IOTWeek
IOT DEPLOYMENT &
BUSINESS CHALLENGES
WHAT LIES AHEAD IN THE AGRIFOOD SECTOR?
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Use-case Lead at IoF2020

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Communication partner at 365FarmNet

Network Manager bei CLAAS KGaA

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VISION OF THE POTENTIAL DISRUPTIVE IMPACT OF IoT SOLUTIONS ON THE AGRI-FOOD SECTOR

IoT deployment and business challenges for the Agri-Food sector

GRIGORIS CHATZIKOSTAS

June 19, 2019

A VISION OF THE AGRI-FOOD SECTOR IN 2050 THROUGHOUT THE FULL VALUE CHAIN

The Digital Transformation of Agri-Food

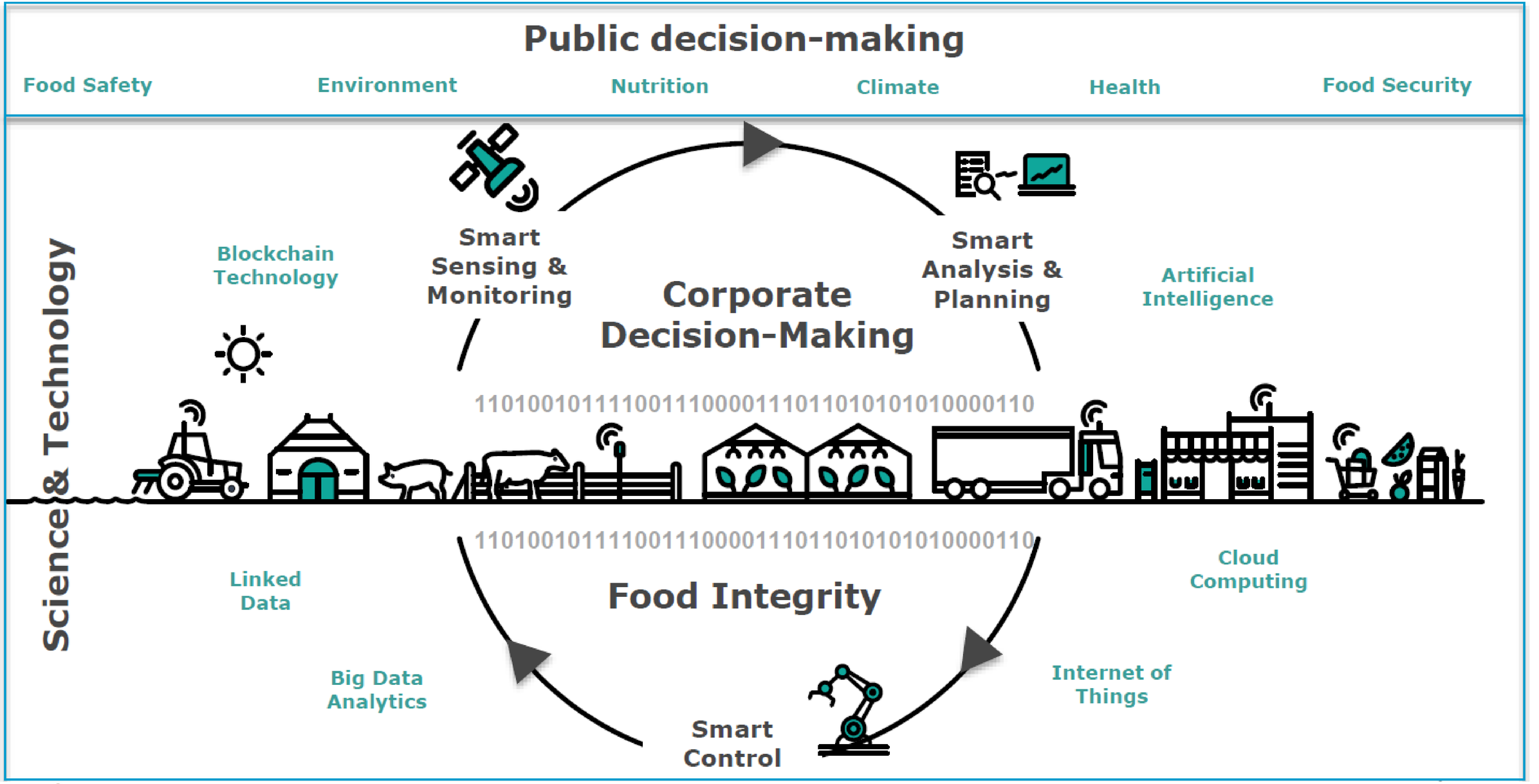
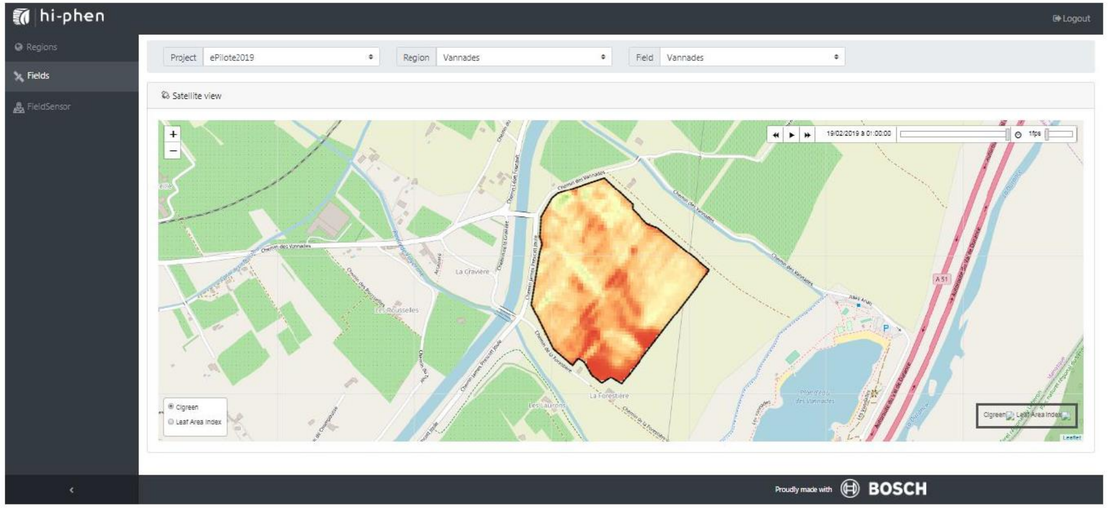


