal set

Comnav provides multiple ways to obtain differential data: CORS/Datalink/PPP/Bluetooth RTK/Single Point Smoothing.

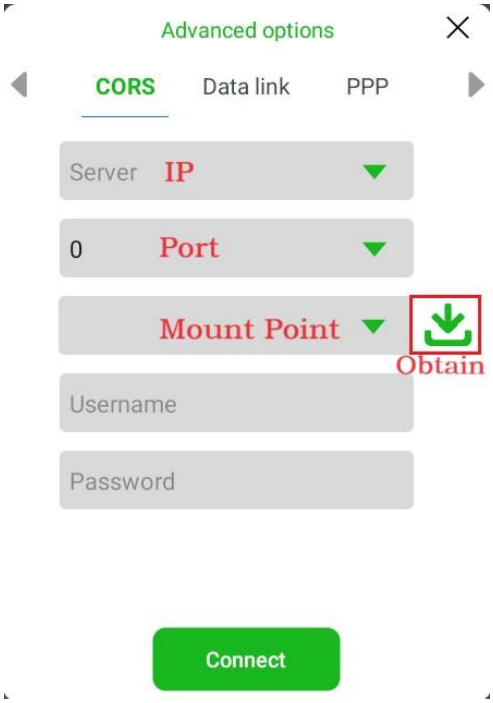
On this screen, you can select to connect to a mobile base station, a network/Bluetooth RTK, PPP or single point smoothing. You can change it through the "***Detailed settings***". If you select Network RTK, this becomes the default mode next time you restart it.



1.3.1 CORS (Network RTK)

You can set up an RTK connection through the network, when a CORS base station nearby and you have a local Ntrip account obtained from the dealer. To enable this mode, you need to connect to the network first.

Ntrip domain: Enter the IP and port, and tap Obtain. The source node field automatically shows the mount points, indicating that the Ntrip domain has been successfully accessed.
Ntrip account: After entering the Ntrip domain information, enter the account and password, and tap Connect to connect to the network RTK.



1.3.2 Datalink (Mobile base station)

Notice: There are two types of A100 Pro GNSS Receiver to choose from. Because the built-in datalink modules are different, there are two different datalink configuration interfaces.

1) Smart antenna with built-in U70 datalink modules need to select N5 B as the corresponding mobile base station, and this module currently only supports communication of the same model.

2) Tablets with built-in Harxon datalink modules need to select N5 A as the mobile base station, At the same time, if customers have other brand base stations, such as Trimble, Satel, Harxon, etc. can also be used.

If you need detailed information about mobile base stations and different tablets or you cannot choose the instrument you need, please feel free to contact our sales or technical staff, we will do our best to provide you with satisfactory service

For example, select U70 module AG501 Pro, and it use N5 B as base station.

Step 1 Mobile base station N5 B:

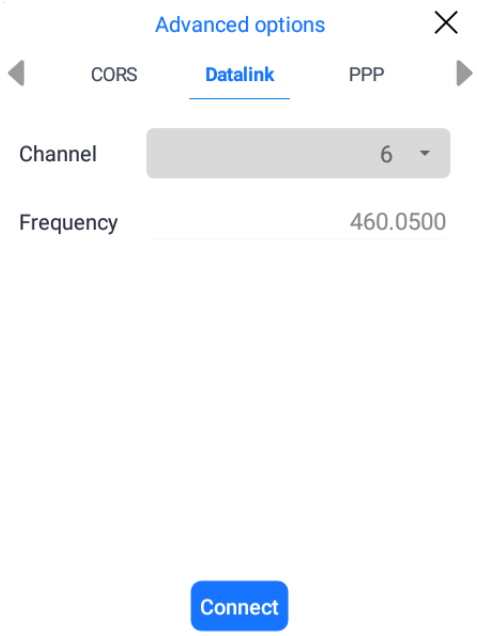
Press and hold the power button to turn on the N5. Use the buttons to configure the base station frequency in the LED front panel display to send differential data. There are usually 11 frequencies (453.050~463.50) to choose from. Datalink coverage is affected by terrain, weather environment, etc. Up to 15km under ideal conditions.

If you finish configuration, this becomes the default frequency next time you restart it.

For the detailed process, please refer to the YouTube video on configuring agricultural base stations: https://youtu.be/2a6BwRoRcE0?si=3qi6iIobBwQ0AyOE

Step 2 Pairing frequency on tablet

After start the Base station N5 B, go to "***Signal set > Advanced options > Datalink***", And choose the same frequency as N5 B, till get a fixed solution.



For example, select Harxon module AG501 Pro, and it use N50 A as base station.

Step 1 Mobile base station N50 A:

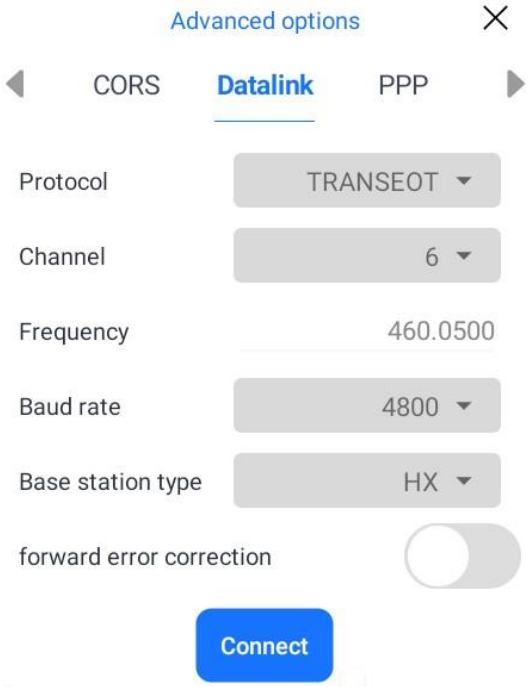
Press and hold the power button to turn on the N50 A. Use the buttons to configure the base station frequency in the LED front panel display to send base station data. There are usually 11 frequencies (453.050~463.50) to choose from. Datalink coverage is affected by terrain, weather environment, etc. Up to 5km under ideal conditions.

