Technical instructions

trapview

by EFOS

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Trapview is a combination of software and hardware solutions for remote monitoring of different pests in agriculture. It is an AI-based Decision Support System facilitating efficient food growing and minimizing impact on environment.

1 / How it works

The trap consists of a solar panel and a battery, HD cameras, modem, GPS, optional self-cleaning mechanism and other advanced electronics that collect data, take pictures, and sends them to the cloud-based IT platform. It is energy independent as it is powered by its solar panel and the battery.

Every picture taken is processed and analyzed by an automatic image recognition module which identifies, counts and marks pests and then markings translate to statistics which make data monitoring easy and transparent and further analysis more intelligent.

Web and mobile application provide powerful analytical tools that allow to efficiently monitor and successfully respond to the situation in the field.

Combination of weather forecast and modeling based on machine learning of population of adult insects provide the most important information in modern crop protection: when and where I should apply crop protection

2 / Recommendations for use

The trap has to be set into the crop/tree canopy best just before the beginning of insect flight. The approximate period can be determined based on years of experience, in combination with determination of temperature sums. Trap has to be lifted into the crown on height, where the activity of monitoring pest is greatest and the entrance of the trap has to be easily accessible. The recommendation is: set the trap parallel to the prevailing wind direction.

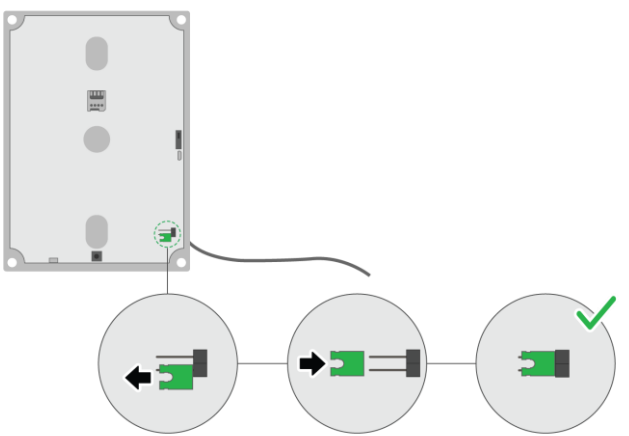
The solar panel has to be mounted on the top of a pillar in the way that solar panel is exposed to the south on the northern hemisphere and to the north on the southern hemisphere and it must not be shaded.

The number and the arrangement of the traps in the orchard/field is determined by the requirements of individual species, thus you have to follow the instructions for successful monitoring of the individual insect.

Use some lure (pheromone/kairomone) which effectively attracts the target species. Lures are not enclosed because we do not want to impose any specific type or producer of lures, since users usually already have their own chosen type of lure. Lures have to be changed according the instructions of the lure producer. The entrances of the trap are reduced to minimum to retain as many attracted in-flying insects as possible. Therefore the entrances have to be free - any leaf or branches have to

be removed regularly to prevent the closing of those openings.

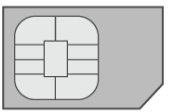
Before you start the device, it is recommended to charge the batteries first. You can charge them with attached USB cable (type A / Micro B) for at least 24 hours. You will plug Micro B connector into device and type A connector into an USB adaptor for regular socket or your computer. During charging the device has to be switched OFF (ON/OFF button). Check also if the battery jumper is put on:



After a long-term storage of the traps batteries always need charging.

