

Digital Experimental Field DIWAKOPTER: A cyber-physical ecosystem connecting space and farm

Space Solutions for Sustainable
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Engineering

Digitale Experimentierfelder

Mit den digitalen Experimentierfeldern fördert das BMEL die Digitalisierung in der Landwirtschaft.

-  Pflanzenbau
-  Tierhaltung
-  Bereichsübergreifend



Source: www.bmel.de/DE/themen/digitalisierung/digitale-experimentierfelder.html, modified

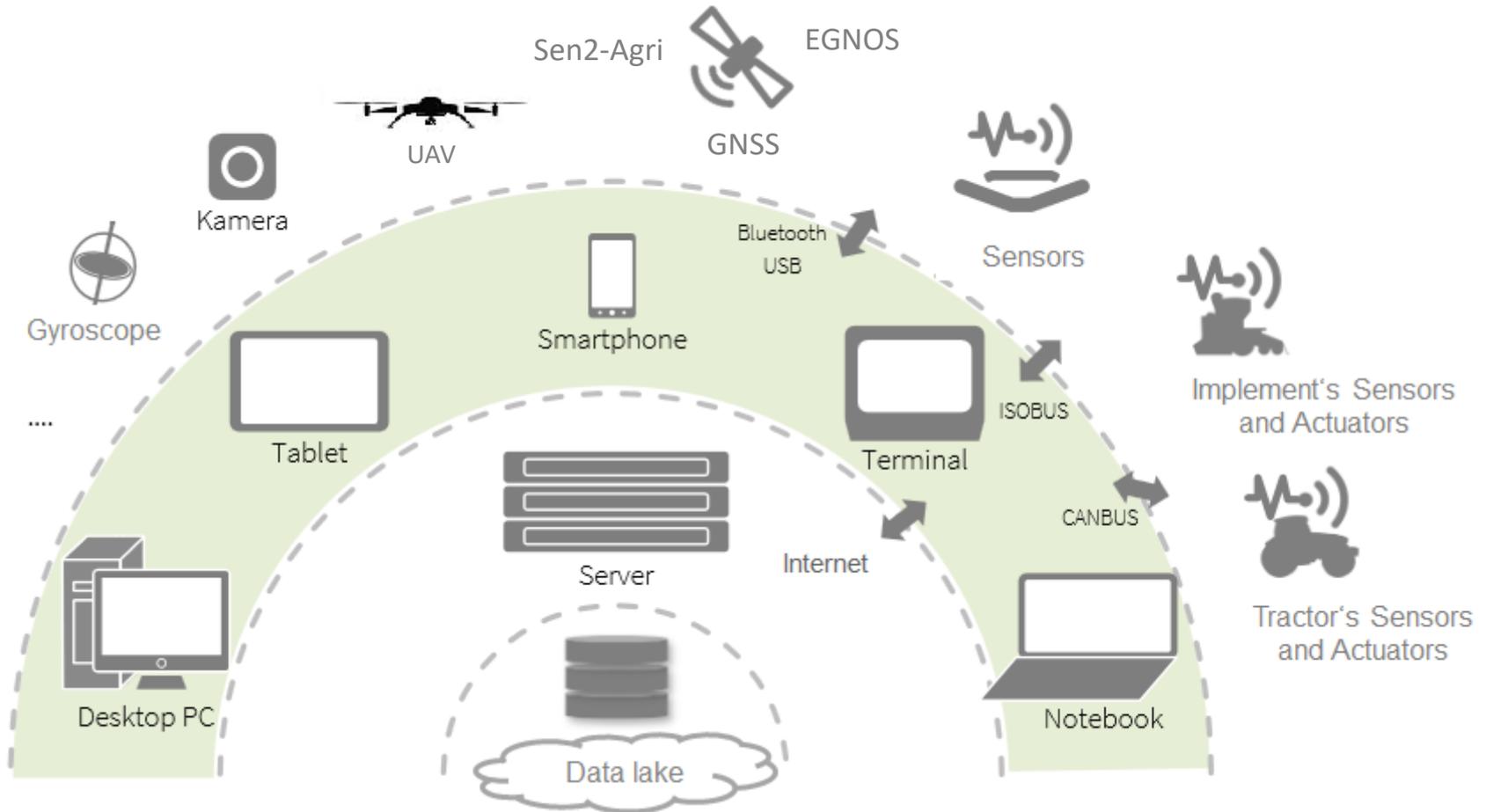
Previous Technology Infrastructure



Desktop PC

Source: R. Matthias; Horsch GmbH, modified

Current Technology Infrastructure



Source: R. Matthias; Horsch GmbH, modified

Our Physical World



Source: Müller Electronics



Source: CLAAS



Source: REICHHARDT



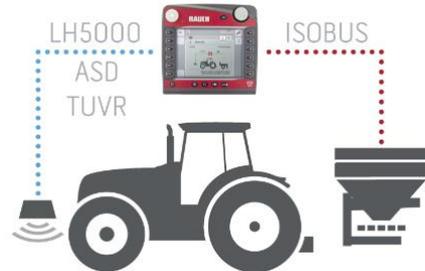
Source: SafeGuard



Source: Greentronics



Source: Greentronics



Source: CCI-ISOBUS



Source: Raven



Source: Topcon

Our Physical World in the (near) Future



Source: www.futurefarming.com



Source: www.naio-technologies.com



Source: agxeed.com



Source: www.profi.de

PHYSICAL

Sensors / Actuators

- Remote sensing, Positioning
- IoT, WSN, Edge Computing
- ISOBUS, UAV, UGV

Interoperability!