For the detailed process, please refer to the YouTube video on configuring agricultural base stations: https://youtu.be/2a6BwRoRcE0?si=3qi6iIobBwQ0AyOE

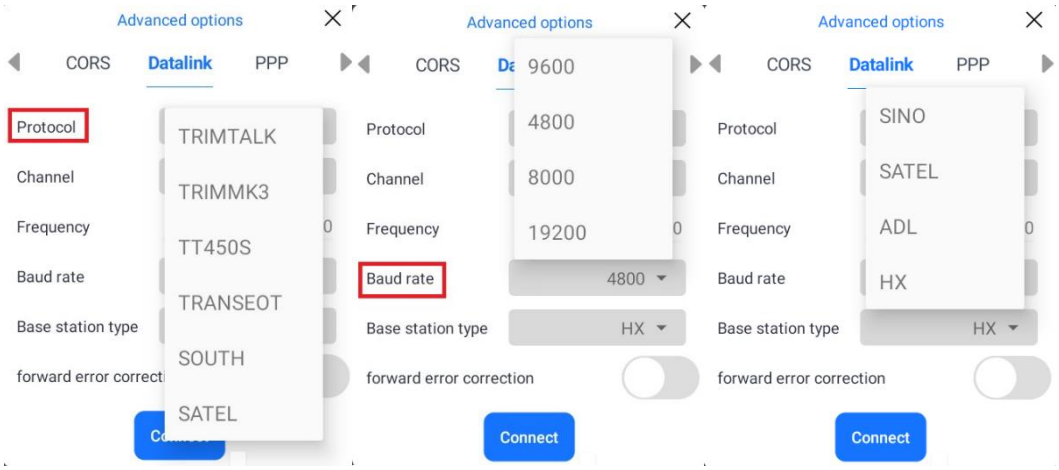
Step 2 Pairing frequency on tablet

After start the Base station N5 A, go to "***Signal set > Advanced options > Datalink***", And choose the same configuration as base station, including protocol, frequency, air baud rate, base station type, till get a fixed solution.

For base station N5 A, the configuration is as below



And if you want to use another protocol or other brand's receiver as mobile base station, Please make sure that the protocol, frequency, and baud rate settings of the tablet and mobile base station are exactly the same.

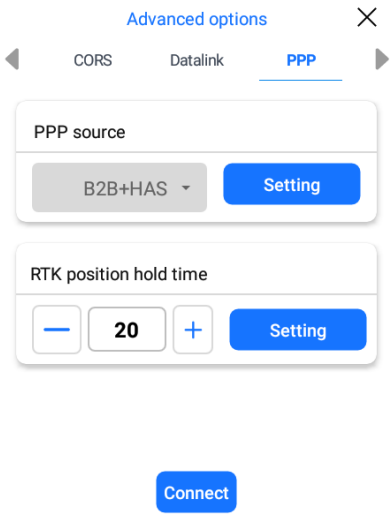


1.3.3 PPP

PPP services do not require the use of 4G signals and datalink signals and will not incur any extra costs. Directly receive corrections sent by satellites. After 15-20 minutes of satellite signal convergence, the accuracy can reach 10-15cm.

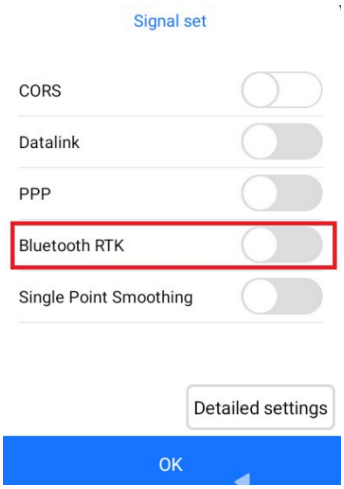
Currently supports Beidou **B2B** high-precision service and Galileo high-precision service **HAS.** Depending on the satellite coverage, the performance effects and convergence times vary in each region.

Whether the convergence is completed can be checked in the GNSS status upper left of the main interface or the menu-satellite position interface. If the convergence is not completed, it will display that Satellite based not converged. If the convergence is completed, the currently set PPP source will be displayed, such as HAS, B2B or B2B+HAS.



1.3.4 Bluetooth RTK

If your mobile phone terminal can receive corrections and you want to share it to AG501Pro via Bluetooth, you need to match them via Bluetooth at first, and turn on "Signal> Bluetooth" in software. If the reception is successful, the data stream will appear in.



1.3.5 Single-point-smoothing

Single-point smoothing means that the board smooths the beating positioning without accepting any differential data to obtain relatively smooth and stable positioning data. ComNav uses DP-filter Smooth Technology, it delivers consistent position error and assures a smooth (pass to pass) accuracy within the sub-meter to centimeter range. Over a 15-minute window, the Pass to pass accuracy can reach about 15cm in a typical field.

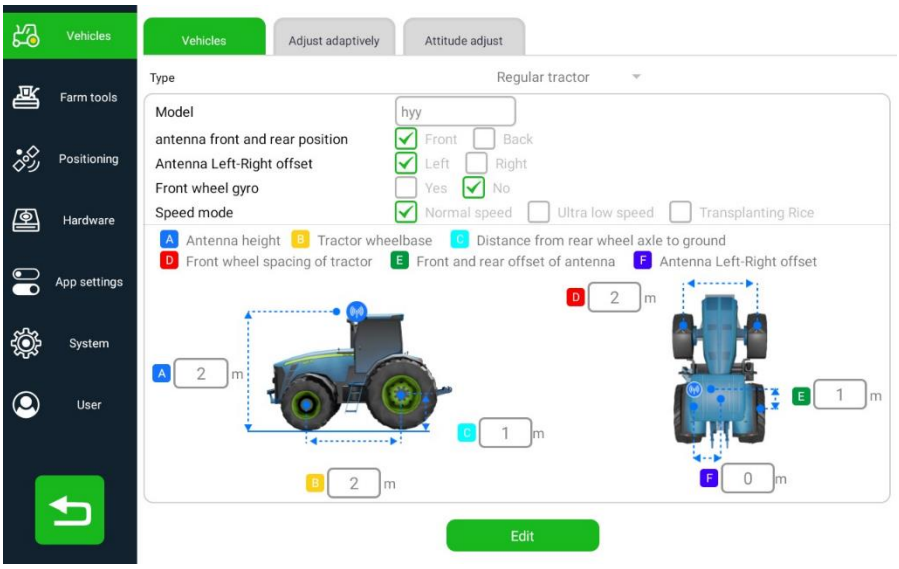
Pass to Pass accuracy is the term used by farmers to describe their user needs in relation with accuracy; and the term used by GNSS manufacturers to describe the accuracy the equipment can provide. Once you have done a pass in the field with the tractor, and you return and place it in the same position according to your GNSS equipment, you are not exactly in the same place, there is a bias. This bias is the so called “pass-to-pass” accuracy.

2 Menu

Tap the “***Menu***” tab. On the displayed details screen, tap the required items and enter the corresponding vehicle data to complete vehicle parameter settings.