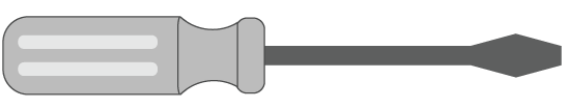
3 / What will you need

SIM card



Pheromone lure

A screwdriver



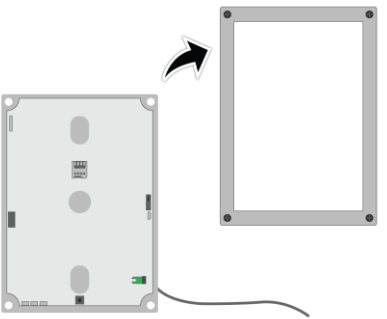
4 / Recommendations about the SIM card

- You need a micro SIM card.
- It needs a valid contract with a mobile provider with the possibility to send data via LTE / LTE-M / UMTS / GSM. Depending on modem of the device requirements are as follows:
  a) LTE – M and GSM (in case of poor LTE – M coverage the device will connect to GSM)
  b) LTE and UMTS and GSM (in case of poor LTE coverage the device will connect to UMTS or GSM)

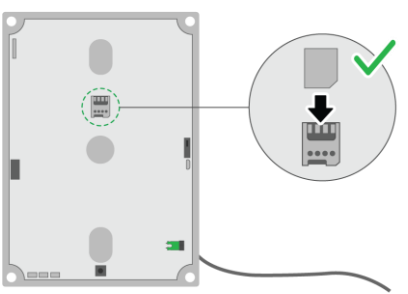
  This contract has to be activated up front. With one photo taken per day it consumes about 250 MB of data transmission per month. So, be sure that the SIM card doesn't have a limit of data transmission lower than that.
- It has to be unlocked – no PIN code demanding.
- It is recommended to try the SIM card with a cell phone first:
  - the activation – that the SIM card is activated by your mobile provider
  - no PIN code demanding – otherwise unlock it
  - GPRS/UMTS data transfer – connect to the internet

5 / How to start the device

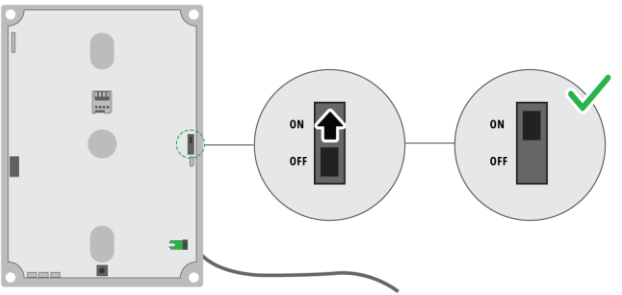
1 Remove the glass cover from the device (use a screwdriver to remove it gently).



2 Insert the SIM card in the appropriate place on the device (SIM).



3 Switch the device ON (ON/OFF switch).



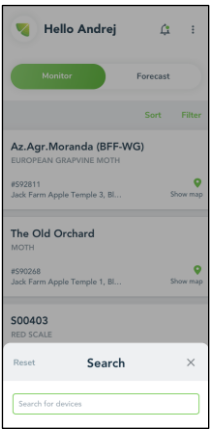
4 Screw the glass cover back on the device.

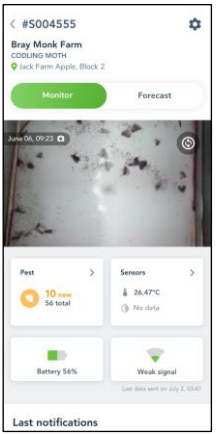
5 Place the device into the appropriate holder.

The next day you should be able to see a photo sent from your trap in the web application (it takes one picture per day if you haven't set any additional capture time).

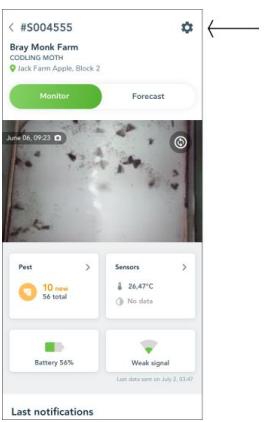
To avoid any issues after the trap is already installed in the field, we always suggest to test it before installation with our mobile app:

- **Log in the Trapview mobile application and search for the device.**

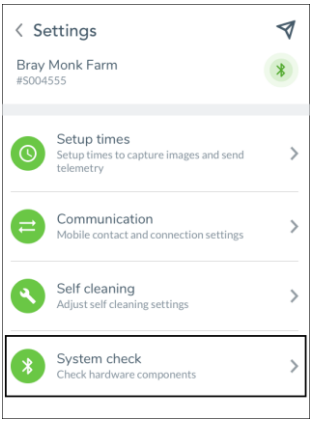




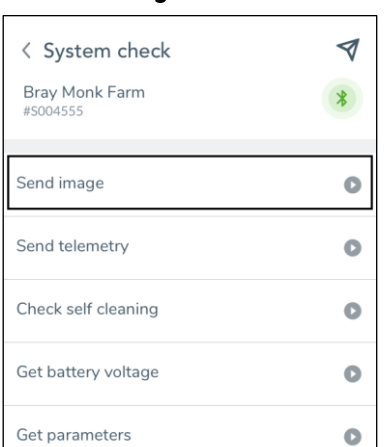
- **Go on settings**



- **Select system check**



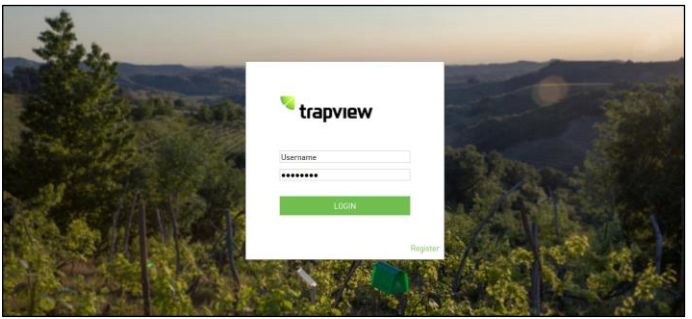
- **And send an image**



You will see the OPERATE light blinking and then also some other LEDs might turn on / flash (MODEM_ACT, NETWORK...) – it shows that the device is operating. In the web application you will see a circulating icon - indicates that the trap is sending data.

Count that it takes a little bit longer to see the picture (telemetry) sent in the web application.

6 / Web application



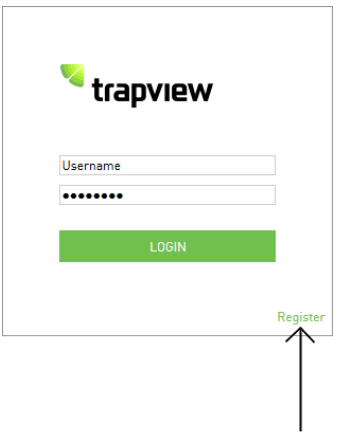
Trapview application offers a preview of high resolution images taken from the trap and includes some analytical features for comparison of data over time. With the software for automated marking and counting of pests alerts for pest occurrence can be triggered. You can also activate automated daily and/or weekly reports which provide a quick insight into all vital information about pest population (new catches, pest pressure in last week, month) as well as the general information related to trap management (battery, signal, picture, pheromone status). The application enables the insight into the historical data, has some statistical presentation of moth counts, pest pressure and also some forecast based on machine learning.