Cloud Computing

- On-demand computing services
- IaaS, PaaS, SaaS
- Farm Management Systems

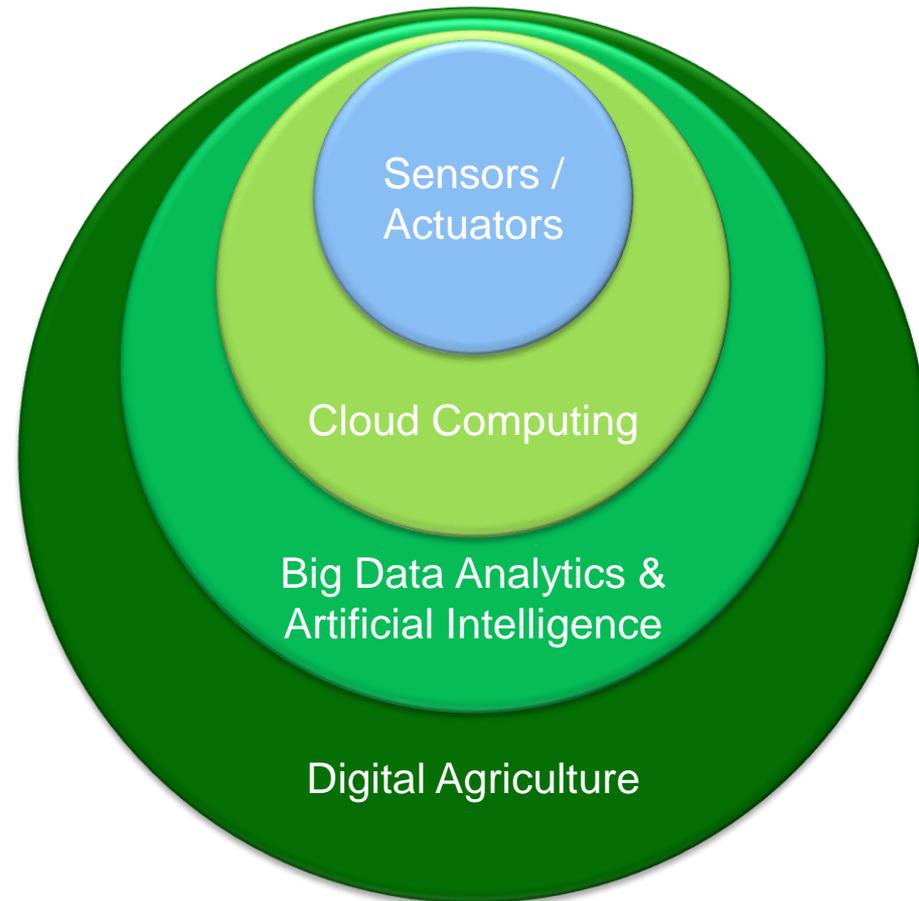
Big Data and AI

- Spark, Hadoop
- Machine Learning
