

# FieldBee

# **Tractor GPS navigation app**

**User manual** 



## User Manual

## FieldBee tractor GPS navigation

Android Application

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## Introduction

Welcome to the FieldBee Android application User Guide. This manual describes how to install, set up, and use the application.

## Technical assistance

If you have a problem and cannot find the information you need in the product documentation, contact our support team by writing to **support@fieldbee.com**.

## Your comments

Your feedback about the documentation helps us to improve it with each revision. Please email your comments to **info@fieldbee.com**.

## Installation

Download the FieldBee app from Play Store by following this link: <u>https://play.google.com/store/apps/details?id=com.kmware.efarmer&hl=en</u>

## Safety

#### Use the electronic display correctly.

Electronic displays are secondary devices designed to assist the operator in fieldwork performance, increase comfort, and provide entertainment. A secondary device is any device that is not required for driving a tractor.

The operator is always responsible for safe operation and the control of the machine.

To prevent injury during machine operation:

• Position the display by following the installation. Ensure the device is protected and does not interfere with the driver's view, and does not interfere with machine control.

• Use the available display functionality only under certain conditions. Only when it is safe to do per the instructions provided. Always follow the rules of safe driving, state, or local laws.

## FieldBee Android Menu structure

	\$	$\equiv$ Record keeping	← Settings
ND Natalie Dushchenko natalia.dushenko@fieldbee.com		Main Tasks	Navigation Navigation tolerance 0.15 m
Navigation			Reverse movement recognition (Beta)
Record keeping		Fields	Field boundary alert (Beta)
FieldBee store	+		Turn implement off when out of field
Settings	o znik	Notes	GPS source GPS Demo
Peedback	:	Glossary	GPS location in vehicle 0.00 m
		Materials Machinery	GPS frequency 5Hz
UPGRADE MY ACCOUNT	: >	Crops Workers	GPS QUALITY FILTER (Beta) GPS, DGPS, FRTK, RTK Novatel configuration
<ul> <li>Navigation</li> <li>Record keeping</li> <li>Settings</li> <li>Feedback</li> <li>Get premium subscript:</li> </ul>	ion	<ul> <li>Tasks</li> <li>Fields</li> <li>Notes</li> <li>Materials</li> <li>Machinery</li> <li>Crops</li> <li>Workers</li> </ul>	<ul> <li>Main Settings</li> <li>GPS settings</li> <li>Implement parameters</li> <li>Setup language</li> <li>Units of measurement</li> </ul>

Each of the following menu options is explained in detail in this chapter.

• **Navigation** – tractor guidance module that provides lightbar navigation, parallel lines, and connection to the external GPS sources and Autosteer controller.

- **Record keeping** management of the field activities such as tasks, fields, and crops.
- **Upgrade my account** management of the application's paid modules.

• Settings – control application parameters such as language, GPS settings, units of measurement, and implement parameters.

## 1. Getting started

## Installing FieldBee

FieldBee app needs an OS Android version that is not less than 7.0.

Download the latest application from Google Play Store.

Run Play Store, key-in "FieldBee" in the search field. In the opened window, select the application and click "Install."

## Language selection

After the application has been installed, you can select the language you prefer before starting work (Fig. 1.1).

The application supports the following languages: English, Danish, Dutch, German, Hungarian, Latvian, Lithuanian, Mongolian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish, Ukrainian, French, and Italian.

After installing the application, loads the device language. If the device language is not supported by eFarmer, the application takes English by default.

You can change the language of the application after registration as well - in the Settings section.

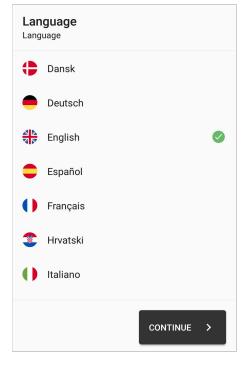


Fig.1.1

## Registration

After the language has been selected, you will have GET STARTED screen (*Fig.1.2*). You may:

- Sign In with GOOGLE;
- Sign Up with email;
- Sign In if you have already registered.

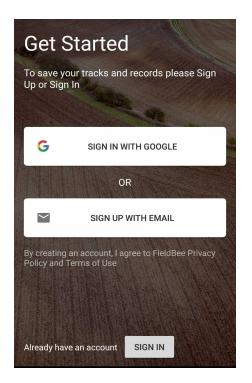


Fig.1.2

## Sign Up with Email

If you haven't registered yet, tap "Sign Up with email" to create an account using an active email address. After accepting Terms and Conditions, fill in the form, including:

- Your Name;
- E-mail;
- Password

Then tap "CREATE MY ACCOUNT".

After the registration, we will send a Registration letter with your login and password to the email provided. This data will be added to your Profile.

## Sign in

To log in, you have to be registered. You can sign into the app in two ways (*Fig.1.2*):

- E-mail, you enter your email, password, and tap "Sign In";
- **GOOGLE**, tap "Sign In with GOOGLE."

If you signed up with GOOGLE, and you'd like to log in with your email, you need to use the data from the Registration email.

After that synchronization screen will appear (*Fig.1.3*). Please stay connected to the internet. It may take approximately 30 sec to 2 min depending on how much data you have stored in the app.

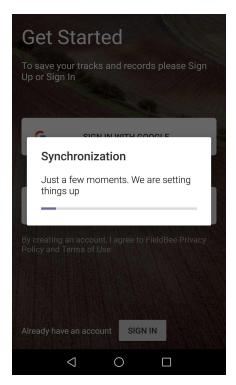


Fig.1.3

## Password recovery

If you don't remember the account password, tap "Forgot".

Enter the email which you registered in the app, and tap "RESET" (Fig. 1.4)

We will send you a link for resetting the password.

If you have not found a letter in the email, check the spam folder.

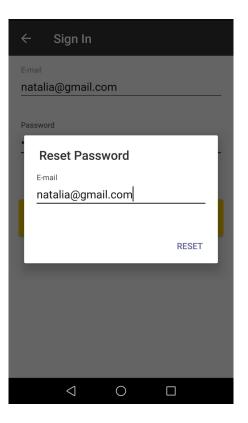


Fig.1.4

## 2. Navigation

On the Navigation screen you can (Fig. 2.1):

- Configure the settings of a track;
- Record and save tracks;
- Create a new task or select from the created ones
- Create a new field or select from the created ones;
- Create a new vehicle or select from the created ones;
- View GPS accuracy and connect an external GPS source;
- Adjust GPS settings;
- Measure the area and perimeter using ruler modes;
- Change map view and layer options;
- Manual navigation with lightbar;
- Automatic steering with Autosteer controller

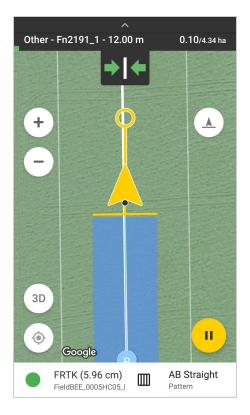


Fig.2.1

## 2.1 Controls

To use the map successfully, FieldBee has the following controls:

Icon	Description
=	The Main Menu button: Allows you to open and close the main menu from any
	app section.
۲	Location: Centres the map to your current location
▶	<i>Ruler:</i> Area and perimeter measurement.
\$	Layers: Map view modes (Normal, Hybrid, Satellite, Crop, Notes)
	1. The button shows you:
	Positioning accuracy: Information about current positioning accuracy
	Green - the accuracy is good for navigation
RTK (0.40 cm)	Yellow - the accuracy is average
	Red - navigation is unavailable
	2. With this better sure same
	2. With this button, you can: <i>Connect device:</i> Connect to an external GPS source (FieldBee L1, FieldBee L2,
	Autosteer and other devices)
	Get better accuracy: You can go to the FeldBee website to view the products to
	improve navigation quality.
+	<i>New track:</i> The button that allows you to Create the new track with appropriate settings: Task, Field, Vehicle, GPS accuracy, and Pattern
<b>II</b>	Select task: Select or create a task with a specified operation type
	<i>Select field:</i> Select or create a field, measuring the boundaries of your field
	Select vehicle: You can select the vehicle and implement from the list or create one
5	with specified parameters
00	
AB Straight	Pattern: Navigation patterns
	<i>Start recording a track:</i> The button starts the navigation mode.

	Implement: You can turn your implement On or Off while recording a track
+ -	Zoom controls: Zoom in and out the map
	<i>Pause:</i> The button pauses recording a track. Then you can Save or Continue the track.
8	Save: Save the recorded track
$\bigoplus$	Shift routes: You can shift the routes position
Ī	Delete: Your track can be deleted with this button
:	<ul> <li>GPS Settings: The additional menu opens the GPS setting:</li> <li>Navigation tolerance</li> <li>GPS frequency</li> <li>GPS quality filter</li> </ul>

#### GPS Source

To increase the accuracy of recording tracks, you can connect an external GPS source.

To select a GPS device, tap the GPS accuracy button  $\bigcirc$  GPS (11.48 m) on the Navigation screen and select **CONNECT DEVICE** (*Fig.2.1.1*). Here you can select the type of device from the list (*Fig.2.1.2*):

- Built-in GPS. Will be used GNSS receiver integrated to Android smartphone
- FieldBee L1. RTK compatible receiver with centimeter accuracy connection via Bluetooth
- FieldBee L2. New generation GNSS receiver with more accuracy connection via WiFi socket
- Autosteer. Setting up and connection to Autosteer controller.
- Other receivers. Novatel compatible devices (Novatel AG-Star, Leica SmartAG, EPS AG-Dream) and other NMEA devices (Devices NMEA devices 0183) with GGA.

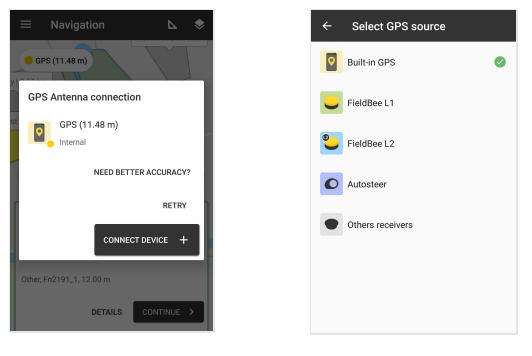
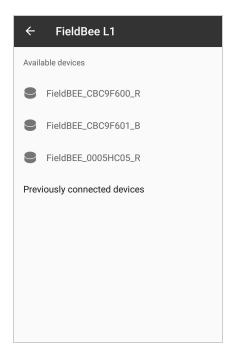


Fig.2.1.1

Fig.2.1.2

To connect **FieldBee L1**, Bluetooth on your phone should be turned on. You will have a list of scanned devices (*Fig.2.1.3*). Select one and click it. Your device will connect to this external GNSS receiver.





To connect **FieldBee L2**, WiFi (mobile hotspot) on your phone should be turned on and the GNSS receiver has to be in the same network. To connect to the receiver, select it from the available devices list. You can also add a receiver manually by entering its IP address (*Fig.2.1.4*).

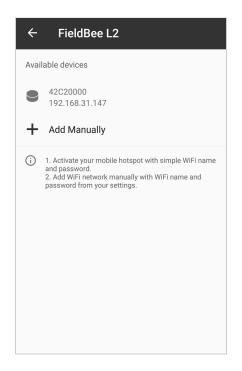


Fig.2.1.4

#### Autosteer connection is described in chapter 5. Autosteer

#### Map layers

You can change Map layers. For this, select  $\checkmark$  on the top panel and choose one of the offered options (*Fig.2.1.5*).

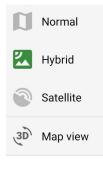


Fig.2.1.5

#### Ruler path

Ruler path measures the distance between objects (or points) on the map. To use it follow these steps:

- On the top panel, press Ruler icon and select "Ruler path";
- Set the points between which you want to measure the distance, by simply tapping on the map;
- You can cancel the last point by tapping back arrow on the bottom menu;
- To delete a point, select one with arrows on the bottom menu and then tap trash icon;
- "Path" and "Direct Path" data are displayed in the bottom right corner (Fig. 2.1.6);
- To exit Ruler mode tap Back button on your device



Fig. 2.1.6

#### Ruler area

Ruler area measures the surface and perimeter of the desired object on the map. To use it, follow these steps:

- On the top panel, press Ruler icon and select "Ruler area";
- Set the points by simply tapping on the map;
- Points can be moved by selecting the necessary one with bottom bar control and dragging the highlighted pointed on the screen;
- You can cancel the last point by tapping back arrow on the bottom menu;
- To delete a point, select one with arrows on the bottom menu and then tap trash icon;
- "Area" and "Perimeter" data are displayed in the upper left corner(*Fig. 2.1.7*);
- To exit Ruler mode tap the Back button on your device

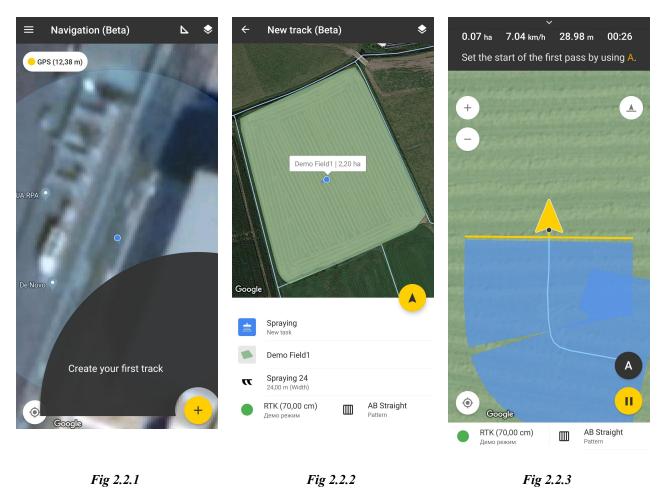


Fig. 2.1.7

## 2.2 Track parameters

Tap + to Create a Track (*Fig.2.2.1*). Before recording the track, you can configure parameters (*Fig.2.2.2*). To do this, fill in widgets of task, field, vehicles, and select patterns. After filling all the parameters, you can Start driving (*Fig.2.2.3*).





#### Select Task

Tap on **Task** in the track parameters widget (*Fig. 2.2.2*). Select a task from the list (*Fig. 2.2.4*), for fast searching, start to type the task name in the search bar.

You can create a new task. To do this, follow these steps:



• Choose the type of task (*Fig. 2.2.5*);

If you don't select a task on the list, it will be created automatically with the type Other.

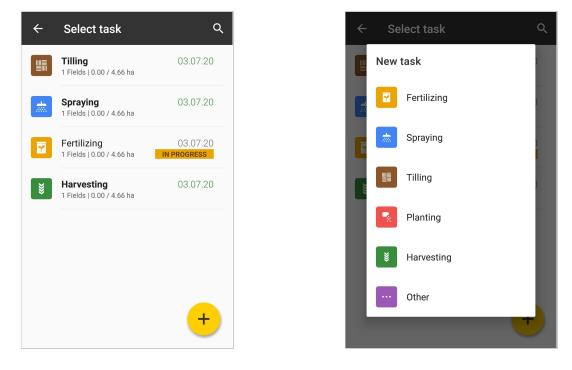


Fig. 2.2.4

Fig. 2.2.5

#### **Select Field**

Tap on the **Field** in the track parameters widget (*Fig. 2.2.2*). Select a field from the list, for a faster search, start typing the field name in the search bar.

