



Selected Examples of Digitalization in Agriculture

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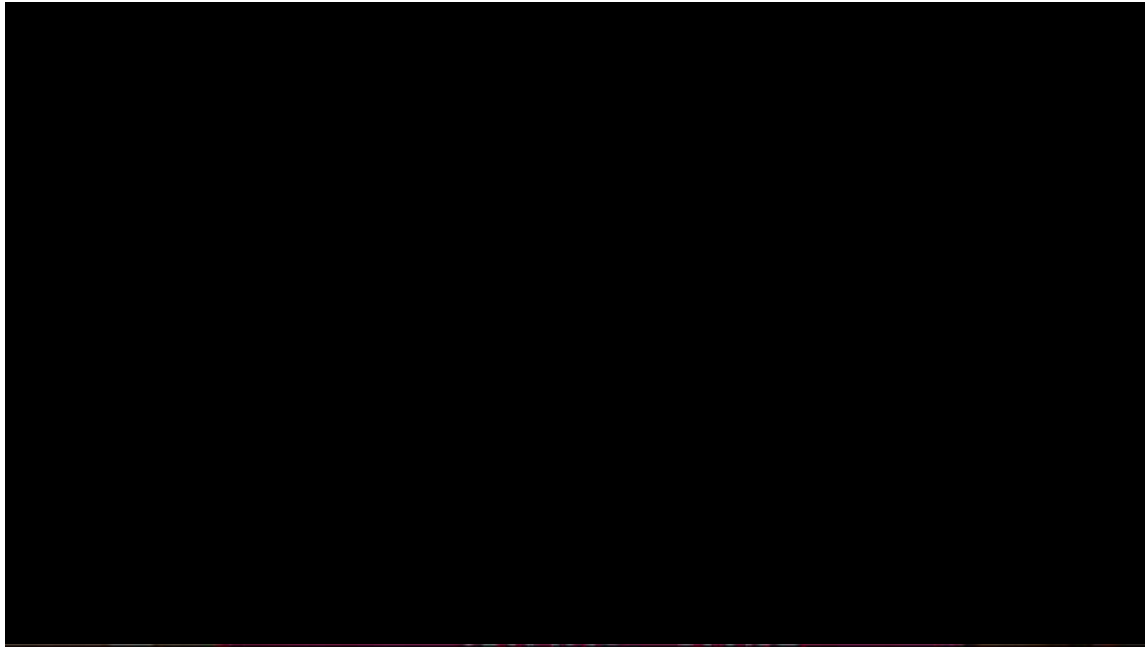
Introduction

- Why digitalization / ICT?
- Project that we are working on
 - **PKP - Student project (FARMBEAST)**
 - **ŠIPK - Student project (FARMBEAST)**
 - **EIP AGRI (Italy) – vineyard robot (ROVITIS 4.0)**
 - INTERREG CE - Transform 4.0 (3 pilots)
 - EIP AGRI (pilot) – (Drones + Multispectral)
 - EIP AGRI (pilot) – sensor networks (AI)
 - Bilateral cooperation – Russian federation (AI)
 - INOVUP (improve teaching praxis)
 - OISAIR (LIDAR + spraying)
 - ERASMUS – VIRAL
 - SYNERGY
 - **Other – Termodrone d.o.o.**
 - Other - Slovenian ministry of agriculture
 - ...

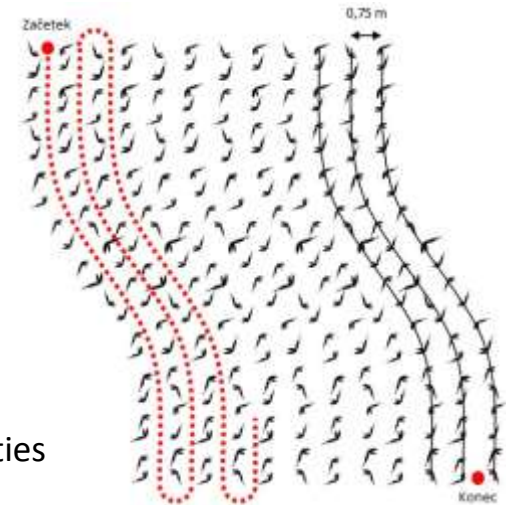




Field Robot - FARMBEAST



- Field Robot Event
 - 1st task – Basic Navigation
 - 2nd task – Advance Navigation
 - 3rd task – Weed Detection
 - 4th task – Weed / Plant Handling
 - Freestyle



• Robot

▪ Hardware

Distributed system (Rpi + NUC) , VLP16 LIDAR, dig. cameras, IMU, 4 DC + 4 BLCD motors, LiFEPo..

