IEC Tehnopolis (Innovation and Entrepreneurship Center)

Tehnopolis
Inovaciono Preduzetnički Centar

Vlada
Crne Gore

2014.

2016.

Ministarstvo
prosvjete, nauke
i inovacija

700+
events

26 000+
participants

70+
trainings

850+
trainees

IEC Tehnopolis today

10+
support
programs

160+
supported
ideas

40+
projects

200+
partners

Biotechnology labratory

One of the three centers within Tehnopolis is the Center for Program Activities, Development, and Research. This center has two laboratories and Data center.

Biotechnology laboratory, Biolab Tehnopolis was established to support agricultural producers and agricultural development, both through the provision of services and through the connection of the academic and business sectors in order to encourage the transfer of knowledge and innovation, which will lead to the creation of new products, as well as improve the quality of the existing ones.

01 drone for monitoring the progress of vegetation and the quality of crops

02 equipment for testing the technical correctness of machinery used for the use of plant protection products

03 equipment for conducting agrochemical and physical – mechanical analyses of soil

04 equipment for performing PCR analyses for the detection of certain pathogens that are the cause of food spoilage

05 equipment for performing analyses of pharmacologically active substances of veterinary drugs in milk samples (LC-MS/MS method)

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SUPPORT PROGRAM FOR
AGRICULTURE PRODUCERS

MONITORING THE VEGETATION CYCLE WITH A DRONE

10
agricultural producers

3
flights

50,000 m²

In the course of 2021, activities related to the implementation of the support program, which is reflected in the monitoring of the vegetation cycle by drone for 10 agricultural producers in the territory of the Municipality of Niksic, were implemented

Three flights were performed for each user

The total monitored area for 6 crops (potato, cabbage, onion, alfalfa, apple, and strawberry) was about 5 ha (50,000 m2)

Monitoring the vegetation cycle with a drone

DRONE PARROT BLUEGRASS

- **The Parrot Bluegrass** Fields is an automated agricultural drone designed primarily for monitoring the growth and quality of crops.
- It is equipped with two types of sensors: an RGB (red, green, and blue) sensor and the Parrot Sequoia sensor.
- The **RGB sensor** is capable of capturing HD video and high-quality photos, making it an excellent tool for visual inspection of crops and vegetation within a given field.
- The ***Sequoia*** system consists of four sensors that capture images in four different spectral bands: green, red, red-edge, and near-infrared (NIR).
- By processing the images collected in these four bands, specialized software can generate maps with various vegetation indices for the selected field.
- The most commonly used index for assessing vegetation health and quality is the **NDVI** (Normalized Difference Vegetation Index).
- The drone can fly at a maximum altitude of **150 meters**, with a maximum operating range of **2,000 meters** from the operator.
- With a single flight, the Parrot Bluegrass Fields can collect data from an area of up to **30,000 square meters**.

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Data Processing

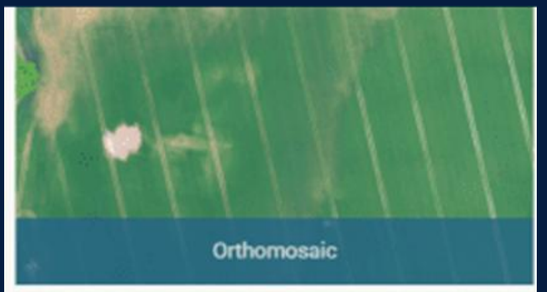
For processing the data collected during each completed drone flight, the Pix4Dfields software is used. This tool enables automated creation of field maps, including true-color orthomosaics, vegetation index maps, elevation maps, and comprehensive reports.

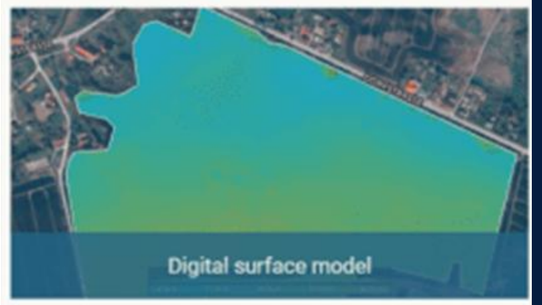
The report may include:

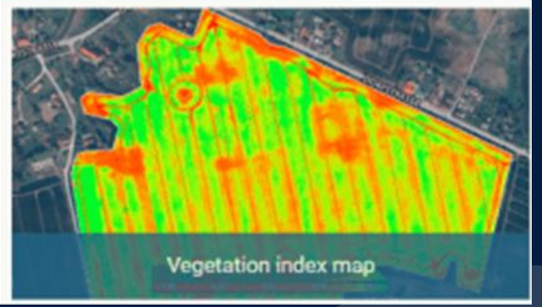
- Name and location of the field
- Date and time of the mapping
- Aerial image of the field
- NDVI map
- Elevation map of the field
- Field coordinates
- Field surface area

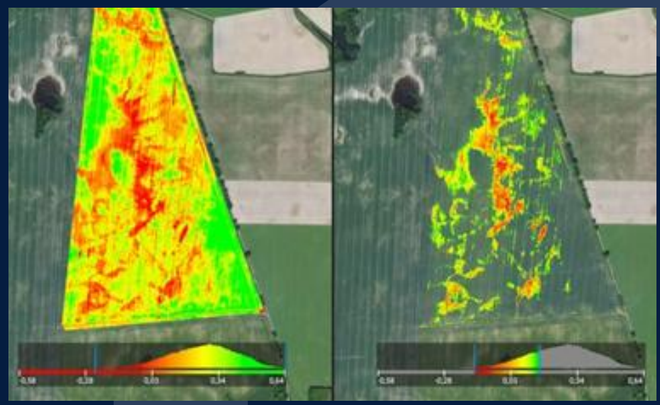
The final report is generated in PDF format.

The results of this monitoring show and locate potential problems in a timely manner, in order to help agricultural producers react quickly and consider solutions to improve quality and prevent yield loss.









Potential Problems and Challenges in Fieldwork

To overcome these issues, careful flight planning, dividing larger parcels into smaller units, and relying on experience are essential for more efficient work.

01

Field conditions – weather (rain, wind, sun, clouds) and physical obstacles (bushes, tall vegetation, trees, power lines, houses).

02

Large and irregular parcels – make flight planning and data processing difficult.

03

Accuracy and planning – estimating parcel size and defining flight paths can be difficult.

04

Crop type – technology works better for dense crops (like potatoes or wheat) than for orchards or sparse vegetation, and it cannot distinguish weeds from cultivated plants.

05

Time on site – fieldwork often takes longer than planned, requiring careful planning and adjustments.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VIRAL Hackathon

THANK YOU!

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