https://app.efos.si/trapview

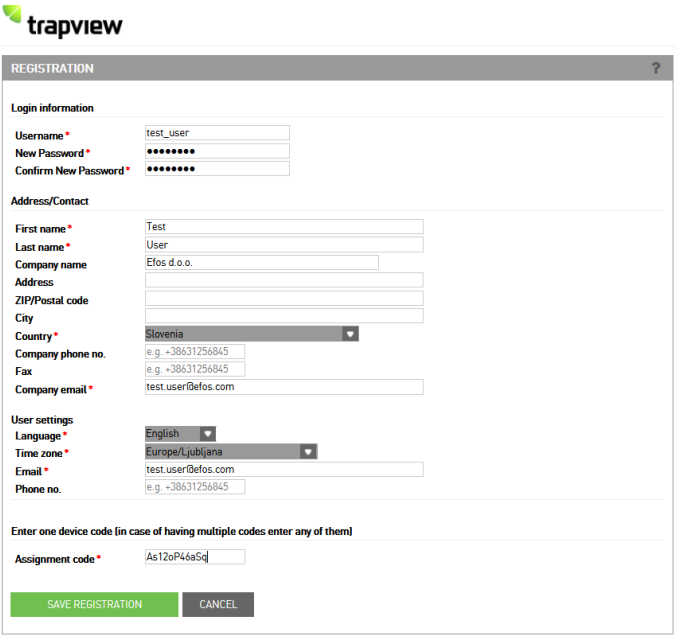
User account

Register

If you don't have an account, you can create it using the "Register" link.



Fill the registration form. Fields with the asterisk are required.



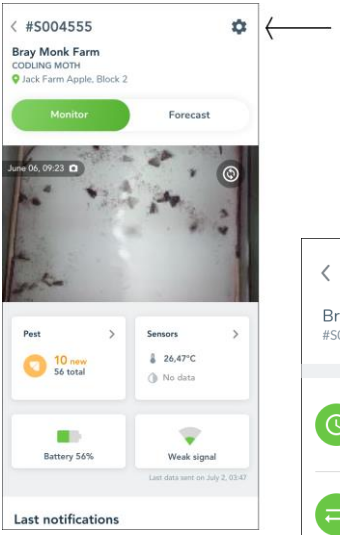
Note: “Device code” is not the serial number of the device. You can find it on the first page of your user manuals. In case you don’t, please consult your distributor.

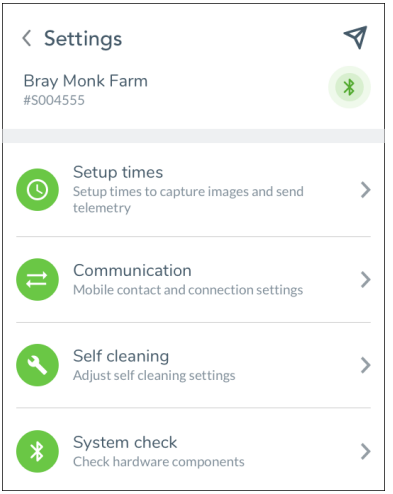
Confirm with the “Save registration” button. A confirmation email will be sent to your email address.

For any further help consult the online help which is available from the web application itself or contact support@trapview.com.

7 / Setting the parameters

You can set some parameters using Trapview mobile application (trapview by Efos d.o.o.) – through settings:





All the parameters that you can set:				
Par. no.	Name	Description	Default value	Command to set new value
4	sms_emergency_number	an emergency phone number – where does the trap send emergency SMS	+386413 23124	par=4,phone_number
6	gprs_ini_string2	mobile provider setting - APN (in case that the APN that your SIM card will use isn't in the trapview's list of APNs, you will need to set it by yourself)	/	par=6,APN
9	sms_report_number	a report phone number – where does the trap send report SMS	+386413 23124	par=9,phone_number
10	gprs_username	Username for GPRS/UMTS access	mobitel	par=10,username
11	gprs_pass	Password for GPRS/UMTS access	internet	par=11,password
To restore the values of all the parameters to default values, simply use the command: pardef				

Par. no.	Name	Description	Default value	Command to set new value
16	capture_time1	at what time it will take photos – always set a full hour, the value 00:00 means that the time is not set.	HH:00	par=16,HH:00
17	capture_time2	additional capture time.	00:00	par=17,HH:00
18	capture_time3	additional capture time.	00:00	par=18,HH:00
20	telemetry_time1	at what time it will send the telemetry – the value 00:00 means that the time is not set.	HH:00	par=20,HH:00
21	telemetry_time2	additional telemetry time.	00:00	par=21,HH:00
22	telemetry_time3	additional telemetry time.	00:00	par=22,HH:00
To restore the values of all the parameters to default values, simply use the command: pardef				

8 / Maintenance

When the flying period ends, the trap and the electronics should be withdrawn from the orchard/field. To shut the device down just turn it OFF (ON/OFF button). The device should be stored in a dry place during the winter time. The housing has to be checked and if it is not damaged, it can be reused in the next season, otherwise the electronics must be separated from the old housing and be placed into a new housing.