- Deep Learning

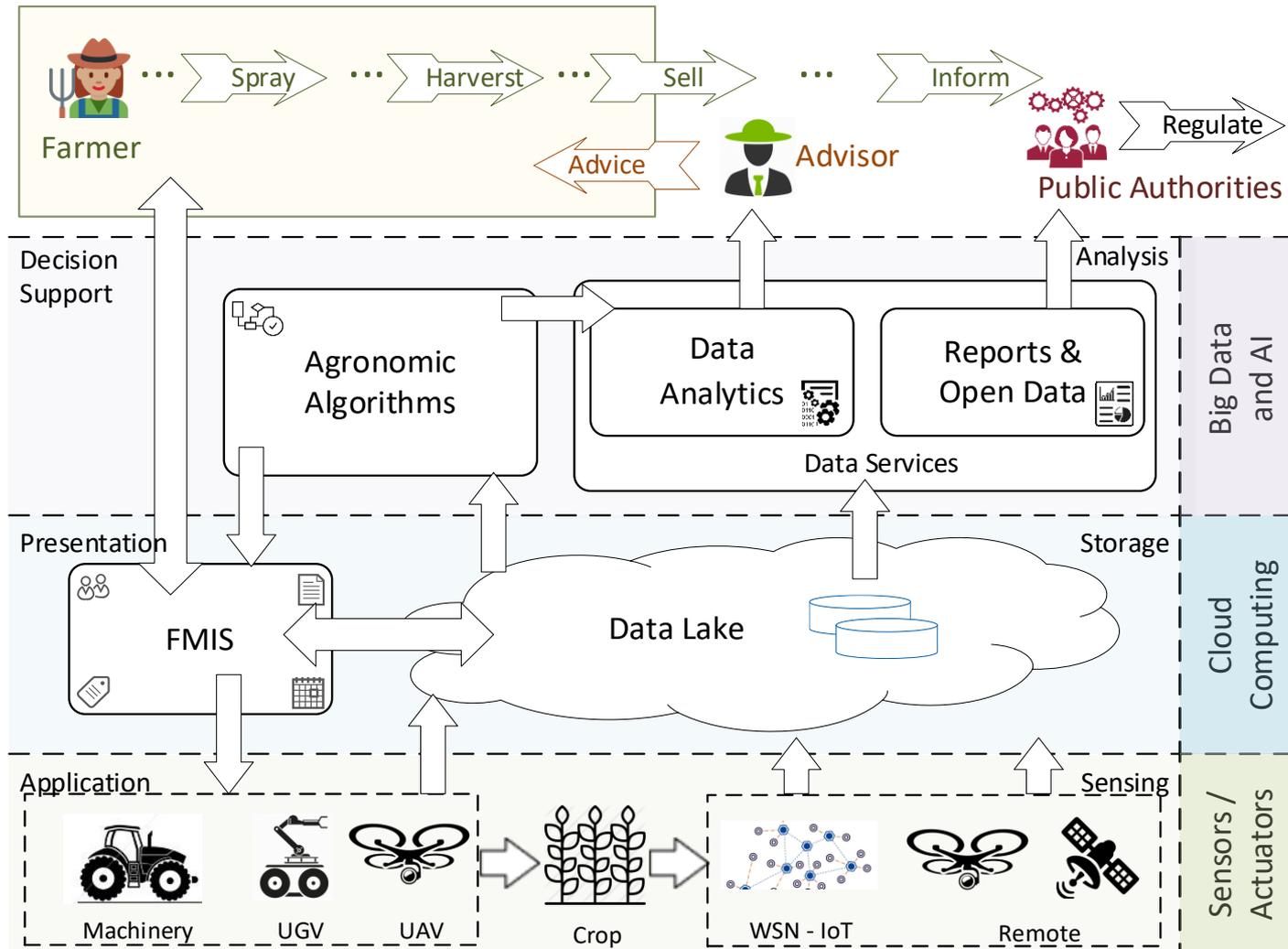
Digital Agriculture

- Highest level of cognition
- Data-driven processes
- (Near) real-time auton. operation