Fields are ordered in the sequence of the closest distance from your location to the field. The distance to each field according to your current location is written near each field on the map (*Fig. 2.2.6*).

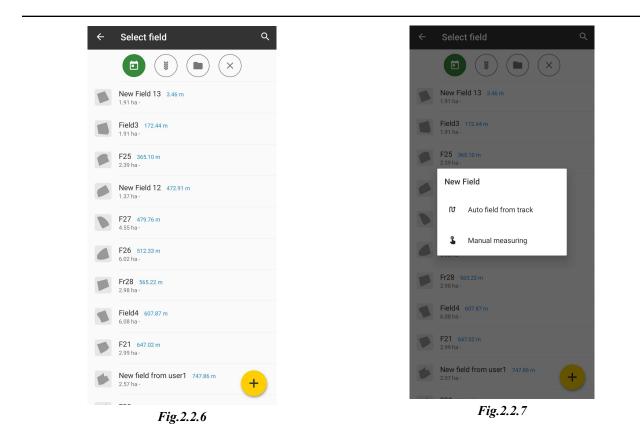
Also, you can create a new field (Fig. 2.2.7).

To do this, click to button. You can create new Field via: 1. Auto field from track

2. Manual measuring

For more information about creating a new field, go to Fields

If you are a new user, you would need to add fields for better user experience!



Tap the Select Vehicle in the track parameters widget. You can select a vehicle and an implement from the existing lists (*Fig.2.2.8*), for faster search, start typing the vehicle/implement name in the search bar. If the

machinery isn't on the list, you can add a new one manually by tapping  $\stackrel{\bullet}{\longrightarrow}$  button (*Fig.2.2.9*).

See Machinery in the Glossary section of Record Keeping.

÷	Machinery Q
Vehicles	
5	<b>Case</b> 3.00 m
5	Claas 3.00 m
Π.	Fendt
5	3.00 m
<b>~</b> ~	Hardi 3.00 m
5	John Deere 3.00 m
5	New Holland 3.00 m
E	Nitro/Miller
<b>6</b> •••	3.00 m
	+
	Fig.2.2.8

#### **Implement parameters**

Width of implement is a required parameter to record the track. It is used to calculate the covered area. By default, it is set 12 m.

**Distance to Implement** is set for displaying the distance between the implement and the tractor while track recording.

If You work with a non-symmetrical implement, just set the value for **Offset from the center** parameter. And then, You will be able to easily switch sides (right/left) during field operations. (*Fig. 2.2.10*)

Setting parameters of the implement can be done in the following ways:

- Choosing Machinery with necessary implement width, distance to the tractor and offset from the center;
- Using up and down arrows, you can set the parameters;
- Using the on-screen keyboard. To do this, you should place the cursor in the field of the implement parameter, and the on-screen keyboard will appear. Use the keypad to enter the value.



Fig. 2.2.10

## 3. Tractor guidance

## Overview

The machine operator in navigation mode gets the map of a field with the lines for navigation (*Fig.3.1*). He can see when the machine is off the line, which allows the processing of the field with minimal overlaps and misses. Satellite map and field map allow for simple orientation. Speed, distance, and processed area indicators allow for more accurate observation of the technological requirements of the operation.

FieldBee tractor navigation Android Application User Manual. V.7.7.0

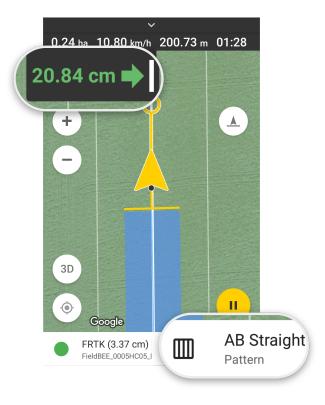


Fig.3.1

## Systems Safety

- Do not use guidance systems on the roads. Always Turn off the guidance system before entering the roadway.
- Do not attempt to enable (activate) the guidance system during transportation on the roadway.
- Guidance systems are designed to assist the operator in performing field operations more efficiently.
- The operator is always responsible for the path of the vehicle.
- Systems do not automatically detect or prevent collisions with obstacles or other vehicles.

## Functionality

Icon	Description
Used patterns	<b>Used patterns</b> All used patterns for the field with different implement width are available for the next Task. You can easily execute operations with different implements. Once you created guiding lines - they will be available for further works
AB Straight	AB straight AB straight is suitable for the regular shaped square or rectangular fields, without "non operational spots". In this case, our system will automatically draw parallel straight lines that you should follow on your field
AB Curve 1	<b>AB curve</b> AB curve is suitable for all field's shapes and particularly for fields with "non-operational spots". In this case, you will make the first run along a curved/non-straight line, after the first turn the application will create next lines parallel to the first run
AB Manual	<b>AB Manual</b> AB Manual is suitable for building straight guidelines on the field regardless of whether you are driving or standing. You can set A and B points manually at any place on the field you want. And then parallel straight lines will be automatically drawn

Headland Straight	<b>Headland straight / curve</b> Headland is suitable for spraying operations. In this case, you will make the first run along the borders of the field, set A and B points on one side, after driving around the field the application will calculate all lines for the field and will calculate the remaining area
Multiple Headland	<b>Multiple HeadLand</b> Multiple Headland pattern is suitable for operations with small implements like (planting, plowing, etc). When Multiple pattern is selected, the user can set up the number of headlands that he wants to process around the field and also select the Internal pattern. While navigating user can switch between Headland and Internal patterns
Saved Track	<b>Saved track</b> With the "Saved track" pattern you can always return to the same line in the field. It is suitable to work ina field with a difficult symmetry. It enables you to use a previously saved track as the line for tractor guidance

## 3.1 Start Navigation

To record the track for the task, follow these steps:

- Go to NAVIGATION
- Tap  $\stackrel{\bullet}{\smile}$  button to create a new task
- Fill in task parameters (see <u>Track parameters</u>);
- AB Straight is a pattern set by default. You can select other patterns which are described in section <u>Patterns;</u>
- Check out the accuracy of the GPS signal (*Fig. 3.1.1*);

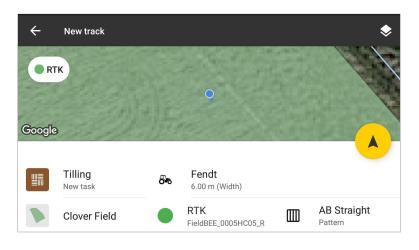


Fig. 3.1.1

To start Navigation, you will need to choose the GPS source:

- 1. Tap GPS source;
- 2. Tap "Connect device" (Fig. 3.1.2);
- 3. Choose your device (*Fig. 3.1.3*):
  - a. Built-in GPS

Built-in GPS - Android device internal GPS. Internal GPS accuracy is in the range 2-5m.

b. FieldBee L1 receiver

FieldBee L1 - high accuracy GNSS receiver that provides +/-2 cm RTK accuracy with correction and 30 cm - 1m without correction (DGPS mode)

c. FieldBee L2 receiver

FieldBee L2 - new higher accuracy GNSS receiver that provides +/-1 cm RTK accuracy with correction and 20 cm - 30 cm without correction. It has tilt compensation sensors that will keep your tractor on a line with high precision, even on hilly fields

d. Autosteer

Setting up and connecting to the Autosteer controller that helps you to follow the guiding line without driving manually. It helps to get 0-4 cm accuracy during your operations.

e. Other receivers, including Novatel

Novatel External GPS receiver provides positioning in DGPS correction mode (SBAS) with 20-50 cm accuracy.

You can connect to Other External NMEA receiver, which has a Bluetooth connection and is ready to transmit NMEA messages at 115200 baud rate.

4. Wait until the GPS device is connected, then your location will be determined by the device.

Also, you can change the GPS Source in the Settings menu (Settings).

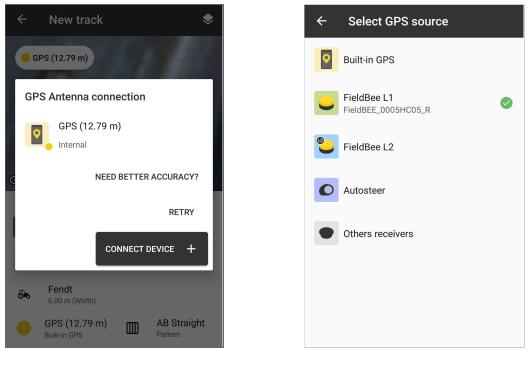


Fig.3.1.2

•





The bottom panel displays the GPS source, precision, and pattern. On the top panel you can see path, area, time, and speed. Also, you can use the controls:

Icon	Description
"	Pause Navigation
٢	Location center
+ -	Zoom in/Zoom out the Map
	Implement ON/OFF
A A	Switch Implement to the <b>left/right</b> if you have offset from center in implement parameters

	Switch Multiple HeadLand circles/inner pattern
AB	<b>A</b> point is for setting the start and <b>B</b> point is for setting the end of the first pass. Parallel guidelines will be built on the full field (if the field was added to Task) in accordance with implement width
→ ↓ 32 cm → ↓ ↓ ← 33 cm	<b>Deviation bar</b> shows deviation value from built pass
Return to pass	Return GPS position to the pass

On the paused Navigation you can use the following controls:

	Continue Navigation
	Save track
:	GPS Settings
	Shift routes
Î	Delete track

To build the guidelines all over the Field, tap • the route.

to set the beginning of the route, then set the end of

If you don't need parallel guidelines, you can record and save a track without setting the AB line.

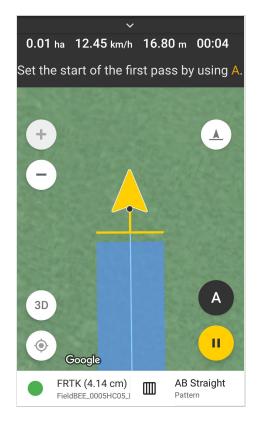
A



•

button (*Fig. 3.1.4*) to pause track recording

- Tap button (*Fig. 3.1.5*) to Continue track recording
- Tap button (*Fig. 3.1.5*) to Save the current track



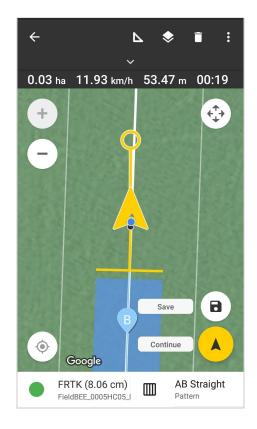


Fig 3.1.4

Fig 3.1.5

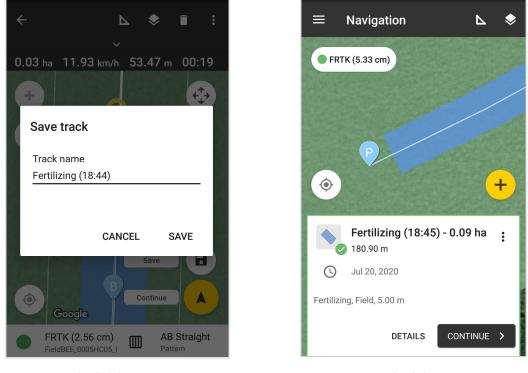


Fig. 3.1.6

Fig. 3.1.7

If you tap **SAVE**, you can specify a track with the name (first track or reference track etc.) (*Fig. 3.1.6*). After saving the created track as a card, you can see the covered area and last stop point on the map(Fig.3.1.7). So, it can help with the continuation of fieldwork next time.

Please press implement off, once you are out of the field in order app stops coloring the track. In the settings, this feature is selected by default "Turn implement off when out of field". You may unselect it, if required.

## 3.2 Continue Saved Track

- 1. From the Navigation screen:
  - a. Go to Navigation.
  - b. Swipe up Track Card. Recent track list is opened, scroll and find one, which you want to continue.
  - c. At the Track card tap "Continue" button to continue Navigation for the current track (Fig. 3.1.7).
- 2. From Record keeping section:
  - a. Go to Record keeping.
  - b. Go to Tasks.
  - c. Choose Task you are going to Continue progress:
    - i. If you wish to continue the existing track, just tap on it in the list of tracks.
    - ii. If you wish to create a new track for this Task, tap

button.

- Tap Tracks
- Choose the field you want to work at
- Tap START button to start Navigation

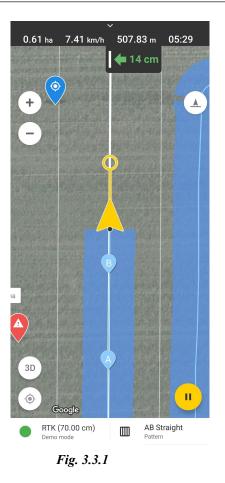
When you continue recording a track for the specific field, you see recorded tracks and the final point of the last track.

If you want to Continue track, which was saved with certain Implement parameters and guidelines according to the selected Pattern, tap **CONTINUE** - the same **Implement parameters**, **Pattern** and **guidelines** are inserted in Track settings automatically.

## 3.3. Return Position

Sometimes GPS signal shifts. In this case, it is necessary to adjust the position on your device. You can do this while you are driving.

If you see your GPS position shift, you'll tap on the deviation bar (*Fig. 3.3.1*). Return to pass button will appear (*Fig. 3.3.1*), tap it, and your GPS position will return on pass.



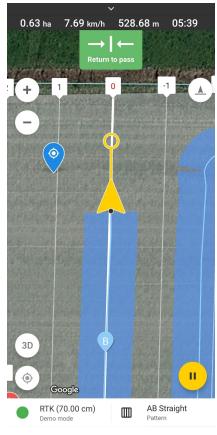


Fig. 3.3.2

## 3.5. Track settings

#### Sound and voice notification

You can turn off/on Sound and Voice notifications. For that, you need to Pause the track and tap icon on the top panel (*Fig.3.5.1*).



App sound. Beep sound appears, when your deviation from the current path is in the red zone to 3m.

App Voice sound. Voice sound says:

- Implement OFF at track recording;
- GPS type is switched at track recording.

**Field boundary alert (Bate).** Field Boundary Alert appears at 50m to field boundary, voice notification appears at 30m to field boundary.

#### **GPS** Settings

You can adjust GPS Settings in the Navigation. For that, you need to Pause the track and tap icon on the top panel (*Fig.3.5.1*).

Menu with GPS Settings will be opened (*Fig.3.5.3*):

- 1. <u>Navigation tolerance</u> an acceptable deviation from the guideline can be edited in two ways:
  - Manual entering with the keyboard
  - By tapping Up and Down arrows

You can set the value from 0.00 m to 1.00 m

- 2. You can select GPS frequency for regulating accuracy while navigating: 1Hz, 2Hz, 4Hz, 5Hz or 10Hz
- 3. Also, you can set a filter for GPS quality: GPS, DGPS, FRTK, and RTK

All changes are saved automatically on this dialog. After tapping the Back button, you return to the Navigation and can continue recording a track with the GPS settings you have configured.

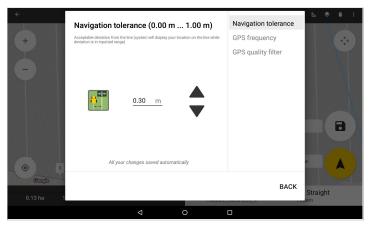


Fig.3.5.3

## 4. Patterns

3.