2.1 Vehicles information

A Antenna height: The vertical height of the antenna to the ground
B Tractor wheelbase: The horizontal distance between the center of the front wheel and the rear wheel
C Distance from rear wheel axle to ground: Rear wheel axle position to ground position (rear wheel radius)
D Front wheel spacing of tractor: The distance between the centers of the two front wheels
E Front and rear offset of antenna (Antenna position): Horizontal distance from antenna to Front/Rear wheel center
Front wheel gyro: The front wheel angle sensor can be installed on both the left and right wheels and needs to be installed on the place can rotate left and right with the tire. Please ensure it is installed horizontally.
Speed mode: when the speed of vehicle is between 0.3-1km/h, select Ultra low speed to obtain accuracy and stable operation.

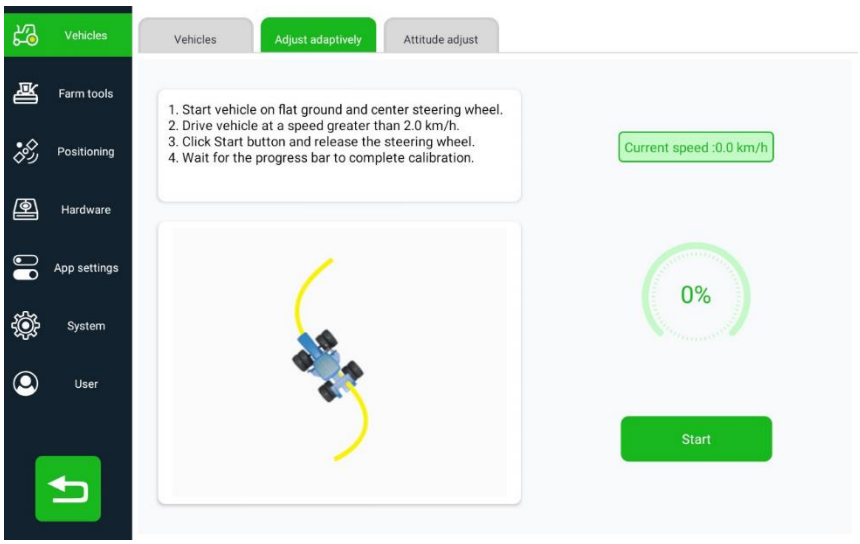


2.2 parameter calibration/Parameter

2.2.1 Parameter calibration

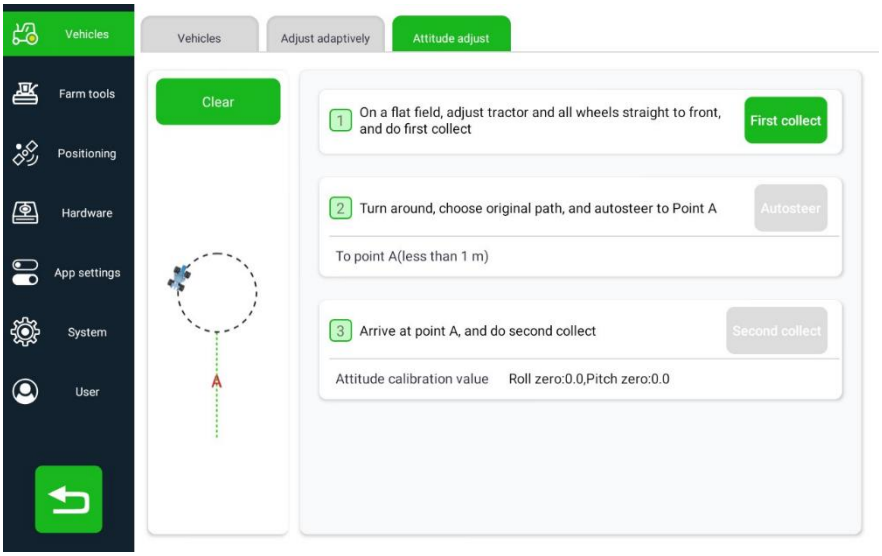
Calibration is usually completed during first use and does not require subsequent calibration. Calibration is mainly divided into 3 steps, including: Heading Calibration > Adjust parameters Adaptively> Attitude Adjust. Please Proceed in order, and refer to ***Chapter II-1Vehicle commissioning*** for the details

Adjust parameters adaptively



Adjust adaptively obtain proper motor control of steering wheel strength.
Firstly, start vehicle on flat ground and center steering wheel.
Secondly, drive vehicle at a speed greater than 2km/h.
Then start button and release the steering wheel.
Finally wait for the progress bar to complete calibration.

Attitude adjust



Attitude adjust is to obtain the calibration value of roll angle and pitch angle of the vehicle.
The first step is to click First collect to collect a point as point A.
In the second step, drive forward to a suitable place and complete the U-turn, then click Autosteer (you cannot click it when the U-turn is not completed). At this time, the distance between the current vehicle and point A will be displayed. Stop the car within one meter from point A and click Stop.
The third step, click Second collect, prompts that the calibration is completed and obtains the attitude angle calibration value.

Heading Calibration

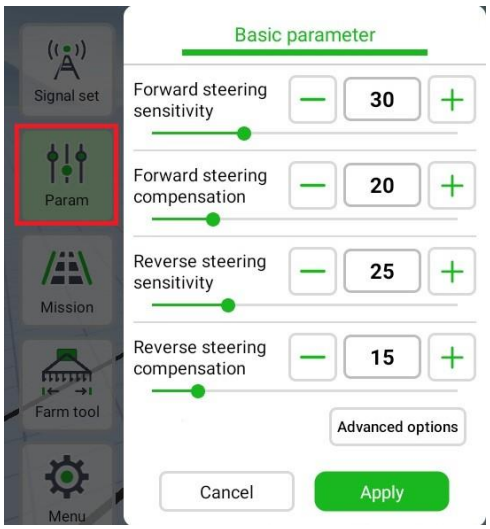
If the heading is not initialized during later use, please follow the on-screen prompts to complete the initialization.

2.2.2 Parameter

Specific values are obtained through automatic calibration. The specific performance of the motor in controlling the vehicle in these numerical autonomous driving systems

Basic parameter:

Default value as below, after calibration, they will change



Forward steering sensitivity: Obtained from Adjust parameter adaptively. Control how fast the steering wheel turns. The higher the value, the faster the steering wheel turns. Default value is 30.

Forward steering compensation: Obtained from Adjust parameter adaptively. Control the steering wheel rotation amplitude to prevent overcorrection or correction is not timely. Appropriate parameters will allow the vehicle to rotate the steering wheel more frequently when

driving at high speeds, because faster speeds and larger angles are required to complete the rotation of the motor in time. On the contrary, when driving at low speeds, the steering wheel turns less, keeping the vehicle running smoothly and straight without over-correction. Default value is 20.