CYBER



Digital Agriculture Ecosystem



Source: Jointly conceived with Disy Information Systems GmbH

DIWAKOPTER – Digital Experimental Field Implemented Technologies

- Spraying Operations using UAVs
- UAV Tracking
- Precision Fertilization



DIWAKOPTER – Digital Experimental Field Spraying Operation



Source: www.youtube.com/watch?v=icq4Pzkv_2M

DIWAKOPTER – Digital Experimental Field

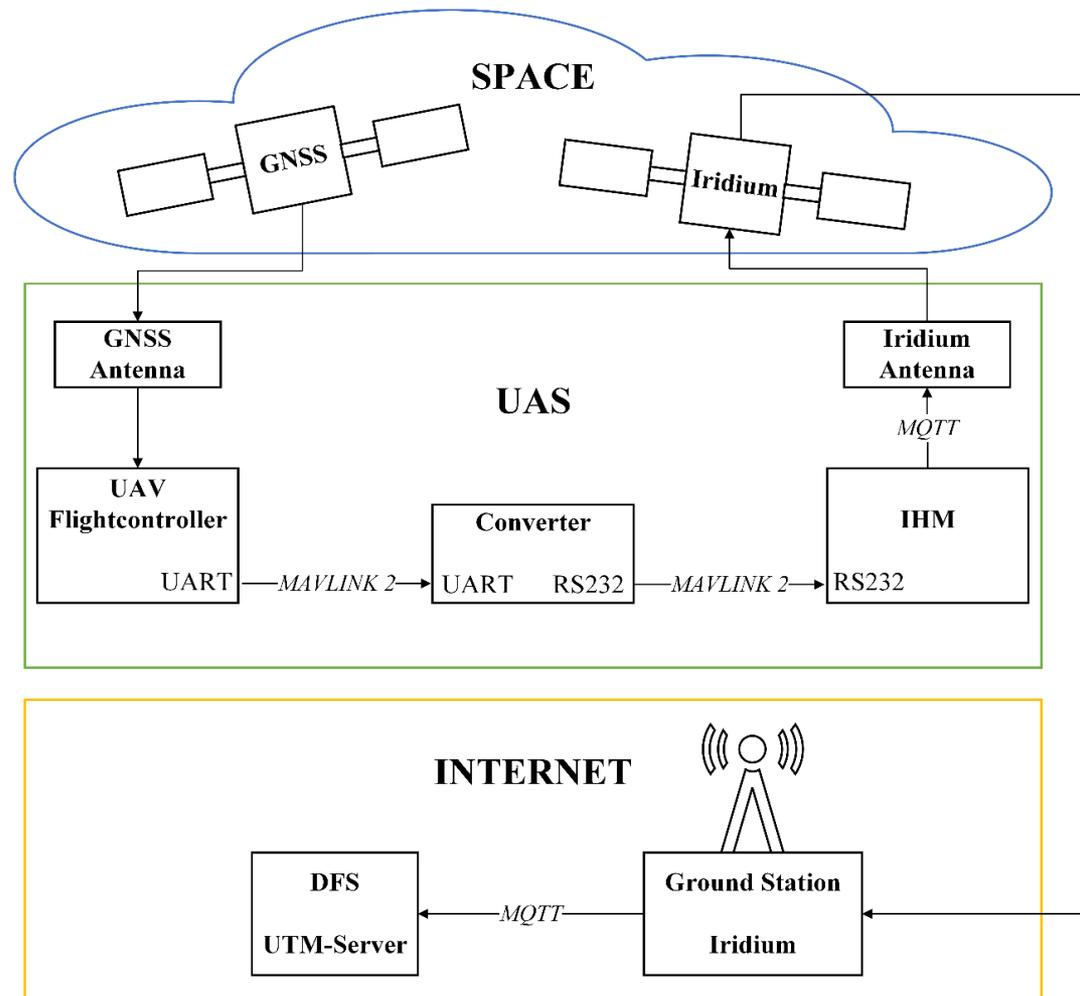
Drone Tracking by the DFS

UAS (Unmanned aircraft system)