4.

Patterns help you to process fields more accurately. You can build them and synchronize them for the next use. To start, follow the next steps:

- 1. Go to Navigation
- 2. Tap button after the <u>Track parameters</u> have been filled up.

Then, tap Pattern icon AB Straight Pattern (*Fig. 4.1*).

- Select an appropriate Pattern for your work.
- 5. Tap on it (*Fig. 4.2*).
- AB STRAIGHT and AB CURVE
- AB MANUAL
- HEADLAND patterns
- MULTIPLE HEADLAND
- SAVED TRACK
- USED PATTERNS

÷	New track (Beta)						\$
	30300	15 34	10 32				and a
The second							
							1
	ALL SALE	11-25			199		
	Tilling New task						
	Field Demo						
π	<b>Impl1</b> 24.00 m (Width), 12.00 m	n (Offset)					
	RTK (70.00 cm) Demo mode			AB Straigh	t		
Fig. 4.1							
×	Select pattern						
× Patte							:=
							=
Patte	erns						B
Patte		AB Straight		AB Curve	6	AB Manual	
Patte	erns	AB Straight		AB Curve	6	AB Manual	B
Patte	erns	AB Straight		AB Curve	6	AB Manual	B
Patte	erns	AB Straight		AB Curve	6	AB Manual	B
Patte	erns	AB Straight		AB Curve	G	AB Manual	B



## 4.1 AB STRAIGHT and AB CURVE

Start driving (AB Straight or AB Curve pattern):

- 1. Set A-point at the beginning of the first pass (*Fig. 4.1.1*);
- 2. Set B-point at the end of the first pass (*Fig. 4.1.2*).

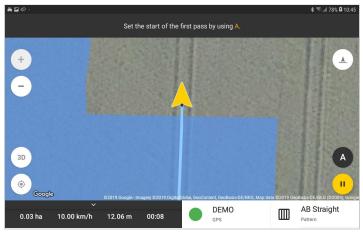


Fig. 4.1.1

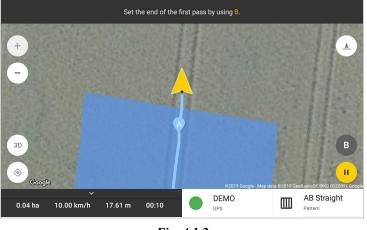
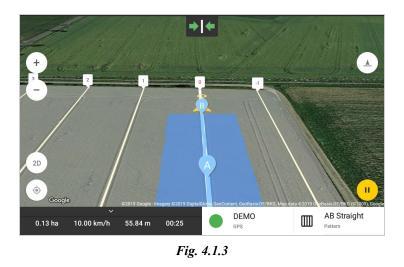


Fig. 4.1.2

The app will build an initial guideline between these points and display parallel guidelines for the whole field (if a field is added to the task). Additional routes will appear automatically with every new turn (if a field is not chosen).



Lightbaron the top shows a deviation from the optimal route. It also shows how far you deviate from the route (*Fig.* 4.1.3).



Fig.4.1.4

After the AB line was built, the route was marked as 0. On the left side, routes are marked 1,2,3,... At the right side, routes are marked -1,-2,-3,...

For numbering routes, you need to specify a field. (Fig. 4.1.4).

To delete current pass guides :

1.

AB Straight

- Tap <sup>Battern</sup> button.
- 2. Choose a pattern you want to use
- 3. Tap DELETE GUIDES (*Fig. 4.1.5*).

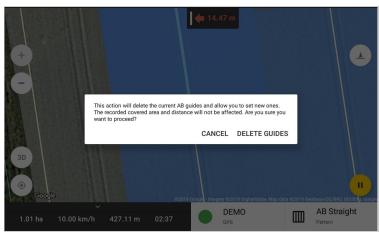
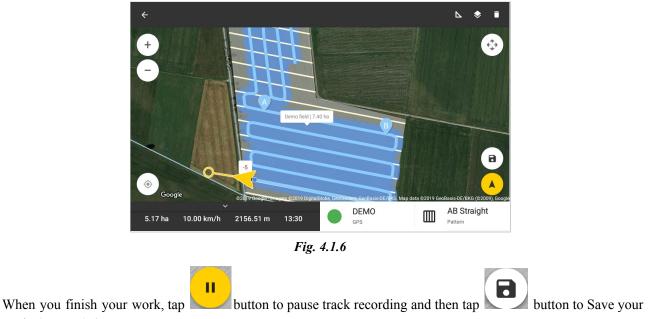


Fig. 4.1.5

Current routes are deleted and now you can create a new AB line.



track. (Fig. 4.1.6).

To use the AB Curve pattern - follow the steps for AB Straight pattern.

### 4.2 AB MANUAL

To set a straight AB line with an AB Manual pattern, driving is not necessary.

1. Zoom out or move the map to find the required place and tap on it to set the Start point of the first pass (*Fig. 4.2.1*);



Fig. 4.2.1

2. Tap on the map to set the End point of the first pass (*Fig. 4.2.2*)



Fig. 4.2.2

The guidelines will be built in the same way as for the AB Straight pattern: the initial guideline is built between these points, and parallel guidelines for the full field will be drawn (if a field is added to the task). Additional routes will appear automatically with every new turn (if a field is not chosen).

The light bar on the top shows a deviation from the optimal route. It also shows how far you deviate from the route. (*Fig. 4.2.3*)



Fig. 4.2.3

Also, if you selected AB Straight pattern and forgot to set A or B point to create the initial pass while driving, you can change the pattern to AB Manual and set the AB line at any place you want.

### **4.3 HEADLAND PATTERNS**

If you select the HEADLAND pattern (Headland Straight, Headland Curve), you can record one or more field circuits (*Fig. 4.3.1, Fig. 4.3.2*)

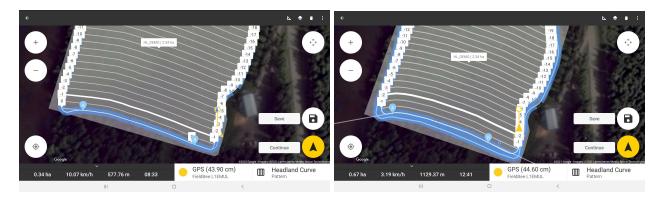


Fig. 4.3.1

Fig. 4.3.2

One Perimeter

1. At the beginning of a perimeter, tap the SET button (*Fig. 4.3.3*);



Fig. 4.3.3

2. Then set points A and B for the first pass (*Fig. 4.3.4*);



3. At the end of a boundary, tap the SET button to close it (*Fig. 4.3.5*), and the app will build AB parallel passes along the perimeter (*Fig. 4.3.6, Fig. 4.3.7*).



Fig. 4.3.5

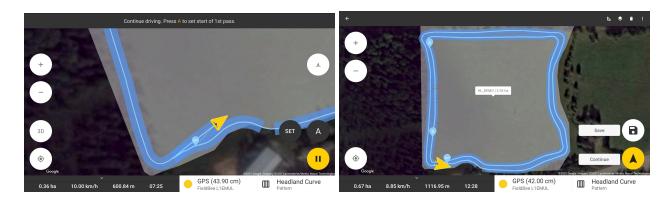


Fig. 4.3.6

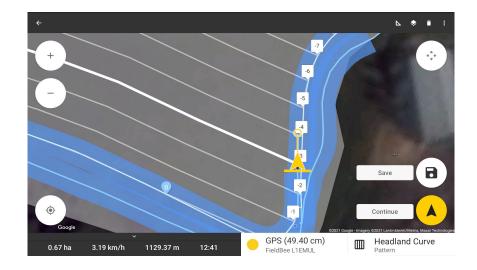
Fig. 4.3.7

Two or more circuits

- 1. At the beginning of a perimeter, tap the SET button (*Fig. 4.3.3*);
- Drive one circuit and continue driving the others (Fig. 4.3.8). 2.
- 3. While driving the last inner circuit, set A, B points on its side to fix the first pass (Fig. 4.3.9).



#### Fig. 4.3.8 Fig. 4.3.9



4. Continue recording track to SET point, then tap the SET button to close the perimeter(Fig. 4.3.10).

Fig. 4.3.10

### 4.4 MULTIPLE HEADLAND

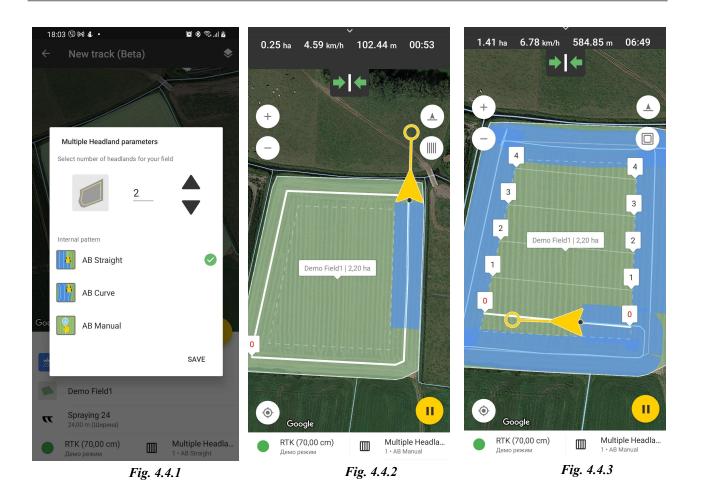
We have modified the HeadLand pattern, now the application draws guidance lines along the field border. You can use these circles for more precise agriculture. And also it became possible to reselect the inner pattern (AB Straight, AB Curve, AB Manual) and save recorded track circles.

To use the Multiple HeadLand pattern:

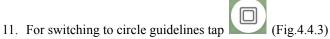
- 1. Tap Add track.
- 2. Select the field.

#### ! For Multiple HeadLand pattern, the field is required.

- 3. Tap Patterns and select Multiple HeadLand (Fig. 4.2)
- 4. Multiple Headland parameters dialog is opened (Fig. 4.4.1)
  - a. Set number of circles
  - b. Select inner pattern
  - c. Tap Save



- 5. Multiple Headland with params are set as the pattern.
- 6. Tap Start.
- 7. Multiple circles are built according to the field geometry, machinery width and offset (*Fig.4.4.2*);
- 8. Recorded circles;
- 9. Tap **1** to switch to inner pattern (AB Straight, AB Curve, AB Manual) (*Fig.4.4.2*)
- 10. Set A-point at the beginning of the first pass, then set B-point at the end of the pass. Parallel guidelines are built in the inner circle.



If you want to change inner pattern, when start record a track with Multiple HeadLand:

- 1. Tap to switch to inner pattern (AB Straight, AB Curve, AB Manual) (*Fig.4.4.2*)
- 2. Then tap Pattern name: Multiple HeadLand at bottom bar (Fig. 4.4.2)

3. Select pattern screen is opened (*Fig. 4.4.4*)

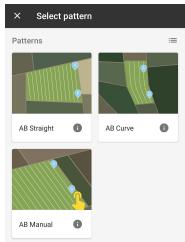


Fig. 4.4.4

- 4. Re-select pattern by tapping it;
- 5. Delete guidelines confirmation message is shown;
- 6. To delete current guidelines tap DELETE GUIDES
- 7. Then you can set A,B points again.

### 4.5 SAVED TRACK

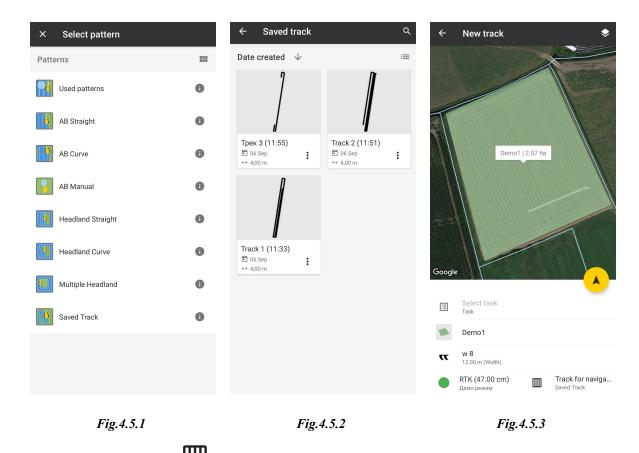
We saved your tracks, from the previous operations, for using them as a Pattern.

#### We saved all tracks related to the field.

If you **are a new user** without any tasks and tracks, when you tap the pattern SAVED track, you see the message: "There are no tracks for the pattern on the selected field".

So you need to:

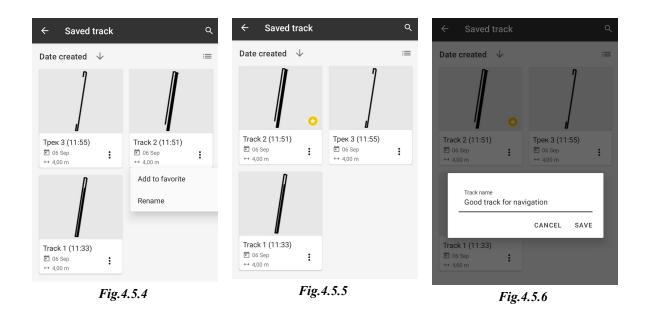
- 1. Start a track;
- 2. Select a field;
- 3. Record a track on the field, and save it. This track will be saved as a pattern for the following tasks on the field;
- 4. Then you create another task for the same field;
- 5. Start new track;
- 6. Tap Pattern section and select SAVED track (*Fig. 4.5.1*);
- 7. Pattern tracklist is opened for the field (*Fig.4.5.2*);
- 8. Select track, which you want to use as a pattern, tap it;
- 9. The track is shown on the field (*Fig.4.5.3*).



If you want to change a track, tap  $\bigoplus$  to open pattern list and then select another track from the Saved tracklist (*Fig.4.5.3*)

Also, you can rename the track and mark it as your favorite:

- 1. Add a track;
- 2. Select the field;
- 3. Tap Pattern section and select SAVED track (*Fig.4.5.1*);
- 4. Pattern tracklist is opened for the field (*Fig.4.5.2*);
- 5. Tap three point at track card or list item (*Fig.4.5.2*).



- 6. Track menu is opened (Fig.4.5.4): Tap Add to favorite/ Remove from favorite
  - Track marked/unmarked with star at list (*Fig.4.5.5*)
  - Track menu is opened (Fig. 4.5.4): Tap Rename
    - Open dialog: Rename track (Fig. 4.5.6)
    - $\circ$   $\,$  Enter a new name and tap Save
    - The new track name shows at SAVED track list and the track name is changed at the Task.

### 4.6 USED PATTERNS

7.

USED PATTERNS provide the list of the patterns earlier used on the field.

#### Used patterns are the saved 0 guideline and related to the field.

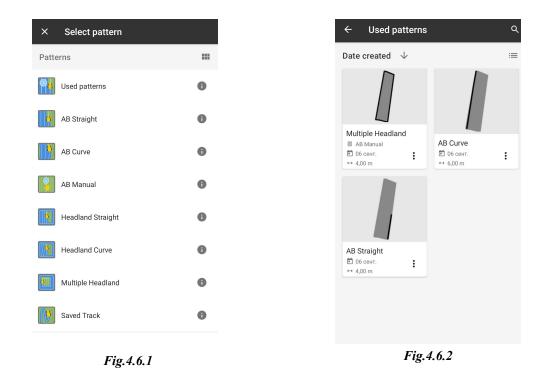
Used patterns will be available for different tasks with the field they belong to.