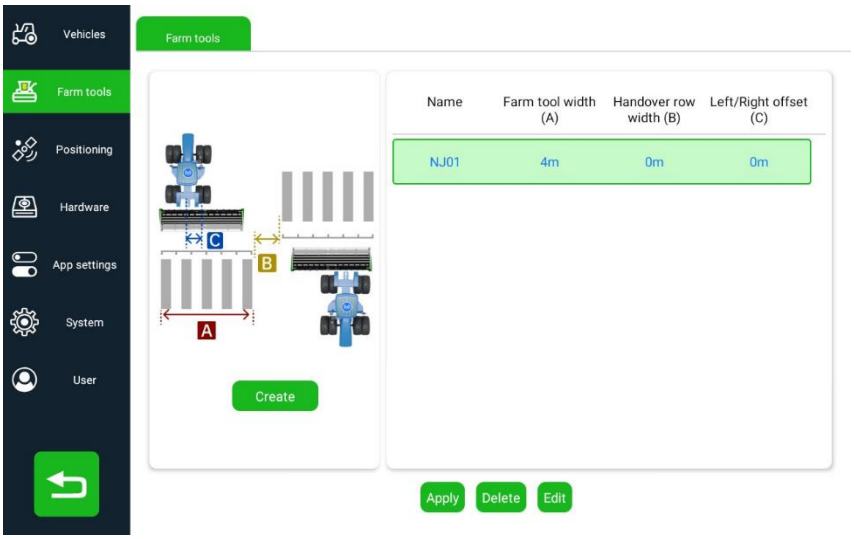
Reverse steering sensitivity： Reference forward

Reverse steering compensation: Reference forward

2.3 Implements /Farm tools

Note that the installed farm tools should not significantly exceed the tractor load, and farm tools should be installed firmly to avoid significant shaking. Otherwise, the automatic driving straightness effect will be reduced.

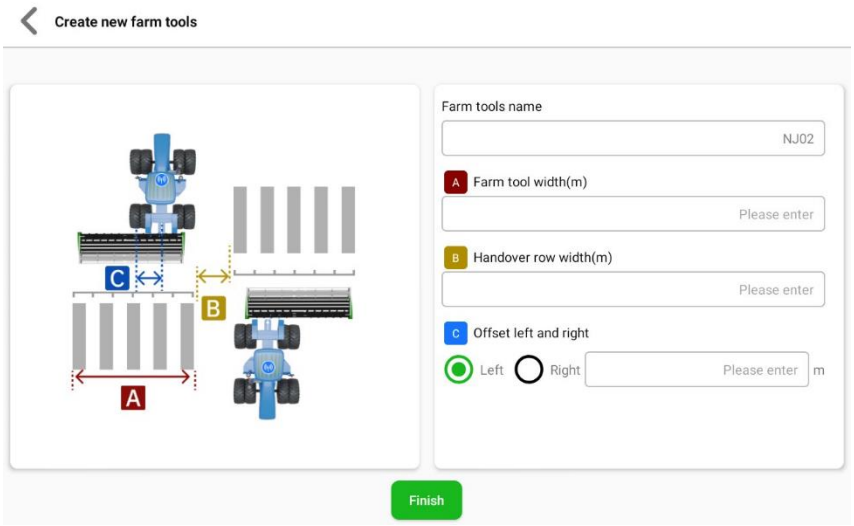
1) Implement



A Farm Tool Width: Actual farming width of agricultural tools.

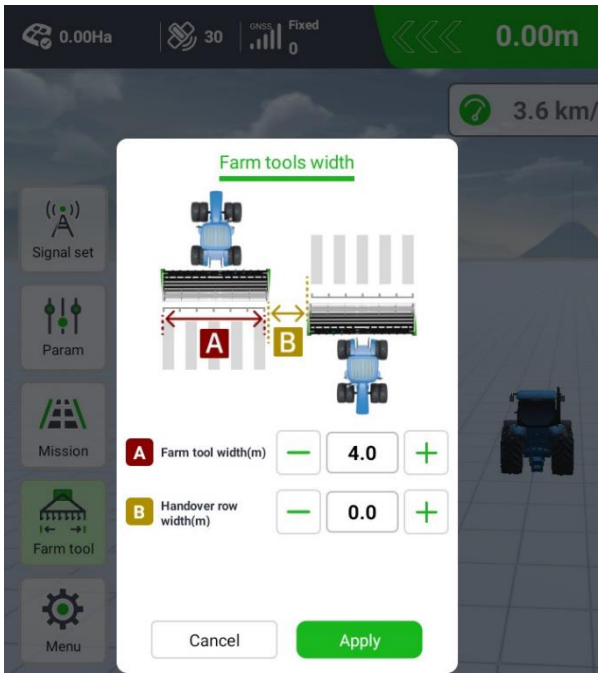
B Handover row width: Customized the distance between rows. 0 means that the two rows intersect but do not overlap.

C Left/ Right Offset: Offset value between the center of the farm tool and the central axis of the tractor.



2) Farm tool

Quickly view and edit farm tools



3 Operation

3.1 Create a task

Add new guidance line

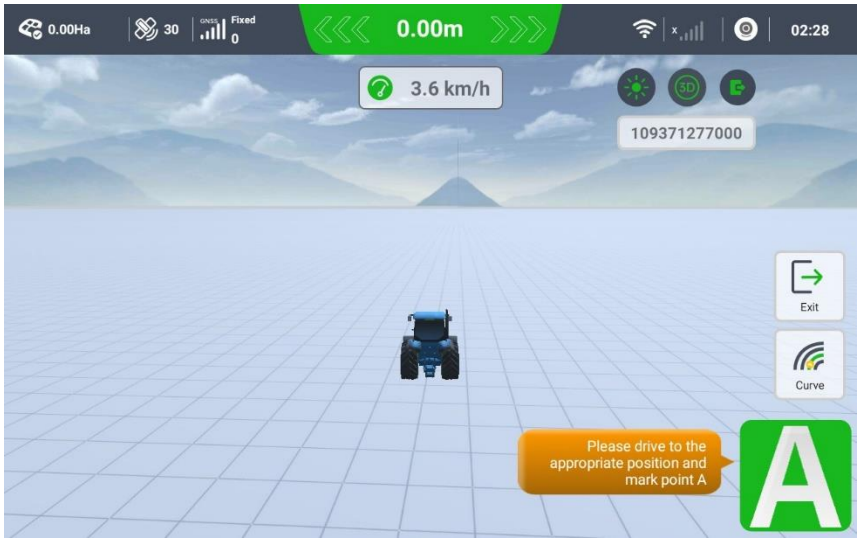
Click "***Create***" button on the right of the main interface to select a task type for a required job line, as shown in the figure below:

3.1.1 Straight line

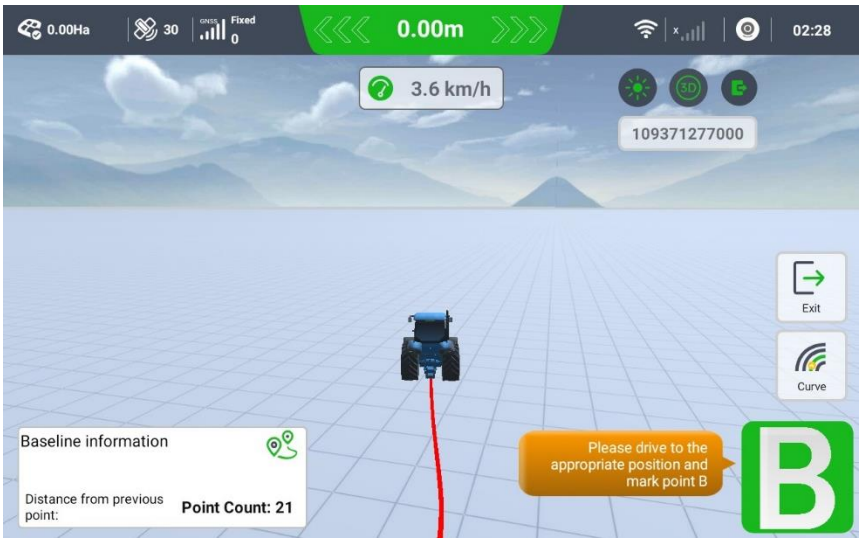
Collect point A and point B and generate guide lines and parallel lines.
Please refer to ***Chapter Ⅱ-3.2 Create a task***

3.1.2 Curve

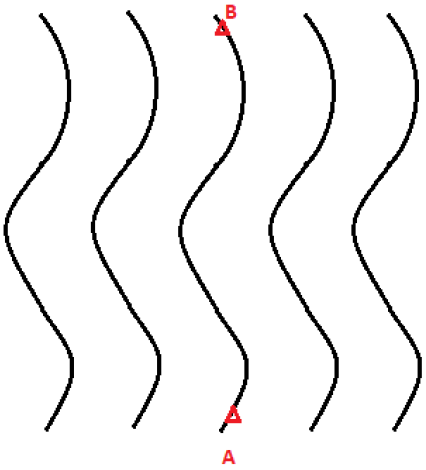
Please drive to the appropriate position and click ***A***
Then keep driving at a constant speed according to the preset curve trajectory, and the software will automatically collect the isometric curve path.



After the collection is completed, click point **B** to generate multiple isometric curves.

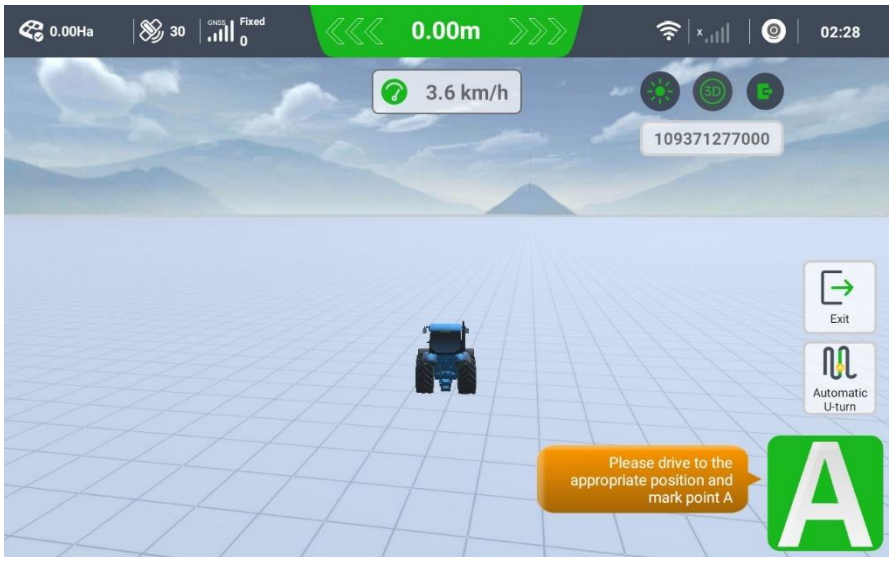


The generated Job line is as shown below:

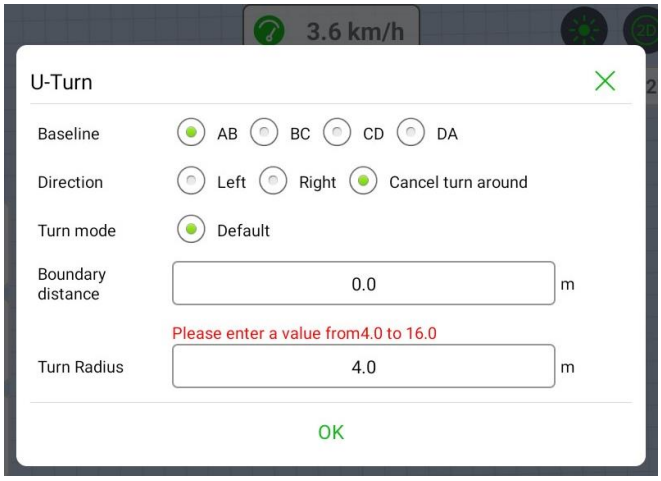


3.1.3 Automatic U-Turn

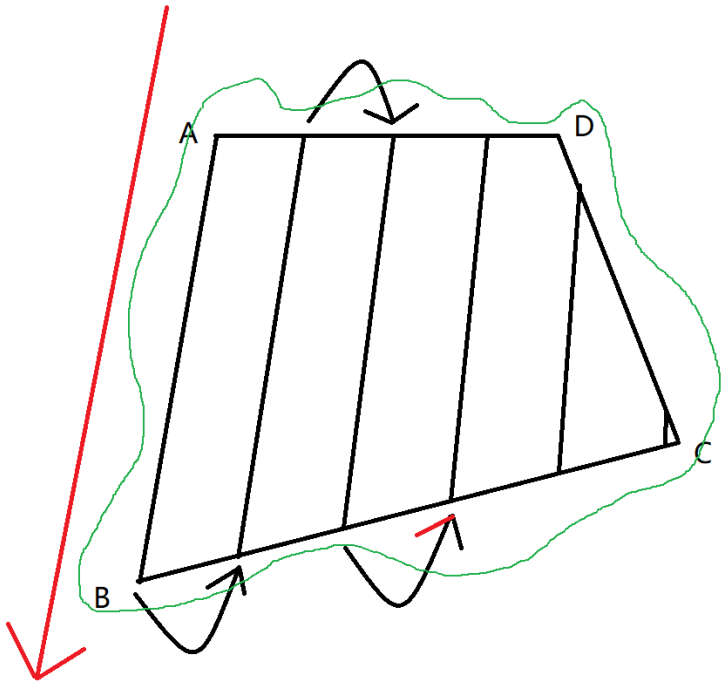
Collect four points A,B,C,D to create a regular quadrilateral.