▪ Software

ROS + autonomous driving + obj. detection and manipulation

• Support / funding

- Sponsors
- PKP projects – companies
- ŠIPK projects – non profit entities
- Competition - refund





Vineyard robot – ROVITIS 4.0



Starting point

- **DODICH loader**
 - Wheels, SKID STEER
- **Sensors**
 - 2D LIDAR, MEMS IMU, odometry
- **Software**
 - Linux + Programs in C++

Research & development

- **DODICH loader**
 - Wheels, SKID STEER
- **Sensors**
 - 2D LIDAR, MEMS IMU, odometry, RTK GPS
- **Software**
 - LINUX + ROS + algorithms (row following)

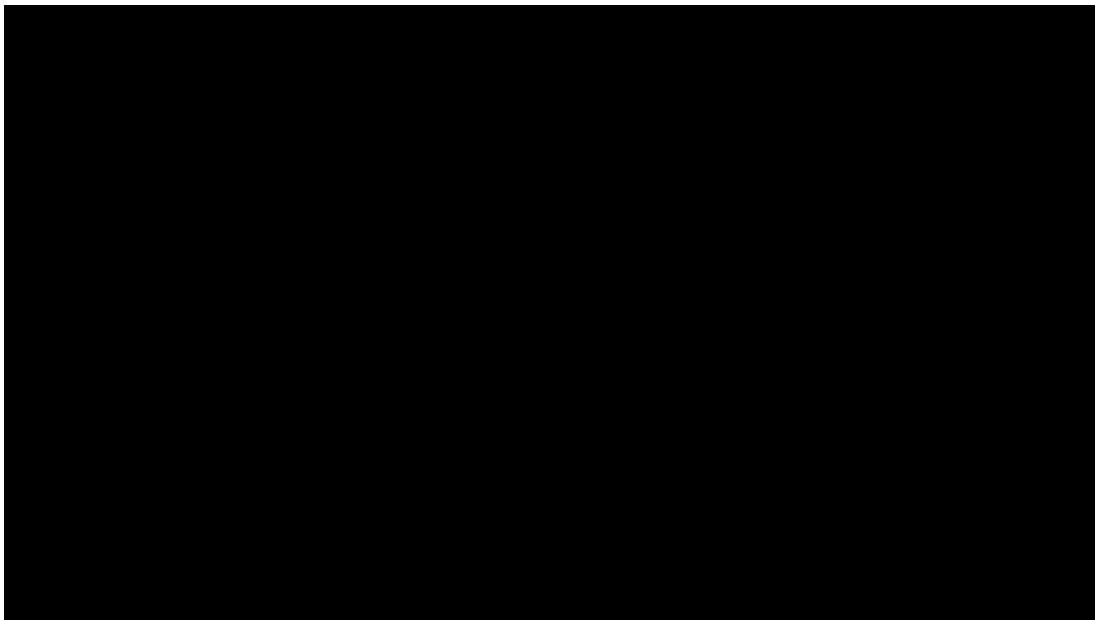
Current phase

- **ENERGREEN remote controlled platform**
 - Tracks, SKID STEER
- **Sensors**
 - 3D LIDAR, MEMS IMU, odometry, RTK GPS
- **Software**
 - LINUX + ROS + algorithms (path planning, path following, localization, FieldSLAM)

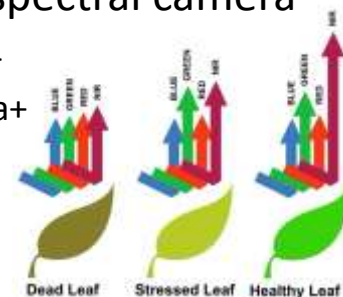




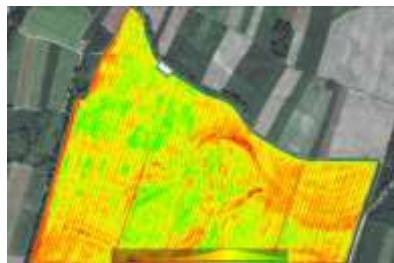
DRONES – Termodrone d.o.o.



- Challenges in agriculture
 - Use less plant protection products
 - Use less fertilizers
 - Detect problems
- Drones + multispectral camera
 - DJI Phantom 4
 - Parrot Sequoia+



- Solution
 - Variable application maps
 - Integration to existing farming machinery for automated precise local treatment





Thank YOU!

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