If there is no available USED PATTERN for the field - it means that you have not saved any track with the guiding lines for this field.

You need at least one saved track with an AB line to use it for the next Task.

- 1. Record a track with one of the Patterns(AB Straight, AB Curve, AB Manual, etc.) with guidelines and save it.
- 2. Each pattern for one field will be saved to the USED PATTERNS list automatically.
- 3. Start a new track on the same field.
- 4. Set Vehicle/Implement parameters: width, distance, offset
- 5. Tap the Pattern button
- 6. Choose Used patterns (*Fig.4.6.1*).

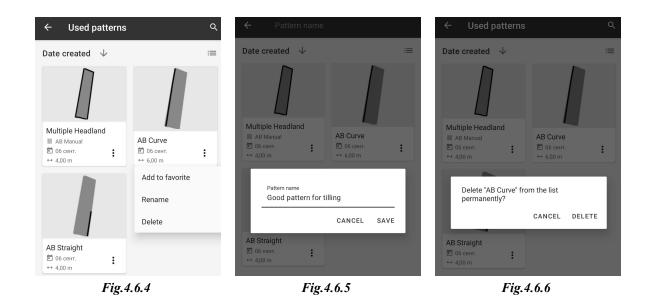
- 7. Select a pattern you want to use (*Fig.4.6.2*).
- 8. The field will be marked with guidelines from the selected pattern with settled width from track params (*Fig. 4.6.3*).
- 9. Your field is ready to start driving with the selected pattern.



If you want to change a Pattern, tap it to open the pattern list and then select another Pattern from the Recently used pattern list.

Also, you can rename the pattern and mark it as your favorite or delete it:

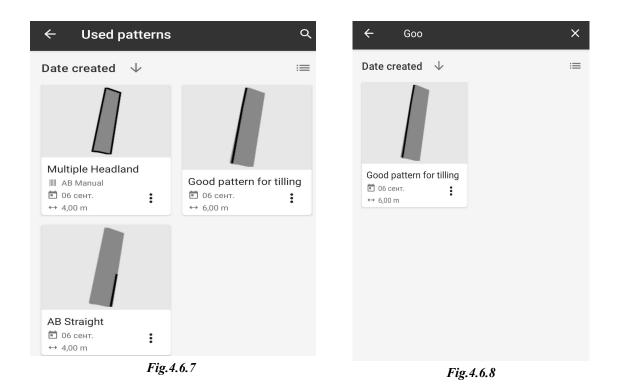
- 1. Add a track;
- 2. Select the field;
- 3. Tap Pattern section and select USED PATTERN (*Fig. 4.6.1*);
- 4. Patterns list is opened for the field (*Fig.4.6.2*);
- 5. Tap three points on a pattern card or list item (*Fig.4.6.2*).



- 6. Pattern menu is opened (Fig. 4.6.4): Tap Add to favorite/ Remove from favorite
  - Track marked/unmarked with star at list
- 7. Pattern menu is opened (Fig. 4.6.4): Tap Rename
  - Open dialog: Rename pattern (*Fig.4.6.5*)
  - Enter a new name and tap Save
  - The new track name shows at Pattern list
- 8. Pattern menu is opened (*Fig.4.6.4*): Tap Delete
  - Open dialog: Delete pattern
  - Tap Delete. The pattern is deleted from the app.

The Application collects all patterns for the field, sometimes you need to find some pattern:

- 1. Tap search icon at the top bar (*Fig. 4.6.7*)
- 2. Start to enter pattern name (Fig. 4.6.8) and pattern list is filtered by name.



### 4.7 Shift guidance lines

Using navigation patterns you can build the correct navigation line (base line) for the field, then use it for other operations by shifting the guidelines.

For shift lines, follow the next steps:

- 1. Go to Navigation and start to record track with AB lines;
- 2. Stop the vehicle and tap **PAUSE** button;

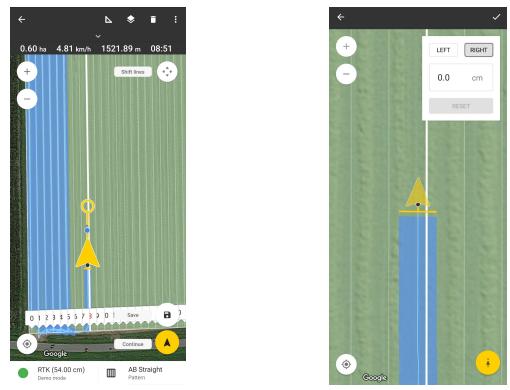
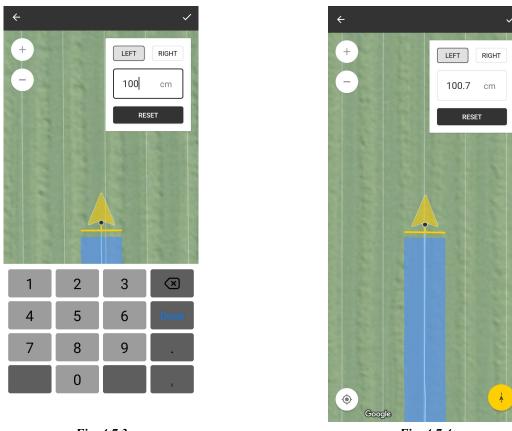


Fig. 4.7.1

Fig. 4.7.2

- 4. The shift can be done in two ways:
  - a. Select shift side and enter the value (Fig. 4.7.3);
  - b. Tap button Shift navigation lines to my position (Fig. 4.7.4)...







5. Tap

button to save guidelines shift if you are satisfied (Fig. 4.7.3, Fig. 4.7.4).

## 5. Autosteer

Autosteer helps you to follow the guiding line without driving manually. It helps to get 0-4 cm accuracy during your operations.

### Systems Safety

- Do not use guidance systems on the roads. Always turn Turn off the guidance system before entering the roadway.
- Do not attempt to enable (activate) the guidance system during transportation on the roadway.
- Guidance systems are designed to assist the operator in performing field operations more efficiently.
- The operator is always responsible for the path of the vehicle.
- Systems do not automatically detect or prevent collisions with obstacles or other vehicles.

### 5.1. Autosteer setup

To connect ECU to the FieldBee app, you need to follow the next step:

- 1. Turn on the ECU.
- 2. Wait until it becomes ready for connection.
- 3. Open FieldBee app.

4. Tap the Accuracy button on the Navigation screen to access the GPS Antenna connection dialogue (*Fig.5.1.1*).

- 5. This dialogue allows the operator to connect Autosteer and RTK GNSS receiver.
- 6. Tap the button CONNECT DEVICE + on the dialogue (Fig. 5.1.1).

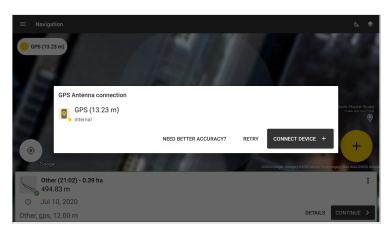


Fig.5.1.1

7. Select Autosteer from the list of devices (Fig.5.1.2).

← Select GPS source	
2 Built-in GPS	0
➡ FieldBee L1	
SieldBee L2	
O Autosteer	
Others receivers	

Fig. 5.1.2

#### 8. Autosteer connection type

Select your connection to the ECU type from the list (*Fig.5.1.3*).

Three types of connection to the ECU is available to choose:

- Select **WiFi** in case of direct connection to the ECU via WiFi network (WiFi should be enabled on your mobile device)
- Select **WiFi Router** in case if your ECU is connected with Ethernet cable to the WiFi router. (Mobile device should be connected to the router's WiFi network *\*rtkwifi by default*)
- Select **Ethernet** in case of direct connection to the ECU with Ethernet cable.

(Ethernet cable should be connected to your mobile device)

← Autosteer conne	ctions		
ECU	WiFi	_	Tablet
	<))))		
WiFi			
ECU	4G WiFi router	WiFi	Tablet
		<))))	<b>*</b>
Wi-Fi Router			
ECU			Tablet
			<u> </u>
	Ethernet		
Ethernet			

Fig.5.1.3

9. After selecting your connection type, wait until ECU-S1 (or on your WiFi router access point in case of WiFi Router connection) will appear in the list. (Fig.5.1.5)

← Autosteer	
Available devices	

Fig.5.1.5

Tap on the ECU-S1 (*or on your WiFi router access point in case of WiFi Router connection*) to select it. Safety information dialogue will be displayed. You have to read *Safety Information* before start navigation to avoid injuries and incorrect use of Autosteer (*Fig. 5.1.6*)

← Autosteer	
Safety Information	
Please take special note of the following warnings:	
1. There is NO obstacle avoidance system included with the manufacturer's product MORE	
2. The Auto steer system does NOT control the speed of the vehicle <u>MORE</u>	
3. The Auto steer system will take over control of the vehicle's steering system when the auto steer system is activated MORE	
4. Use of the Auto steer system is NOT permitted while the vehicle is on public roads or in public places MORE	
The autosteer system installer and manufacturer disclaim any responsibility for damage or physical harm caused by failure to adhere to the following safety requirements:	
• As the operator of the vehicle, you are responsible for its safe operation.	
The autosteer system is not designed to replace the vehicle's operator.	_
GOT I	т

Fig.5.1.6

After confirmation of *Safety Information* autosteer will be Enabled automatically, and the Navigation screen will be opened.

10. You can check your Autosteer status by tapping the Accuracy button on the Navigation screen again. You'll see actual Accuracy, number of Satellites, and Heading of Autosteer (*Fig.5.1.7*).

Also, you can disable Autosteer from this dialog.

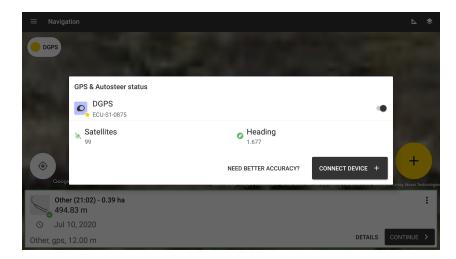
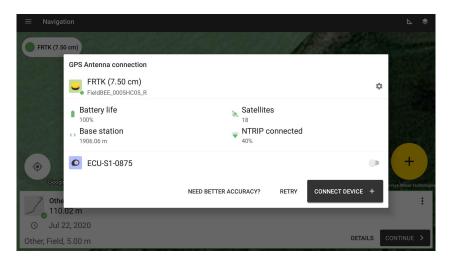


Fig.5.1.7

11. If you disabled Autosteer, you can easily enable it on the Status dialog by tapping the toggle Autosteer (Fig. 5.1.8)





12. By tapping on the ECU-S1, the screen with device details can be opened (*Fig.5.1.9*)

÷	Autosteer	
Enable	Autosteer	•
Enable	seat switch	
Autoste	eer WiFi IP address	
10.10	00.100.100	
	DOWNLOAD LAST 10 MINUTES LOG DATA	
	DOWNLOAD ALL LOG DATA	
	OPEN AUTOSTEER SETTINGS PAGE	

Fig.5.1.9

On the screen Device details (Fig.5.1.9) you can see the IP address for your connection type.

(10.1.1.1. for Ethernet and WiFi Router connection, 10.100.100.100 for WiFi direct connection) You can change it if necessary.

Also, on this screen, you can enable or disable the Seat switch and open the Autosteer settings web page.

### 5.2. Steering Enable / Disable

You can use the following controls on the Navigation screen while driving:

Icon	Description
	Autosteer Engage. It means that Autosteer is DISABLED now. Tap this button to ENABLE Autosteer. After tapping this button, Autosteer starts following the guiding line and drives forward automatically.
	Autosteer Disengage. It means that Autosteer is ENABLED now. Tap this button to DISABLE autosteer. After tapping this button, Autosteer stops following the guiding line, and the driver needs to take the driving wheel under his own control. *To disable Autosteer, it is enough to turn a driving wheel. After turning the driving wheel, driving must be executed manually.
	It means that Autosteer has Steering Interruption now.
*	<b>Steering Adjust.</b> The Steering Adjust enables the operator to adjust the vehicle steering performance to match these changing conditions. You can change the response of the selected item by using the slider bar.

- 1. Tap button on Navigation to Start a new Track or Tap to continue previous track from Recent Tracklist.
- 2. Fill in <u>Track parameters</u>.
- 3. Start driving.
- 4. Create AB line by tapping button A at the first pass start and B at the end for building the guidelines.
- 5. Tap to start steering (*Fig.5.2.1*).



Fig.5.2.1

6. To disable steering:





### 5.3. Autosteer adjust

After the vehicle has been calibrated, it should perform adequately for most normal field operations. However, in some situations, it may be necessary to adjust the steering performance to consider field conditions, implement selection, traveling speed, etc.

The Autosteer Adjust dialogue allows the operator to adjust the vehicle steering performance to match these changing conditions. You can change the response of the selected item by using the slider bar.

To access the Steer Adjust dialogue, tap the **Settings button** 

on the Navigation screen (*Fig.5.3.1*)

					8	· · · ·
Motor Aggress	siveness				Motor Aggressiveness	
Adjust how aggress	sively the MDU motor	turns the steering w	heel.		Steering Freeplay	
					Steering Response	_
Smooth 0	5	10	15	20 Aggressive	Heading Aggressiveness	
					Cross Track Error	
	All your	changes saved au	ıtomatically		Line Acquisition	
					Reverse Response	
						BACK
Google	and the				A second	gen (2028 Maxar Technologies
0.19 ha	∼ 10.00 km/h	156.37 m	00:57	DGPS ECU-S1-08	75 AB Str Pattern	aight

Fig.5.3.1

#### Autosteer Adjust Dialogue Parameters Description

Option	Description
Motor Aggressiveness (For MDU only)	Adjusts how aggressively the MDU motor turns the steering wheel (this option is available for vehicle profiles that use a Mechanical Drive Unit).
Steering Freeplay	Compensates for free play in the vehicle's steering. Accounting for free play is most important at high speed. Too much freeplay compensation leads to excessive steering wheel movement, especially at low speed.
Steering Response	Adjusts for oscillations of the vehicle when it is on the desired path.
Heading Aggressiveness	Adjusts how aggressively the vehicle reacts to changes in the vehicles heading.
Cross Track Error	Adjusts how aggressively the vehicle reacts to changes in cross-track error.
Line Acquisition	Applies to MDU-G4 only. Adjusts how aggressively the vehicle steers onto the desired steering path (A/B line). The goal is to adjust the ECU-S1 system to take the shortest route without excessively sharp or sudden movements of the vehicle.
Reverse Response	Adjusts steering aggressiveness when the vehicle is traveling in reverse.