Select one of the sides AB/BC/CD/DA as the baseline, set the U-turn direction, mode, etc.



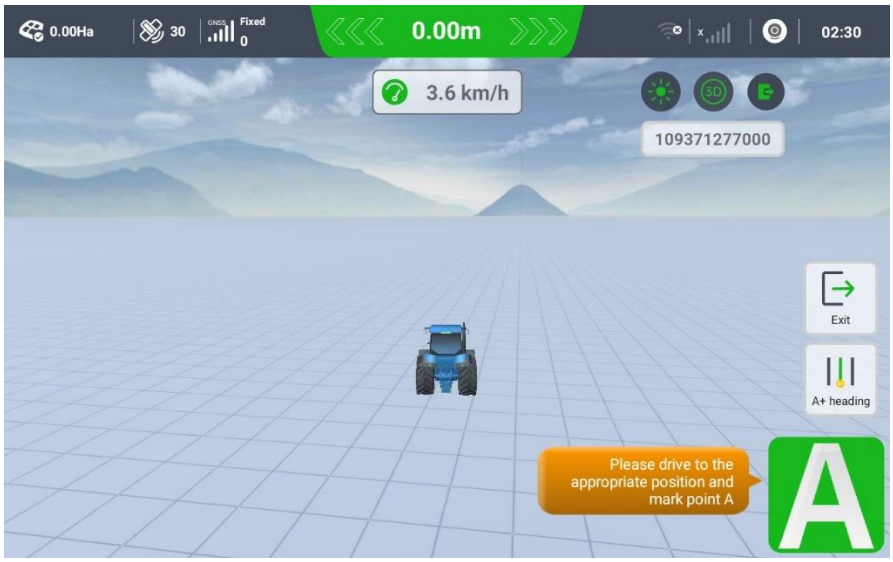
When the tractor is in the area, turn on the autosteer, and when it is about to reach the intersection of the Job line and the boundary, it will automatically turn around according to the set parameters.



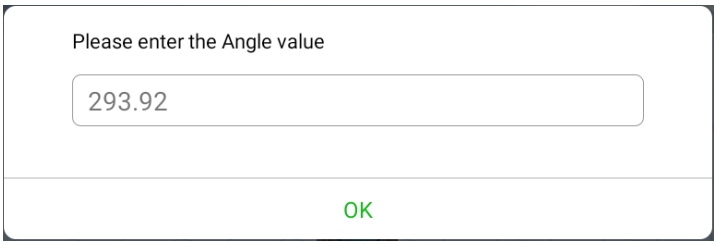
3.1.4 A+ Heading

A+ Heading task uses a point position and an angle from true north to establish a straight guide line.

Please drive to the appropriate origin position and click ***A***,



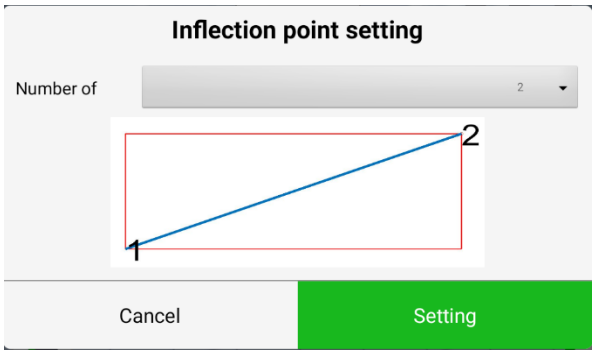
The vehicle will automatically determine the angle between the current heading and the north direction. You can also enter the angle value independently.



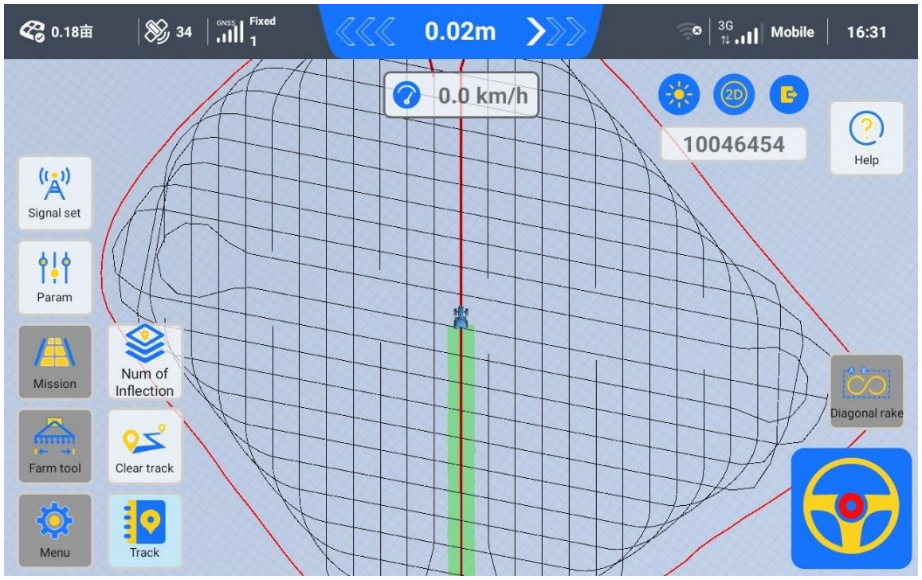
3.1.5 Diagonal Rake

Specially used for raking the ground. The turning angle is more reasonable during use, so it is suitable for raking tools.

Use AB two points plus trajectory to select the work plot. Collect point A as the starting point, collect one point every meter to record the driving trajectory, and end at point B, which will automatically close. You can choose the number of inflection points 2 or 3.