The solar panel has to be cleaned regularly with the textile or paper towel.

9 / Technical specification

Device

The device should only be opened by skilled person.
It does not qualify as outdoor equipment. The final enclosure is the end product consideration.
The power supply is limited by PS2 (LPS – Limited power source: max. 8A/100W).

Size: 180mm x 130mm x 35mm
Operating temperature: –15-80°C
Charging temperature: 5-40°C

Solar input:

Supply voltage range	5.0-14.0V
Max. Current rating	0.75A

Battery system: Lithium-Ion (Li-ion)

Nominal Voltage	3.6V
Rated Capacity	6.7Ah
Wh rating	24.1Wh

Cameras:

Options	**Resolution**
2x regular - inside	8 Mpx
1x wideview - inside	8 Mpx
1x external	8 Mpx

Modem (wireless module) options:

PHS8-P → with global roaming
UMTS / HSPA / 3G GSM / GPRS / EDGE / 2G
Supply voltage range 3.3 - 4.2V optimized for minimal power consumption
Operational Temperature range: -40 °C to +85 °C
RoHS and WEEE compliant

ELS61-E → with roaming inside Europe
LTE / 4G UMTS / HSPA+ / 3G GSM / GPRS / EDGE / 2G
Supply voltage range 3.0 - 4.5V optimized for minimal power consumption
Operational Temperature range: -30 °C to +85 °C
RoHS and REACH compliant

BG96 → with global roaming
LTE-Cat M1 GSM / GPRS / EDGE / 2G
Supply voltage range 3.3 - 4.3V highly optimized for minimal power consumption
Operational Temperature range: -40 °C to +85 °C
RoHS compliant

BG95-M3 → with global roaming
LTE-Cat M1 GSM / GPRS / EDGE / 2G
Supply voltage range 3.3 - 4.3V highly optimized for minimal power consumption
Operational Temperature range: -35 °C to +75 °C
RoHS compliant
EG91-EX → with roaming inside Europe
LTE / 4G UMTS / HSPA+ / 3G GSM / GPRS / EDGE / 2G
Supply voltage range 3.3 - 4.3V optimized for minimal power consumption
Operational Temperature range: -40 °C to +85 °C
RoHS compliant

EG91-AUX → supports extra bands for Brazil
LTE / 4G UMTS / HSPA+ / 3G GSM / GPRS / EDGE / 2G
Supply voltage range 3.3 - 4.3V optimized for minimal power consumption
Operational Temperature range: -40 °C to +85 °C
RoHS compliant

BLE (for app connection):

Bluetooth 5.1
FCC, ISED, MIC, KC and CE compliant
temperature range: -40 °C to +85 °C
highly optimized low power mode
Supply voltage range 1.9 – 5.5V

Solar panel

Pmax	3W
Tolerance	+/-5%
Vmp	6V
Imp	0,500A
Voc	7.1V

Rh/T sensor – optional

Model	SHT20
Typ. Humidity Accuracy (%RH)	+-3
Typ. Temperature (°C)	+-0.3
Supply Voltage Range (V)	2.1 to 3.6
Interface	I^2C

Antenna options

Internal

Gain	1.8 dBi 700-1000 4.2 dBi 1710/2690
Frequency	698-960 mHz 1710/2690 mHz
Max Power	2 W

External

Bandwidth	700-960/1710-2600
Gain	7 dBi 700-1000 3.5 dBi 1710/2600
Frequency	700-960 mHz 1710/2700 mHz
Max Power	25 watts
Length	45 cm
Radome Diameter	16 mm
Cable	5.0 m or 10.0 m of Low loss RG58

Notes

support@trapview.com

trapview