### 5.4. Steering Interruption

- User Display Disengage Disengage steering manually from the Android application
- User Steering Wheel Disengage User turned the steering wheel
- GPS Position Dropout GPS Position no longer OK
- GPS Attitude Dropout GPS heading no longer OK
- No Move Timeout Held still for too long
- Too Far From Row More than 0.5 implement width from row
- Calibration Error Current Vehicle is not Calibrated
- Frozen Row Not Found More than 0.5 implement width from row

- Seat Switch Seat Switch required and Triggered
- User Turning Wheel -
- Bad GPS GPS not OK for Steering
- No Defining Row Data No valid path data received
- Wild Point Position Exceeded Too large jump in GPS Position
- Wild Point Heading Exceeded Too large jump in heading tight curve
- Invalid Token Token must match data sent
- Seat Switch triggered If Seat Switch is required, and no operator present

# 6. Record keeping

### Overview

Record keeping allows you to create field records and automatically generate reports. Field records. You will be able to input the following data manually while working in the field:

- type of operation
- denomination and quantity of materials used (fertilizers, pesticides, seeds, etc.)

Automatic tracking. The following information can be added automatically to the field report from the GPS tracking:

- type of operation
- area and distance covered
- machine used

Reports. As a result, you will be able to view your field report and export it to PDF for your records (Fig. 6.1).

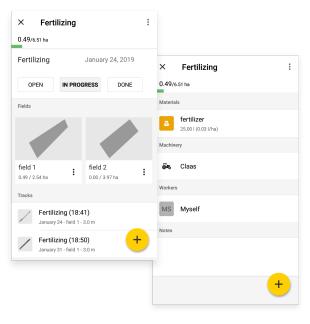


Fig.6.1

### 6.1 Tasks

### Tasks view

Go to the menu item Tasks. To work with your Tasks, you can use two types of preview:

- List View (*Fig. 6.1.1*). To change the view, tap **I** on the top bar.
- Map View (*Fig 6.1.2*). To change the view, tap on the top bar.

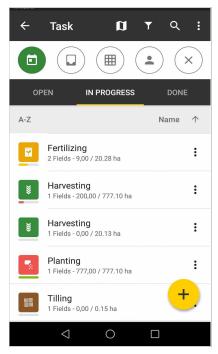


Fig. 6.1.1

In the List View you can:

- sort Task by progress;
- create a new Task;

- search required Task in the list;
- sort Task by name, type or create date;
- filter task view;
- view and edit Task information;
- track Task performance
- delete Task.



Fig 6.1.2

In the Map View you can:

- view actual Task map;
- choose map mode (normal, hybrid, satellite);
- search your location on the map;
- create a new Task;
- filter task view;
- view Task information.

Create a new Task

To add a new Task tap the Add button (*Fig 6.1.3*).

in the bottom right corner and select one of the offered Task types

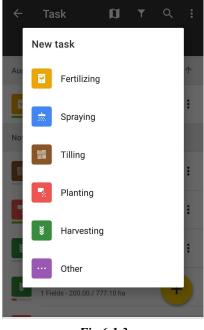


Fig 6.1.3

Then select fields which you want to add to a Task (Fig.6.1.4). To sort Fields by Name, Distance to, Size, Crop or

Group tap on You can also create a new field by tapping	+	. For more details on how to create a field,
check Create a new Field section		

÷	Fields:2 (Area:508,	•	:
Area		Size	$\checkmark$
	<b>Field_1</b> 370,00 ha - Barley		
	<b>Field_2</b> 138,74 ha - No crop		
	Field_3 30,81 ha - Cotton		
	Field_4 28,17 ha - Bean		
	Field_5 15,00 ha - No crop		
	Field_6	4	

Fig.6.1.4

To save selected fields tap

Then the Task details screen is opened (Fig.6.1.5).

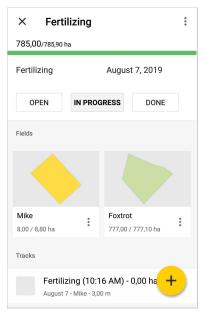


Fig.6.1.5

You can add and edit Task information:

- Name. The task name is created automatically. You can specify the task name manually.
- Status. The task is created automatically with status OPEN. You can select any other status: IN PROGRESS, DONE.
- Date. You can change the date by tapping on it.
- Fields. You can see which Fields you selected for the Task. You can delete a field or edit progress of field by tapping on the field card, if it is necessary for your fieldwork process.
- Notes. Add some notes to the task.

Tap to add more information to the Task (*Fig.6.1.6*)

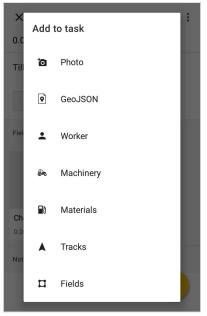
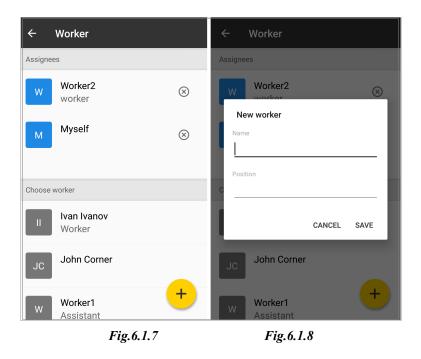


Fig.6.1.6

- Photo. A photo can be added in two ways:
   from the photo, using the camera
   attached file
- **GeoJSON.** You can add a GeoJSON file from your device. It includes points, locations, streets, boundaries, polygons, tracts of land, and multi-part collections of these types. To do that, please select the GeoJSON file from the device's folder, and it will be automatically added to the task on the map.
- Worker. You can select a worker from the list. Choose a worker, and he will be added to the list of Assignees (*Fig.6.1.7*).

To create a new worker tap  $\checkmark$ . Enter his name, position and tap Save (*Fig.6.1.8*). You can also create workers in the Glossary section.



Machinery. Select vehicles, implements and then tap (*Fig.6.1.9*).
 To search the required vehicle or implement in the list, tap .

To create a new one tap 🙂. Choose between vehicle and implement, input machinery model,

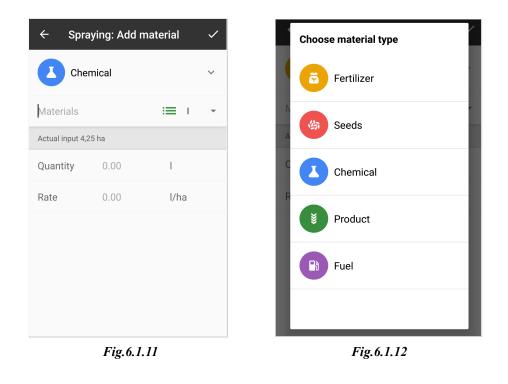
complete the rest of the form, and tap Save (*Fig.6.1.10*). You can also create machinery in the Glossary section - <u>Machinery</u>.

÷	Machinery	۹ 🖬
Vehicles		
0	Nitro/Miller 2,50 m	
0	New Holland 3,00 m	
<b>~</b> ~	New machinery 3,50 m	
6	<b>Hardi</b> 3,00 m	
6	<b>Fendt</b> 3,00 m	
<b>.</b>	Claas	+
	Fig.6.1.9	

• **Materials.** Here, you can add Materials (*Fig.6.1.11*). Tap Materials type and choose the required type you want to add (*Fig.6.1.12*). Then enter the name of Materials manually. You can select Materials from the

auto-suggest list if you created them in Glossary before. Complete the form and tap





• **Tracks.** The screen of Track recording for this Task opens. Tap to start recording. For more details about how to record a Track, see the section <u>Tractor guidance</u>.

• Fields. Select fields that you want to add to a Task (*Fig.6.1.4*) and tap

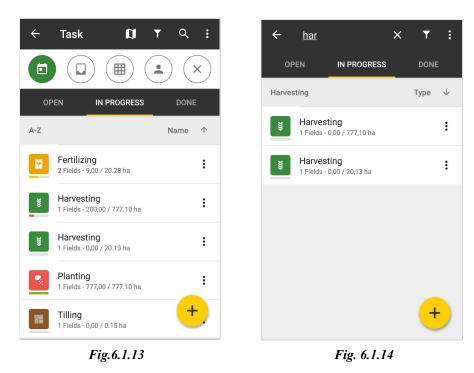
# ALL THE DATA ADDED OR EDITED ON TASK DETAILS SCREEN (*Fig.6.1.5*) IS SAVED AUTOMATICALLY.

After you tap

You can also delete the Task. Tap on the top bar, tap "Delete" and "Ok" on the warning message.

### Search required task

To search for a required task, tap the icon on the top panel and enter the task name. (*Fig. 6.1.13, 6.1.14*)



Each task is displayed with its performance stage of progress.

- Red color shows performance 0-33%
- Yellow color shows performance 34-66%
- Green color shows performance 67-100%

The performance stage of the progress is automatically colored according to the covered field area by tracks. But,

you can also edit it manually in case of any mistake. To do that, please choose a task, tap on the field card, select Edit progress and input required number of the covered area (*Fig 6.1.15*).

FieldBee tractor navigation Android Application User Manual. V.7.7.0

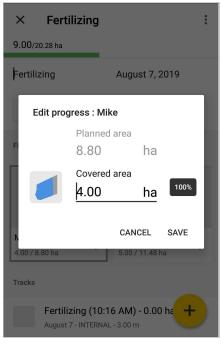


Fig 6.1.15

### Tasks filter

Also, you can filter Tasks by period, Task type, Field, a coworker.

To select filter tap

on the top bar.

Filter panel will appear instantly (Fig. 6.1.16, Fig. 6.1.17).

Elements	Functional abilities
	Filter Tasks by creation date.
	Filter by the selected Task type.
	Execute a search by the selected field.



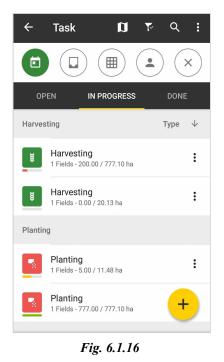




Fig.6.1.17

In the Field section, you will see only filtered fields if you had used a filter before. You can specify multiple filter parameters at once.

To filter your Tasks by **creation date**, tap *6.1.18*).

, put limits of range, and tap on the "Apply" button (Fig.

After choosing the Start and End date, Tasks will be filtered by a selected range

• at the list (*Fig. 6.1.16*);

• on the map (*Fig. 6.1.17*).

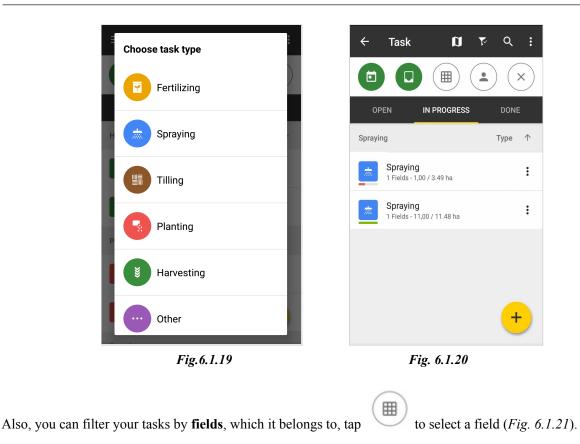
You can filter Tasks by periods: "Last week", "Last month", "Last year". Tap on the period you want, and the filter will be done instantly.

÷	Task	Ø	T	Q	:
					$\langle \rangle$
		AST MONTH		T YEAR	
Start	date	End	date		
	11/12/18		11/12	2/19	_
		F	Reset	Apply	/
Novem	ber 2019				
	<b>Tilling</b> 1 Fields - 0.00	/ 0.15 ha			:
	Planting 1 Fields - 777.0	00 / 777.10 ha			:
¥	Harvesting 1 Fields - 0.00			+	

Fig. 6.1.18

To filter your Tasks by **Task type**, tap (Fig. 6.1.18). Then select task type (*Fig. 6.1.19*). Tasks will be

Filtered by Task type at the list and at the task map (Fig. 6.1.20)



If you have used a field filter, it will be displayed on the panel, and tasks will be filtered by field (Fig. 6.1.22).

choose field	٩
(157.99 ha)	~ )
Field_2 138.74 ha   Add info	- 1
Field_5	- 1
15.00 ha   Info Field_6 4.25 ha	
Barley (370.00 ha)	~
Field_1 370.00 ha	
Bean (28.17 ha)	~
Field_4	
Fig. 6.1.21	

To filter your Tasks by a **coworker**, tap . Then select a coworker (*Fig. 6.1.23*). Tasks will be filtered

at the list and at the task map (Fig. 6.1.24).

÷	Task	ŋ	Ŧ	Q			÷	Task	ſ	<b>1</b>	~7	Q	:
Cł	noose cowork	er		Q							•		$\overline{\mathbf{x}}$
	AC Andrew	Cravec					OP	'EN	IN PROGRI	ESS		DONE	
A	Greg To	mpson					Sprayir	ng				Гуре	$\uparrow$
	GT GT				I			Spraying 1 Fields - 1,	<b> </b> 00 / 3,49 ha				:
N	J John Farmer						Tilling						
Į,	M Myself				l			<b>Tilling</b> 1 Fields - 0,	00 / 0,15 ha				:
	Natalia	Duchah			I		Plantin	g					
	ND Natalie		епко	_			-	Planting 1 Fields - 7	77,00 / 777,10	ha		+	
							Harves	ting				-	
	Fig.6.	1.23							Fig.6.	1.24	1		

To **reset** the filter, tap the icon and tap in the warning message **OK**. To close the filter panel, tap on the top bar.

### Sort and delete Tasks

You can sort Tasks in the list by name, type or creation date.

Tap on the top bar and tap the option "Sort by" (Fig. 6.1.25). Select an option you want to use on the pop-up menu (Fig. 6.1.26). Only one option can be selected.

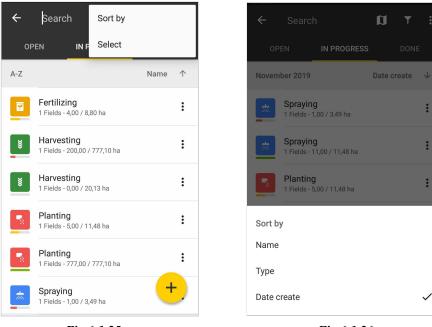


Fig.6.1.25



Tasks will be sorted in the list (Fig. 6.1.27)

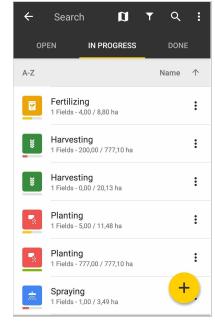


Fig.6.1.27

Also, you can delete Tasks from the list.

Tap on the top bar and tap the option "Select" (*Fig.6.1.28*)

Select Tasks you want to delete. Several tasks can be selected at the same time.

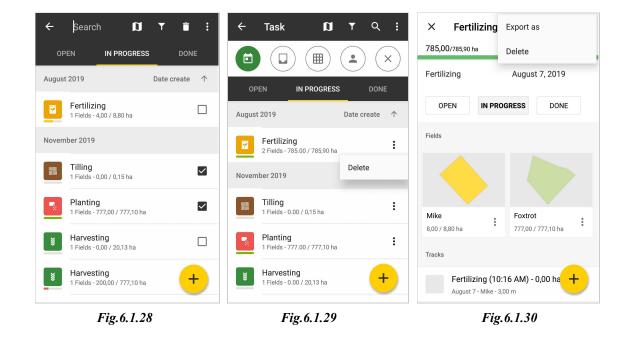
Tap **I** on the top bar and "Ok" on the warning message.