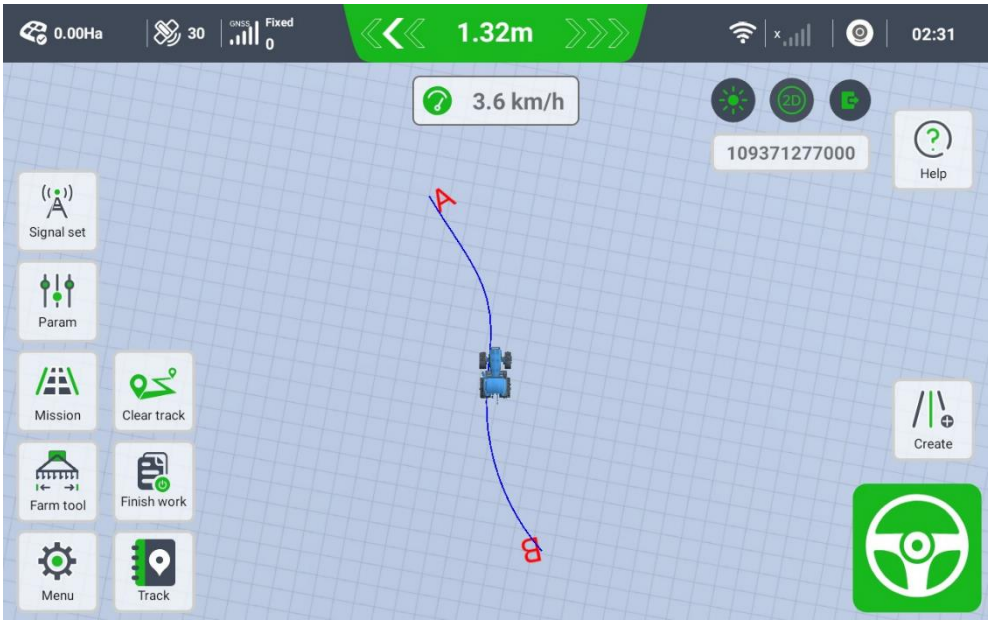


After clicking Set, the software will calculate the planning line using point B as the starting point. As the number of points increases, it usually takes some time to wait.



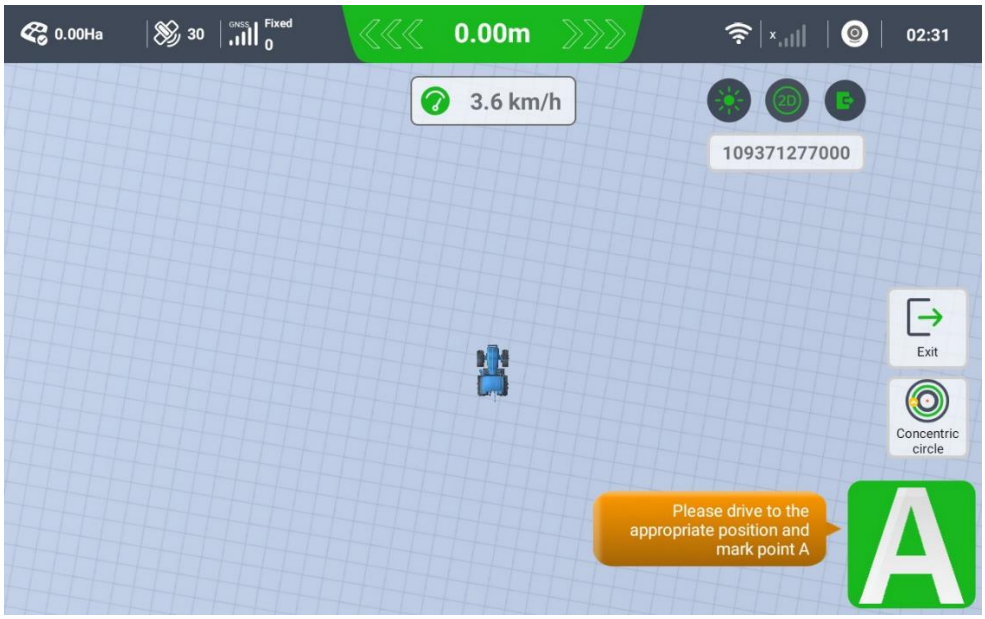
3.1.6 Free track

Free track, select two points A, B to confirm a path. During the path recording process, one point is collected per meter and planned into an operation line. In this mode, In this task, only one line segment is created and no parallel lines will be generated.

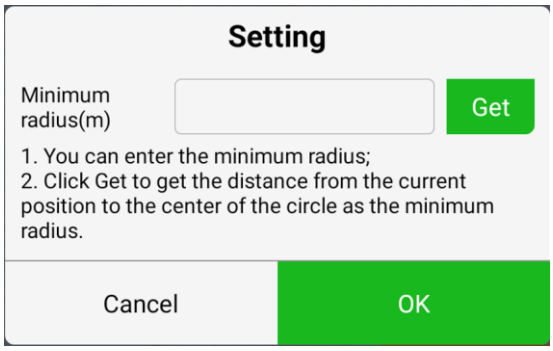


3.1.7 Concentric circle

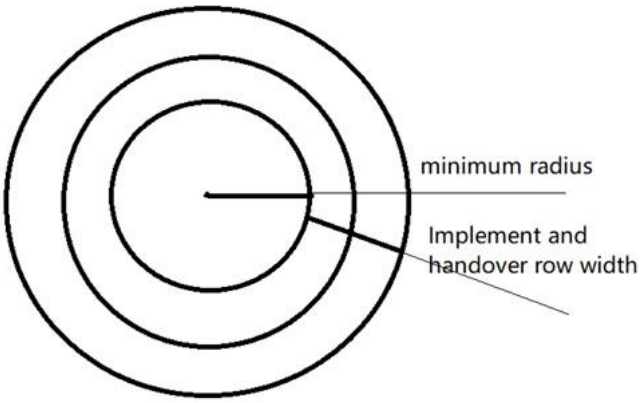
Please drive to the appropriate origin position and click ***A***



Input the minimum radius between adjacent circles, or drive the car to the target position and get the distance



The trajectory is generated based on the width of farm tool and minimum radius.
And currently designed not to automatically travel to the next circle.

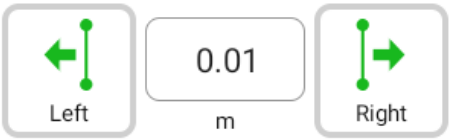


Note: Minimum radius should be more than twice the wheelbase.