- "Drone tracking" enables autonomous flight
- IHM (Intelligent Hybrid Modem)
- Sends position and drone data via satellite to the Internet

DFS (Deutsche Flugsicherung)

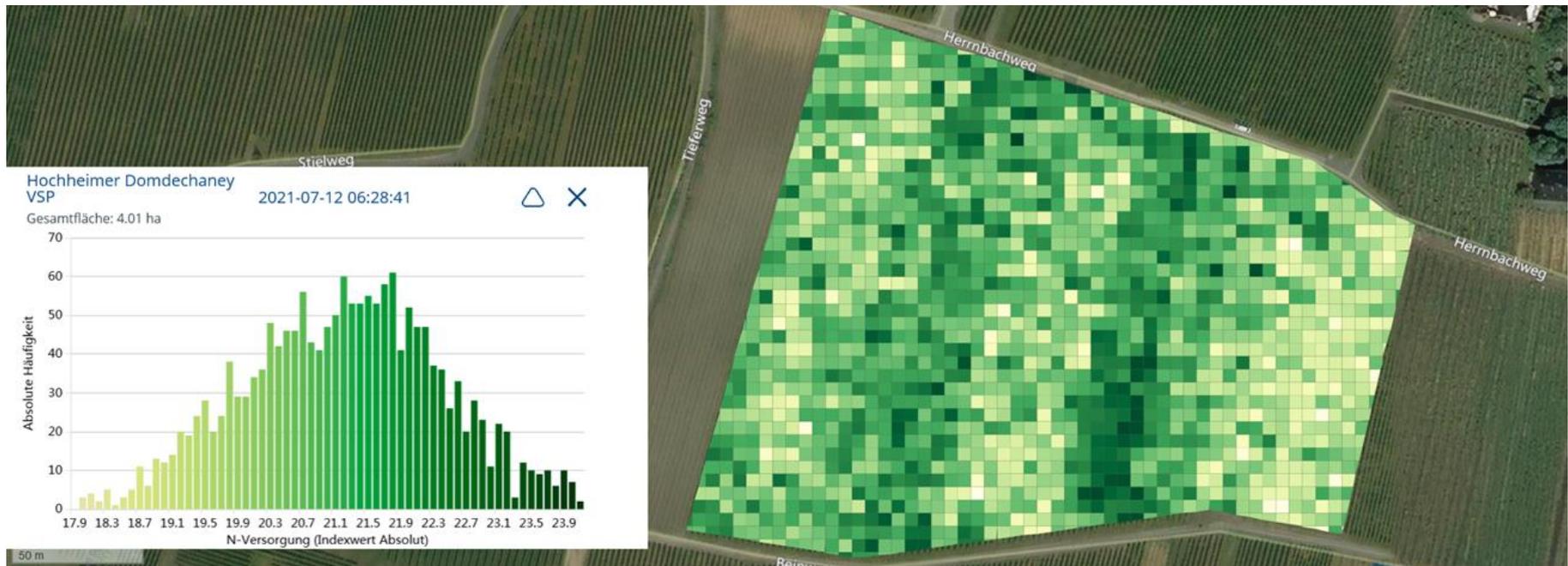
- Monitors the airspace
- UAS Traffic Management (UTM): Obtains real-time information about UAS and can send alerts to avoid collisions



Source: Björn Poss, Hochschule Geisenheim University

DIWAKOPTER – Digital Experimental Field Precision Agriculture

- Precision fertilization on areas of the “Hessische Staatsweingüter GmbH Kloster Eberbach”.
- Objective: Evaluation of the possibilities of precision fertilization in viticulture.



Source: Dr. Matthias Friedel, Hochschule Geisenheim University

Concluding Remarks

- Digital technologies are a reality on the farm forming a cyber-physical ecosystem.
- Sensing technologies have indicated substantial progress in the last years.
- Space solutions have become an essential data source in agriculture for decision-making but also real-time navigation and data transmission.
- Enhanced operations in terms of precision and efficiency are one of the next challenges.
- All technologies should be targeted at supporting the farmers and not replacing them.

Thank you!

Gefördert durch



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Technology in Specialty Crop Production

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