A task can be also deleted from the list viewwhen you press on (*Fig.6.1.29*). Confirm your decision on the warning message.

near each task and tap "Delete"

•

The third option to delete a task by going to a particular task and pressing on the top bar (*Fig.6.1.30*). Choose "Delete" and confirm your decision on the warning message.



### View and edit Task

To view and edit Task information, select the required Task from the list and make the necessary changes (*Fig.6.1.31*).

785,00/785,90 ha Fertilizing August 7, 2019						
Fertilizing August 7, 2019						
OPEN IN PROGRESS DONE						
Fields						
Mike         Foxtrot           8,00 / 8,80 ha         777,00 / 777,10 ha						
Tracks						
Fertilizing (10:16 AM) - 0,00 ha						

Fig.6.1.31

For more details, how to add and edit Task information, see the Section Create new Task.

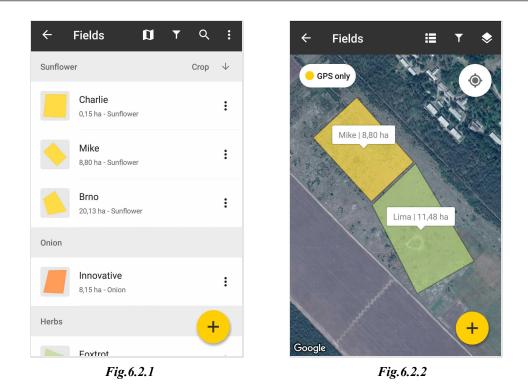
```
Also, you can export the Task report to your device. Tap on the top bar (Fig.6.1.31), tap "Export as" and select the document format you want to get - PDF (Adobe reader) or XLS (Microsoft Excel).
```

To delete the Task, tap on the top bar, tap "Delete" and "Ok" on the warning message.

# 6.2 Fields

Here you can create, edit, filter, and manage your farm fields.





List View

In the list, you can **sort** your fields by:

- Name
- Distance to
- Size
- Crop
- Group

For this, tap on top bar, tap "Sort by" in the additional menu, and choose one option (*Fig.6.2.3*)

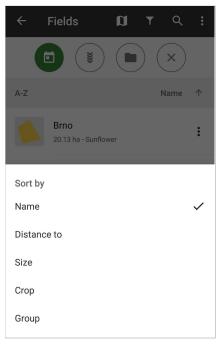


Fig. 6.2.3

: You can **delete** Fields from the list. For this, tap on the top bar and choose "Select" in the additional menu.

Select Fields you want to delete. Several fields can be selected at the same time.

on the top bar and "Ok" on the warning message. Тар



and start entering its name (*Fig.6.2.4*). If you want to search for some field, tap

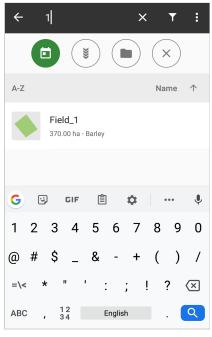


Fig.6.2.4

To move to the <u>Field Card</u>, tap the field name.

Also, you can **filter** your fields by

- crop season;
- crop;
- group.

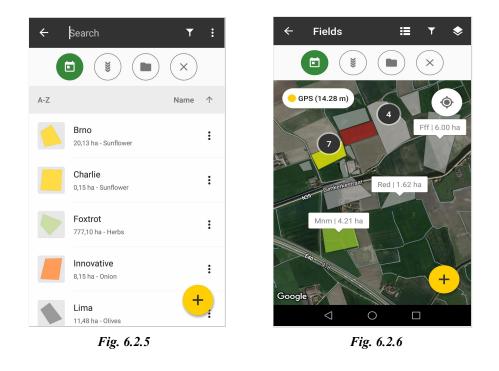


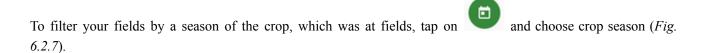
Filter panel will appear instantly (Fig. 6.2.5, Fig. 6.2.6).

The selected season on the filter panel shows all fields by default. On the map, fields are displayed with the crops for the current season.

Fields without crops for any season will not be shown for these seasons.

# WARNING!!! FILTERED LIST OF THE FIELDS WILL BE DISPLAYED AT OTHER PARTS OF APP (TASKS, NOTES LIST AND MAP)



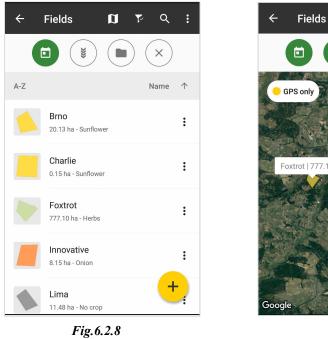


After choosing season, fields will be filtered by selected season

- at the list (*Fig. 6.2.8*);
- on the map (*Fig. 6.2.9*).

Select crop season	٩
2013	
2014	
2015	
2016	
2017	
2018	

Fig. 6.2.7



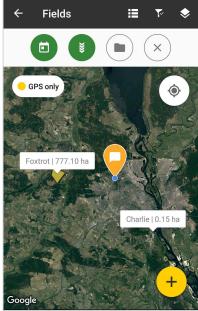


Fig. 6.2.9

To filter your fields by crop, crop season should be selected.

Tap on and choose a crop from the list. (*Fig. 6.2.10*)

After choosing crop fields will be filtered by selected crop:

- at the list (Fig. 6.2.11); •
- on the map (Fig. 6.2.12). •



Fig. 6.2.10

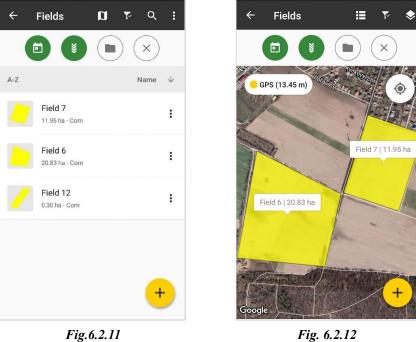


Fig. 6.2.12

To filter your fields by group tap on

and choose a group from the list.(*Fig. 6.2.13*)

After choosing a group, fields will be filtered by the selected group:

- at the list (*Fig. 6.2.14*);
- on the map (*Fig. 6.2.15*).

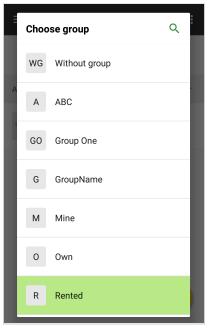
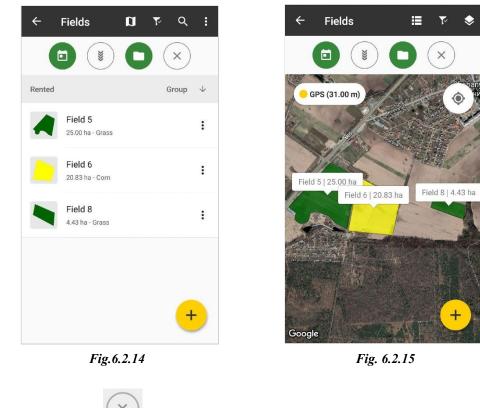


Fig.6.2.13



To **reset** the filter, tap the icon and tap in the warning message **OK**. To close the filter panel, tap on the top bar.

# Map View



Tap it, searching your location on the map



Change Map layers



Return to the list of fields

To move to the Field Card, tap the Field marker (with field name and area).

### Create a new Field

To add a new field, go to Record Keeping/Fields.

Tap + in the bottom right corner and select one of the offered variants (*Fig.6.2.16*):

- Import
- GPS measured
- Manual measuring

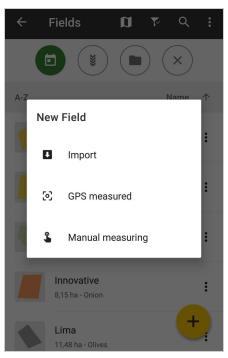


Fig.6.2.16

#### Import your fields

You can import your fields from SHP files. In Field import dialogue, select SEND LINK (Fig.6.2.17).

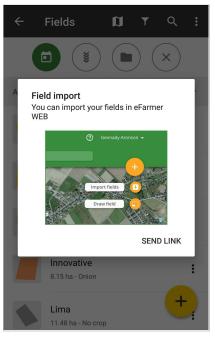


Fig.6.2.17

You can send a link to a web version in any way you like (email, messaging, Skype, and others) or open a Web version link via a browser on your device.

How to import your fields from SHP files you can find in section 4.2 Import fields in eFarmer Web version.

#### Add field using GPS

You can draw a new field with GPS. Go to the area which you want to measure and save in eFarmer. Then set GPS location in the vehicle.

After tapping **GPS**, a measured map is opened. Driving mode:



and start driving around the area (Fig. 6.2.18).

н . For saving the field tap Drive the perimeter of an area, then tap

8

Complete the form and tap SAVE (Fig. 6.2.19).

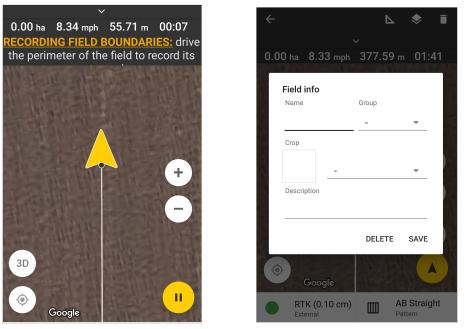


Fig.6.2.18

Fig.6.2.19

#### Manual measuring

You can draw a new field by hand on the map. If your account contains fields, the map focuses on them (Fig. 6.2.20)

To add a new field, follow these steps:

1. Find the field on the map and put points on the field boundary (light touch) (Fig.6.2.21).

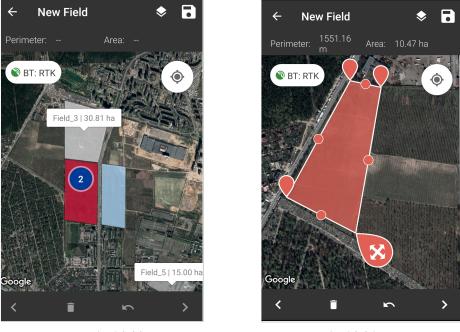
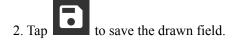


Fig.6.2.20

Fig 6.2.21

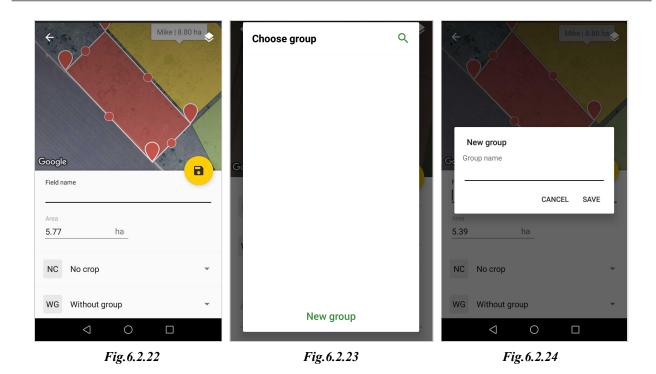
While drawing the boundary of the field, you can move and delete the wrong points.

- To move a point. Select a point, press and hold it. Then drag it to another place.
- To delete a point. Use the arrows to select the point, click on the basket icon.



3. Fill in the Field info: enter Name, choose Crop, choose Group, enter Additional info (Fig.6.2.22).

Also, you can create a New Group - tap New group and enter Group name (Fig. 6.2.23, Fig. 6.2.24).



4. If necessary, you can correct the field area.

We recommend changing the area not more than 10%.



### Field card

To view field details, select a field from the list and tap it or in a map view tap on the field name. The Field card opens. On the Field card, you can see the history of the field: tasks and crop order (*Fig.6.2.25*)

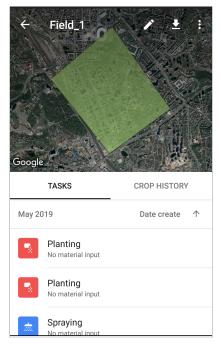


Fig.6.2.25

#### **Field Tasks Tab**

You can view all of the tasks by the field and sort them by creation date or type (*Fig.6.2.25*). To see more details about a task, tap the task's name.

#### **Field Report**

If necessary, you can also generate a report by field tasks.

For this, tap and the top bar. Choose the format you want to get - PDF (Adobe reader) or XLS (Microsoft Excel).

The report can be saved on your device and sent to email by your choice.

#### **Crop History Tab**

Swipe left Field Tasks Tab to move Crop History Tab *(Fig.6.2.26)*. You can add a crop in the field history:

- Tap "+ Add crop history";
- Select season and crop from drop-down lists;
- Tap Save (*Fig.6.2.27*)

÷	Field_1			¢	Field_1		•	
						- M		
a the s					Add crop history			
	ATTE 1			S	eason			
		STAND UN		2	2019			- 1
Google			c	Ge				
	TASKS	CROP HISTORY		С	rop			
		CROP HISTORY		E	Bean		•	- 🔳
В	Barley 2019			Ľ				
						CANCEL	SAVE	
BU	Buckwheat 2019			BU	2019			d
+ /	Add crop history			+	Add crop history			

Fig. 6.2.26

Fig. 6.2.27

For editing crop history, tap crop name and edit, after that tap Save (*Fig.6.2.27*). You can add several crops during the season.

# Edit or delete a field

To edit or delete a field, you can use the Field Card.

### Edit field info

Follow these steps to edit field info:

- 1. At Field Card, tap the icon (*Fig.6.2.28*)
- Enter changes (name, crop, group, and additional info) (*Fig.6.2.29*).
   Also, you can correct the area of the field manually. *We recommend changing the area not more than 10%*.



Field_1		← Field_6 Google	
TASKS	CROP HISTORY	Field name	
May 2019	Date create 个	Field_6	
Planting No material input		Area 4.25 ha	
Planting No material input		B Bean	•
Spraying		R Rented	~
 Fig.6	.2.28	Fig.6.2.2	29

#### Edit field geometry manually

Follow these steps to edit field geometry with manual measuring:

- 1. At Field Card, tap the icon (*Fig.6.2.28*);
- 2. On the top bar at field info (*Fig.6.2.29*) tap and select "Manual measuring";
- 3. Edit geometry (Fig. 6.2.30). Select a point, press, and hold it. Then drag it to another place;



Fig.6.2.30

- 4. When you finished editing, tap **b** on the top bar;
- 5. Then tap to save all changes.

#### Edit field geometry with GPS measuring

Follow these steps to edit field geometry with GPS measuring:

- 1. At Field Card, tap the icon (*Fig.6.2.28*);
- 2. On the top bar at field info (*Fig.6.2.29*), tap and select "GPS measuring";
- 3. Tap and start driving around the area (*Fig.6.2.31*)
- 4. Drive the perimeter of the area, then tap. For saving the field tap
- 5. Complete the form and tap SAVE (*Fig.6.2.32*).

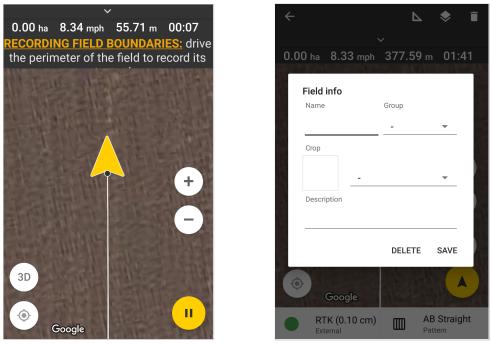


Fig.6.2.31

Fig.6.2.32

### **Delete field**

In edit mode, you can delete the field (*Fig.6.2.29*). To delete the field, tap the Additional menu on the top bar and "Delete". Tap "Ok" on the warning message.