3.2 Nudge

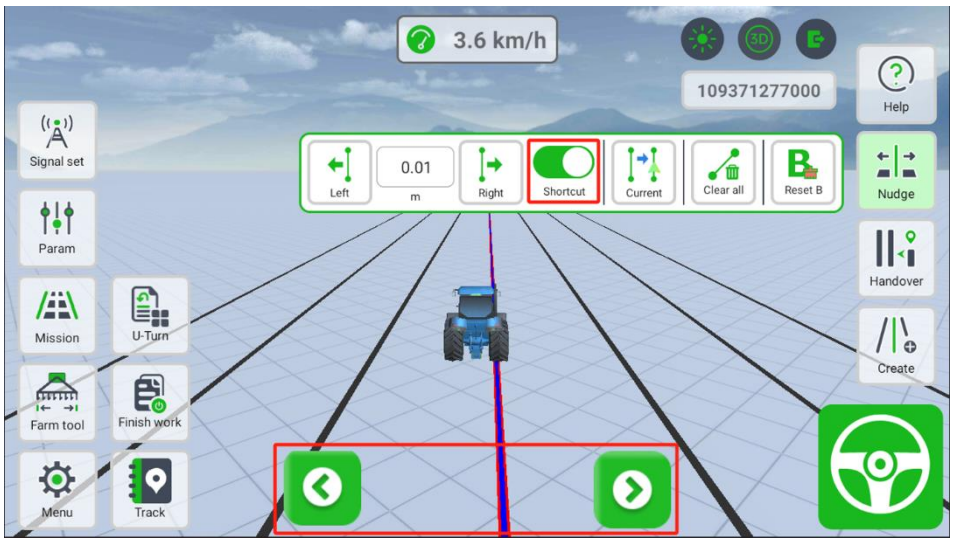
After confirming the guidance line, these lines can be modified. Including all guide line translation and clearing AB control points.

1) Parallel move



Supports moving the guide line to the left or right of the direction of the front of the vehicle according to the value manually entered by the customer (unit: meters)

After turning on the **Shortcut** button, a shortcut button appears at the bottom of the main interface to move the guide line to the left or right. You can move the guide line left or right with one click.



2) Move to current position

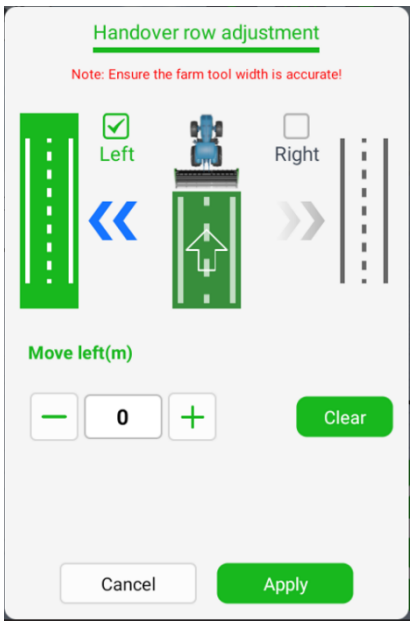
Current: Move the initial guide line to the current vehicle position

3) Clear and reset

Clear all: Clear all previous left and right nudge operations and return to the original guide line

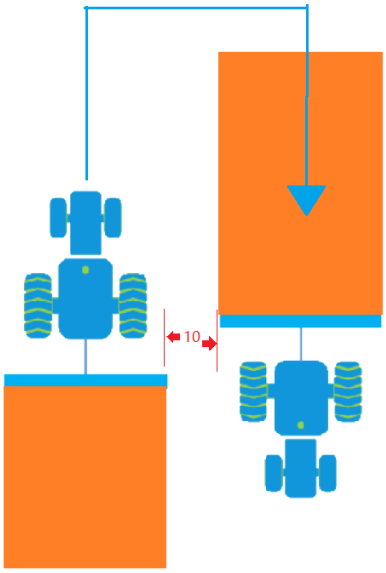
Reset B: Reacquire point B to generate the guidance lines

3.3 Quick Handover adjust (Handover)

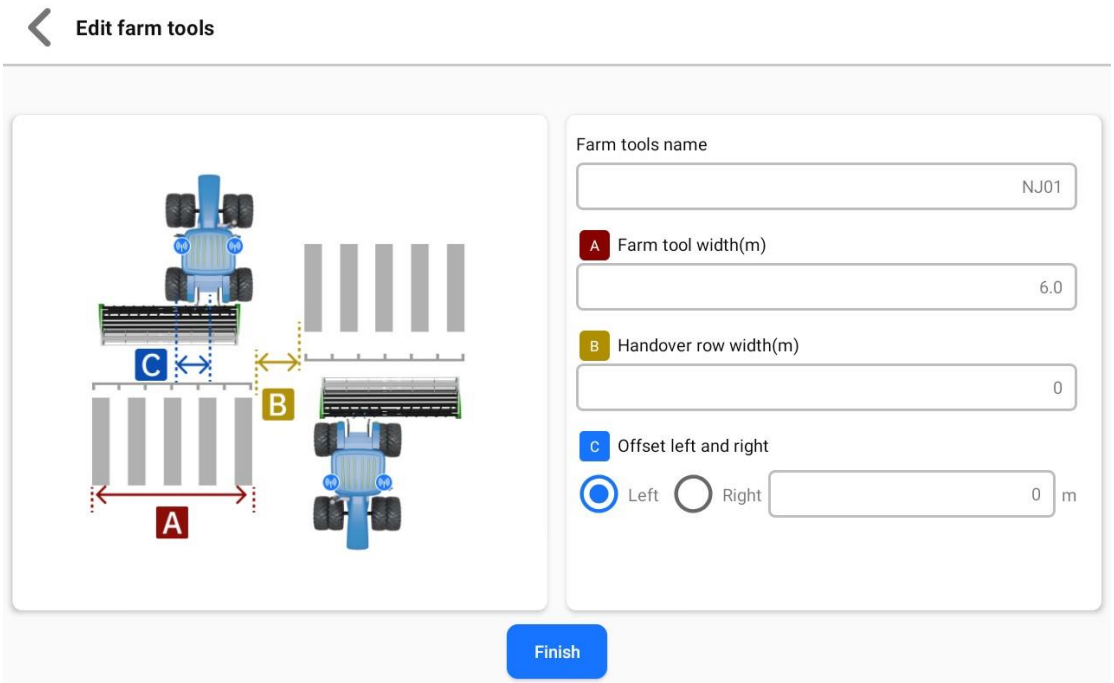


Actual driving of two working lines, quick adjust suitable for situations where only one side of the handover row value is measured. The misalignment of the handover row can be quickly adjusted during the work process

Drive the tractor to travel two working lines as shown in the diagram. Measure the actual width of the intersecting row between the two rows. In the software, enter the measurement value as required for adjustment.



For example, in the farm tool settings picture, the actual width of the farm tool A is 6M, the handover row B is set to 0M, and the offset value C is 0. However, when working in the second row, the tractor veers to the right. If the value is 10CM, then in the "Quick Handover Adjust" on the right side of the main interface of the software, please select "Right" and enter "10CM" as the value to complete the quick adjust.



Note: In which direction the vehicle drives, the handover line can return to normal, and that direction is selected in the software.