You can delete Fields in the list view as well. For this, tap on the top bar and choose "Select" in the additional menu.

Select Fields you want to delete. Several fields can be selected at the same time.

Tap **I** on the top bar and "Ok" on the warning message.

# 6.3 Notes

In the menu Notes, you can see your POIs and POIs information. Go to the menu item **Notes**. To work with your POI, you can use two types of preview:



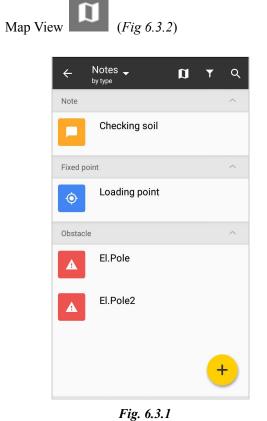




Fig. 6.3.2

In the List View you can:

- create new Note ;
- search required Note in the list;
- sort Note by group or by type;
- view and edit Note information;
- delete Note.

In the Map View you can:

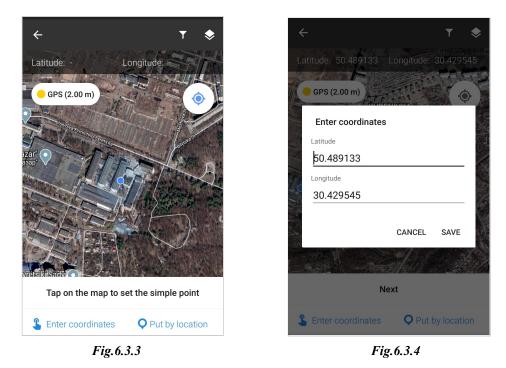
- create a new Note;
- search my location on the map;
- select Map layers;
- view and edit Note information;
- delete Note.

Create new Note

To add a new Note, click the Add button in the bottom right corner and select one of the offered variants: Note, Fixed point, Obstacle. Then the map will be opened (*Fig.6.3.3*).

You can add a Note in three ways:

- 1. Tap on the map to set the simple point
- 2. Enter coordinates. After selecting this option, the dialog for entering Latitude and Longitude is opened (*Fig.6.3.4*). After filling in the coordinates, tap Save, and the Note will appear on the required place on the map.
- 3. Put by location. After tapping this button, the Note will be created right on your current location.



After the Note was set on the Map, tap the **Next** button on the top panel (*Fig.6.3.5*). On the opened Note card, you can add (*Fig.6.3.6*):

- Name for the Note
- Group
- Radius
- Field
- Description
- Attachment: take a photo or attach an image

÷	▼ \$	<del>~</del>			r
Latitude: 50.484928 Lo	ongitude: 30.428556				
GPS (2.00 m)					
	Promdyzayn Промдизайн	Googl	e	11   0 2026 Geo	~
		Nam	ne		
		Group	Without grou	р	•
		Date:	14.08.20	Radius: 0.00 m	
		Field:	No field chose	en	•
Nex	t	Descrip	ption		
Enter coordinates	<b>Q</b> Put by location	Attach	nment		
Fig.6.3.	5		Fi	g.6.3.6	

Tap button to save all information about the created Note. It will be added to your Notes list.

### Search required Note

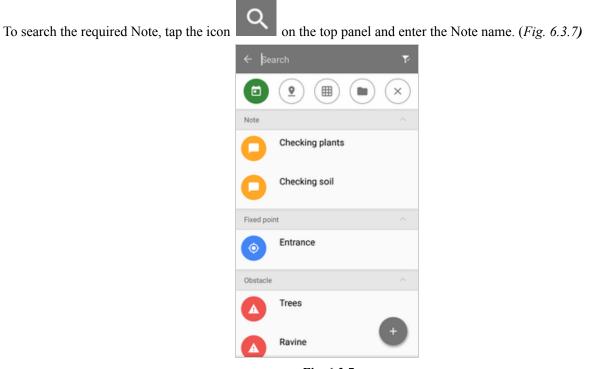
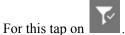


Fig. 6.3.7

# Filter Notes

You can filter a Note by:

- date;
- type of Note;
- field;
- group.



Filter panel will appear instantly (Fig. 6.3.8, Fig. 6.3.9).

Icon	Description
	Execute a search by the selected field.
	Filter Notes by creation date.
	Filter by the selected group.
<b>9</b>	Filter by the selected Notes type.

In the field section, you will see only filtered fields if you had used a filter before. You can specify multiple filter parameters at once.



To filter your Notes by creation date6 tap on 6.3.10).

, put limits of the range, and tap on the "Apply" button (Fig.

≡ Notes - 🖬 रू ९
LAST WEEK LAST MONTH LAST Start date End date
1/1/17 2/7/17
Reset Apply
Fixed point ^
Entrance
Obstacle ^
Trees
Ravine +

Fig.6.3.10

After choosing dates, Notes will be filtered by selected range:

- at the list (*Fig. 6.3.8*);
- on the map (*Fig. 6.3.9*).

You can filter Notes by periods: "Last week", "Last month", "Last year". Tap on the period you want and the filter will be done instantly.

To filter your Notes by Notes type, tap on (*Fig. 6.3.11*)

After choosing Notes type, it will be filtered by a selected range

- at the list (*Fig. 6.3.12*);
- on the map (*Fig. 6.3.13*).

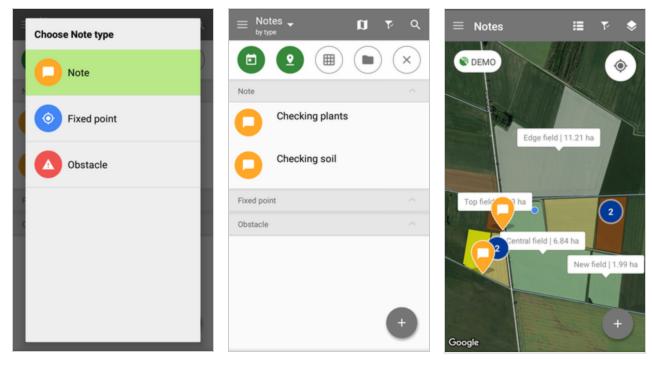
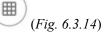


Fig. 6.3.11

Fig. 6.3.12

Fig. 6.3.13

To filter your Notes by fields, which it belongs to, tap on  $\checkmark$ 



After choosing field, Notes will be filtered:

- at the list (*Fig. 6.3.15*);
- on the map (*Fig. 6.3.16*).
- If you have used a field filter, it will be displayed on this panel.

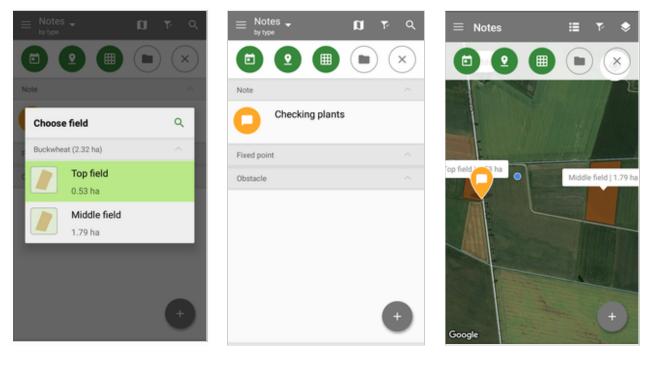


Fig. 6.3.14

Fig. 6.3.15

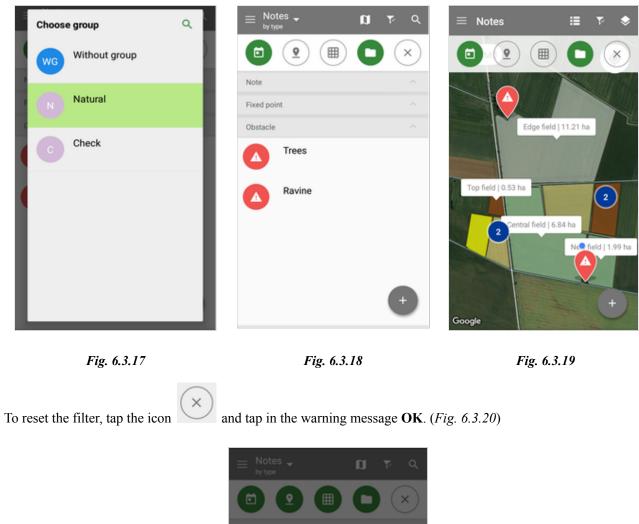
(Fig. 6.3.17)

Fig. 6.3.16

To filter your Notes by the group, which it belongs to, tap on

After choosing a group, Notes will be filtered:

- at the list (*Fig. 6.3.18*);
- on the map (*Fig. 6.3.19*).



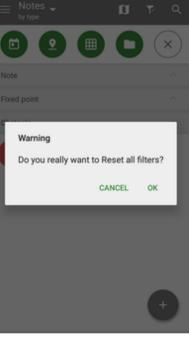


Fig. 6.3.20

### Sorting Note

You can sort Note by group or by type. For this, please select the needed parameter from the drop-down list on the top panel (Figure 6.3.21).

by type				
by group				
Fig. 6.3.21				

### View and edit Note information

To view and edit Note information, select the required Note from the list and make the necessary changes (Fig 6.3.22).

+	<b>)</b>	•
Google		
Loading point		
Group: Without grou	р	•
Date: 20.07.20	Radius: 0.00 m	
Field: No field chos	en	•
Description		
Attachment		
Add photo	C Attach fil	е
Fig	6377	

Fig 6.3.22



### Delete Note

To delete the Note, select the required Note and tap

on the top right corner, then tap **OK** (*Fig.6.3.23*).

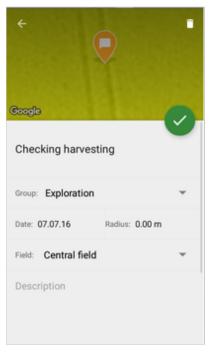
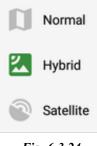


Fig. 6.3.23

Select Map layers

You can change Map layers. For this, select (*Fig.6.3.24*).

on the top panel and choose one of the offered variants



# 6.4 Glossary Materials

Material Glossary is designed to store information about a particular type of material (Fertilizer, Seeds, Chemical, Product). To get started with the Materials, go to the menu item "Glossary/Materials".

To add new material to the Glossary, follow these steps:

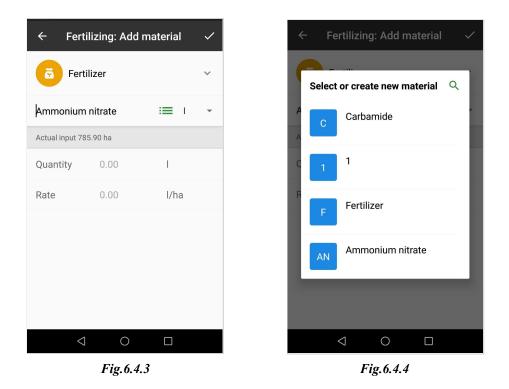
- Go to the Glossary / Materials; •
- + Click on the **Add button** •
- at the bottom right corner; Select the type of materials you want to add (Fig. 6.4.1) •
- Complete the form of New materials and save the record (Fig. 6.4.2). •

⊂ New materials
Material name Units Fertilizer I 👻
Additional info Mineral
SAVE
✓ ○ □ Fig.6.4.2

You can also add Materials from Tasks. Here you can add Materials (Fig. 6.4.3). Tap Materials type and choose the required type you want to add (Fig. 6.4.4). Then enter the name of Materials manually. You can select Materials

from the auto-suggest list if you created them in Glossary before. Complete the form and tap





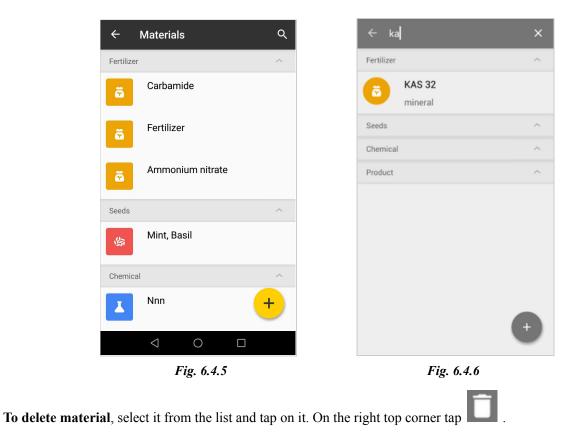
If you need, you can **edit materials** in the list. For this, select the required record and edit needed material information, then save it.

You can also select material type in the form of New materials.

For ease of work with the materials list, you can **use grouping** by material type (fertilizer, seeds, chemical, product) or search by material name.

To close the Group by material type, tap near the required material (*Fig.6.4.5*).

To search the required material in the material list, tap and start to type the material name. You will see the search result in the material list (*Fig.6.4.6*).



If you use the deleted material in tasks, it is left in tasks.

#### Machinery

The Glossary of machinery includes characteristics of the vehicle: type/model, width, distance to implement, offset, height, and additional info. Go to "Glossary/Machinery" to get started.

To add new machinery in the Glossary, follow these steps:

- Go to the Glossary/Machinery;
- Click on the **Add button**

at the bottom right corner;

- Select machinery model you want to add (vehicles, implements) (Fig. 6.4.7)
- Enter vehicle name andwidth. Optionally can be added distance to implement, implement offset from the centerline, vehicle height, notes. (*Fig.6.4.8*).
- Tap the Save button to save a new vehicle/implement.

		Vehicles	5%
		Implements	π
			×
Fig. 6.4.7			

After adding the new vehicle in Glossary it can be easily added during creating a new Task (see section <u>Select</u> <u>Vehicle</u>). After selecting vehicle/implement, all parameters such as width, implement offset, distance to implement will be automatically added in navigation mode in accordance with the chosen machinery.

You can edit machinery data. For this, select the required record and edit it, then save.

For ease of work with the machinery list, you can use grouping by machinery model (vehicles, implements) or search by machinery name.

To search the required machinery in the list, click on and start to type the machinery model (*Fig.6.4.9*).

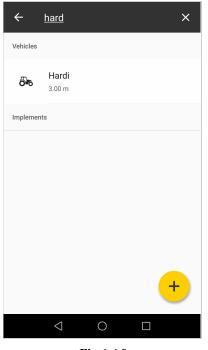


Fig.6.4.9

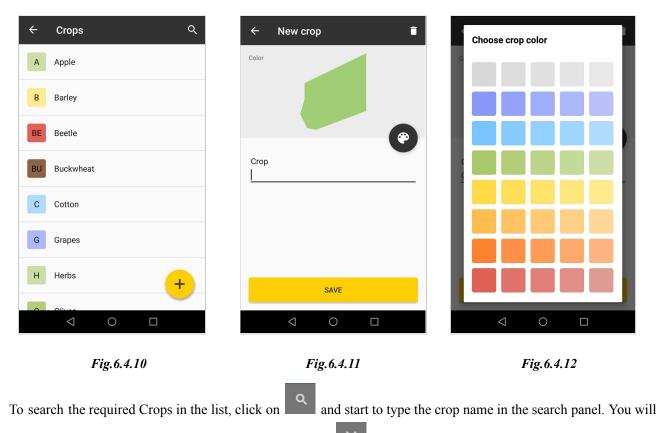
#### Crops

Crops Glossary keeps a list of crops, their name, and color. To work with the Glossary of Crops, go to the menu item "Glossary/Crops" (*Fig.6.4.10*).

To add a new crop in the Glossary, follow these steps:

- Go to the Glossary of Crops;
- On the bottom right corner, tap on the Add button;
- In the form: enter the crop name, select a color, and then save the record (*Fig.6.4.11*, *Fig.6.4.12*).

You can delete the crop any time by tapping **Lul** button on the right upper corner.



see the search result in the list. To Cancel Search click on

#### Workers

When you want to add a worker to your task, you need to add him to Glossary.

To add a new worker in the Glossary, follow these steps:

- Go to the Glossary of Workers;
- On the bottom right corner tap on the Add button (*Fig.6.4.13*);
- In the form, enter the worker's name and position (*Fig.6.4.14*);
- You can add a photo for the worker by tapping button: take a new photo or select from the device gallery (*Fig. 6.4.15*);
- After filling in the worker's information, tap on the Save button (Fig. 6.4.14).

← Co-workers	Q ← New worker	÷	John
ND Natalie Dushchenko Head office			
J John Driver			
GT Greg Tompson Manager			
AC Andrew Cravec	Name		ame
		<u>Jc</u>	hn
	Position		osition iver
	+ save		SAVE
Fig.6.4.13	Fig.6	.4.14	Fig.6.4.15

To search the Worker in the list, tap and start to type the name in the search panel. You will see the search result in the list. To Cancel Search, click on .

To **edit** the worker:

- select a worker and tap it;
- make changes on the worker info and tap Save.

To **delete** the worker:

- select a worker and tap it;
- then tap **L**. And confirm the decision by pressing OK on the warning message (*Fig.6.4.16*).

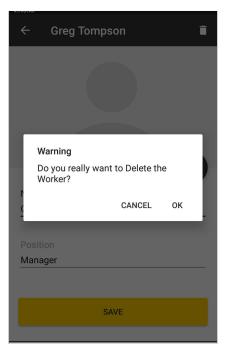


Fig.6.4.16

# 7. Profile

This section contains information about the user of the system, such as name, email, birthday, profile photo, phone, country, city. To go to the **Profile**, tap the main menu and the icon with your profile photo and/or abbreviation name (*Fig.7.1*).

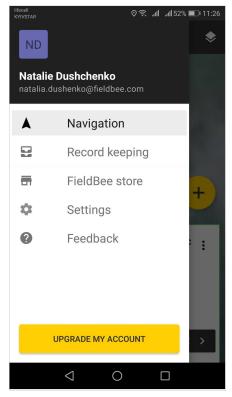


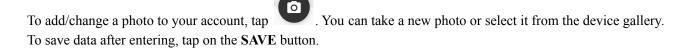
Fig.7.1

### 7.1 Edit Profile

You can edit your Profile (*Fig.7.1.1*):

- Name can be changed manually
- You can put in your birthday by tapping the Birthday section and selecting the date from the calendar
- Country can be selected from the drop-down list
- City and Phone are entered manually

You can change all the information except for the E-mail, which was provided during registration.



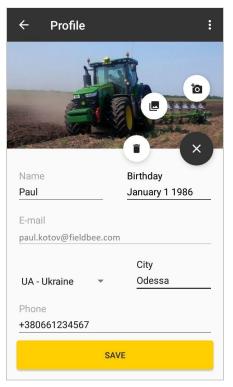


Fig.7.1.1

### 7.2 Delete Profile

Tap to start the account **deleting** process (*Fig.7.2.1*).

Select "Delete account" on the menu to continue the deleting process (Fig. 7.2.2).

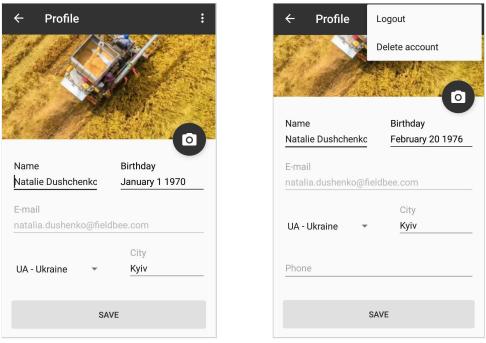


Fig. 7.2.1

Fig. 7.2.2

Input "DELETE" to confirm the deleting process (*Fig. 7.2.3*). Tap the button "DELETE ACCOUNT" to delete it finally (*Fig. 7.2.4*).

← Profile	* *	← Profile	000
	ALL		
Delete account?		Delete account?	
Are You sure to delete your account? All o will be lost.	data	Are You sure to delete your account? All will be lost.	data
Please, enter <b>"DELETE"</b> to confirm		Please, enter <b>"DELETE"</b> to confirm	
<u>[</u>	- 1	DELETE	- 1
CANCEL DELETE ACCOU	INT	CANCEL DELETE ACCOU	UNT
		City	
UA - Ukraine 🔹 Kyiv		UA - Ukraine 👻 Kyiv	
SAVE		SAVE	



Fig. 7.2.4

Also, you can delete your account from the Settings. Find option "Delete account" and do the same steps above.

### 7.3 Log out

To Log out tap finite field for the top bar and select "Log out" on the menu (*Fig. 7.2.2*). Then tap "Ok" on the warning message (*Fig. 7.3.1*).

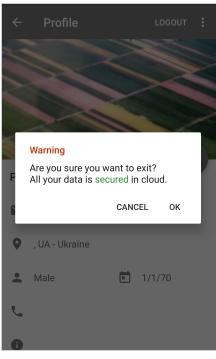


Fig. 7.3.1

Also, you can log out from the Settings menu (Log out steps are the same as above).

# 8. Settings

This section describes the program settings which you can change to adapt to your needs. To do this, open the main menu (Fig. 8.1) and tap Settings.

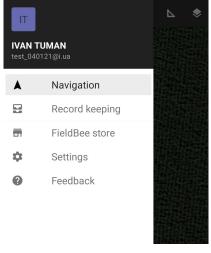


Fig.8.1

### 8.1 System

**Language.** You can choose one of the available application languages during the first application launch (see section Language selection). Also, language can be changed anytime in the Settings menu - System section (*Fig.* 8.1.1), tap tap on "Language" and select the desired language.

← Settings	Language English
System	Units of measurement
<b>Language</b> English	ha, m, km/h
Units of measurement	S Units of measurement
ha, m, km/h	Area Area
Sync now Unsynchronized data (48)	N Length
Navigation	u. m 
Navigation tolerance	A <sup>Speed</sup> km/h
App sounds	CANCEL SAVE
Fig 8.1.1	Fig.8.1.2

**Units of measurement.** In this section of the Settings menu units of Area, Length and Speed measurement can be changed.

To change units of measurement tap on the Units of measurements, the dialog with units will be opened (*Fig* 8.1.2), select and save necessary units.

**Sync now.** Data synchronization lets you use and maintain up-to-date data on all your devices, and lets you restore data if your device is replaced or lost.

To synchronize data on all your devices, you must install FieldBee app on each device and, when FieldBee starts for the first time, specify the same FieldBee account. This allows synchronizing data both manually and automatically.

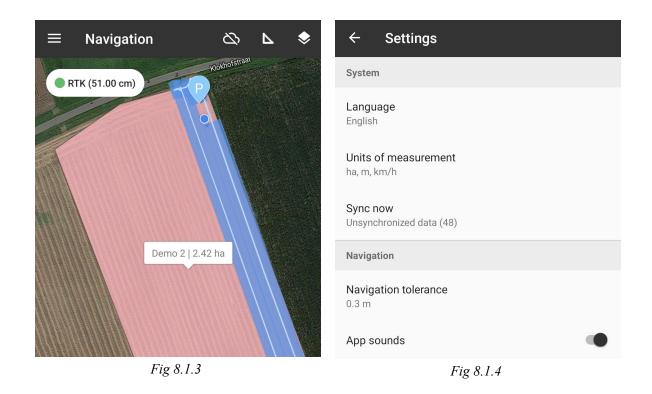
#### ! Internet access is required for data synchronization.

With internet connection FieldBee automatically synchronizes all added data.

But sometimes the synchronization process takes time, it depends on the queue of applications connected to the Internet on your device. For example, you are working with the FieldBee app and watching video online (Youtube, Facebook, Instagram).

We added the ability to synchronize your data manually. Manual synchronization may be initiated, as follows:

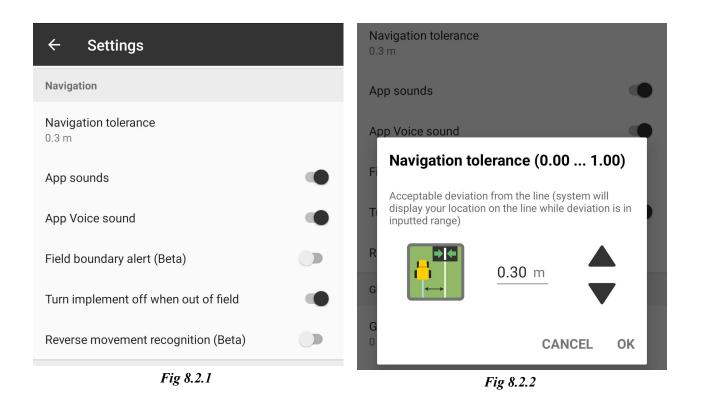
- If the user has unsynchronized data, the icon cross cloud is appeared on the main screen of Navigation or Record Keeping at the top bar (*Fig 8.1.3*). Tap the icon cross cloud, then tap Sync.
- If the user has unsynchronized data, he can go to Settings and tap Sync Now (Fig 8.1.4).



The application synchronizes data to the cloud server.

### 8.2 Navigation

In the navigation section of the settings, you can adjust such parameters as Navigation tolerance, Reverse movement recognition, field boundary alert, turn to implement off when out of the field (*Fig 8.2.1*)



**Navigation tolerance** can be set in a range from 0 meters up to 1 meter and means maximum acceptable deviation of the machine from the navigation line (0.3 meters by default) (*Fig 8.2.2*)

App Sounds. Activate beep notification during navigation.

App Voice Sounds. Activate voice sound for functionality during navigation: GPS quality, turn on/off Implement.

**Field boundary alert** option enables and disables notification alerts at the end of navigation lines approaching field boundaries. (*Fig 8.2.3*)

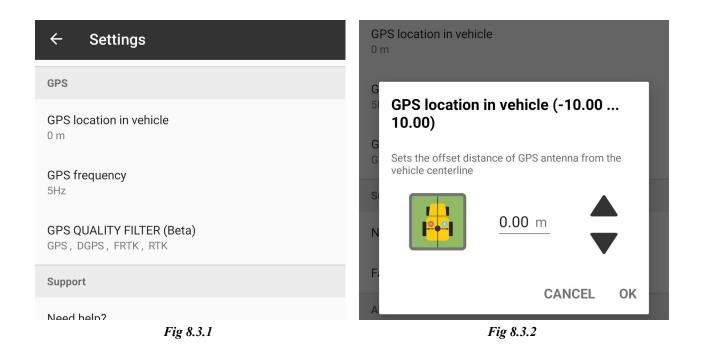
Turn implement off when out of the field, option disables calculation processed area out of the field. (Fig 8.2.4)

**Reverse movement recognition** option enables and disables the feature of recognition when the vehicle is moving backward the reverse movement is detected vehicle arrow color changes to blue and the coverage area stops recording.



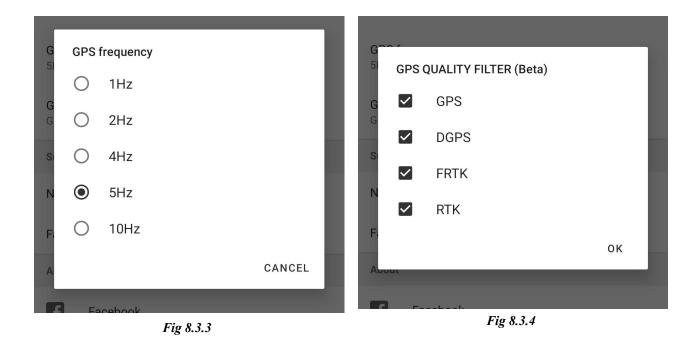
## 8.3 GPS

**GPS location on the vehicle.** Allows setting the offset of the GPS receiver relative to the central axis of the vehicle in a range from -10 m (displacement to the left) to 10 m (displacement to the right). (*Fig 8.3.1*)



**GPS Frequency.** Allows you to adjust the GPS frequency (refresh rate) to meet the connected device capabilities. (Fig 8.3.3) The default value is **5 Hz**. *Do not adjust GPS Frequency settings if your receiver frequency is unknown.* **GPS quality filter.** Allows you to set up location data filtering if you want to exclude location data usage with the precision level that's lower than specific.

By default, during navigation is used data of all precision levels (GPS, DGPS, FRTK, RTK) (Fig 8.3.4).



# 9. Premium account activation

In order to activate the Premium account, you need to open the Main Menu and go to the yellow button "Upgrade my account". (*Fig. 9.1*)

After tapping on that, you'll see 2 options: "Get Premium Subscription" and "I already have a license key" (*Fig.* 9.2). If you don't have your license key yet, please choose "Get Premium Subscription" and then press on "Get license key" (*Fig.* 9.2). After that, you'll be transferred to the website link, where you can buy the annually paid Premium Subscription. After paying, we'll send you an email with an invoice, in which your license key will be written.

Please open the Main Menu again to activate it. Go to the yellow button "Upgrade my account" and tap "I already have a license key" and input your license key (*Fig.9.3*). After doing all these steps, please log out from your account and log in again.

Now you are ready to use the app with full functionality.

Kindly note that the license key after its activation is valid for a year only (with some exceptions).

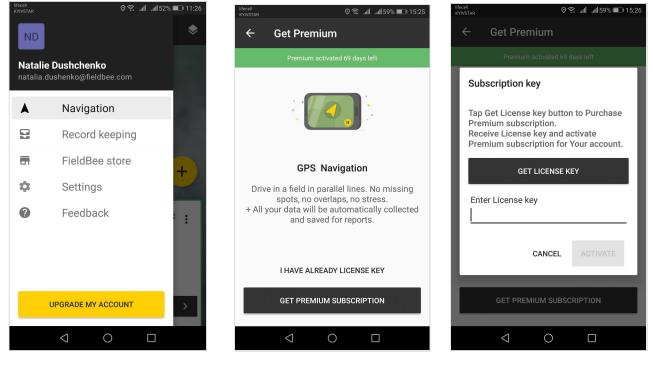






Fig.9.3

# System requirements

- Android OS: version 8.0 or higher with Google play services
- Display: 10" (inches) Resolution: 1280x800 pixels or higher
- CPU: 4-core or more core (Qualcomm Snapdragon/Intel)
- Memory: 4GB RAM or higher
- Interfaces: Wi-Fi or 3G/LTE, Bluetooth