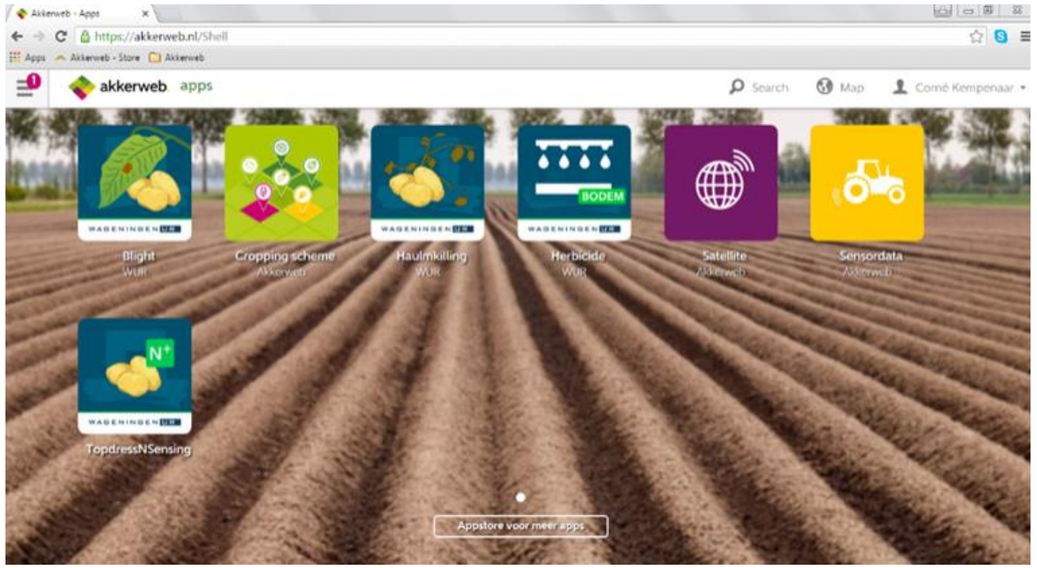
Image source: SmartAgriHubs - Connecting the dots to unleash the innovation potential for digital transformation of the European agri-food sector, presentation of Sjaak Wolfert, SmartAgriHubs kick-off meeting, March 2019

IoF2020 SOLUTIONS AND THEIR CURRENT POSITION IN THE DEVELOPMENT CYCLE

IoT SOLUTIONS FOR ARABLE FARMING



Crop monitoring dashboard



Akkerweb platform dashboard for soil mapping

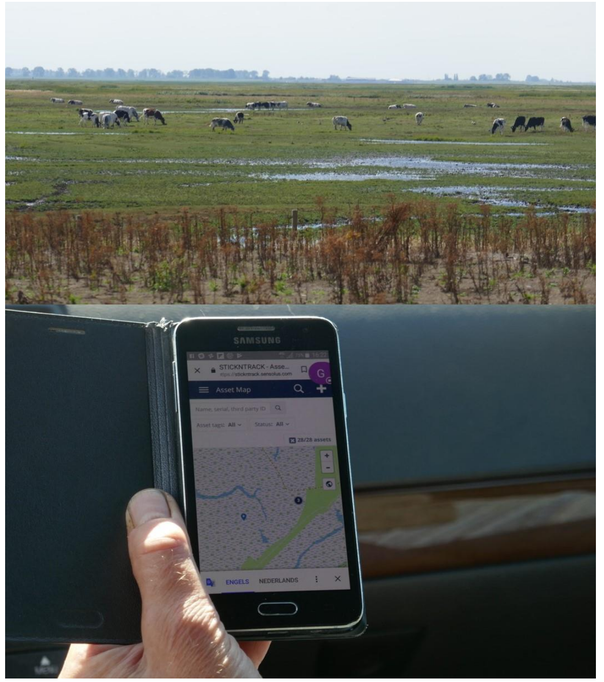
Electrical conductivity scanner detecting clay content and organic matter for conductivity zoning

- Arable farming has 44 deployment sites
- Interoperability between farm machines and software is bridged

IoT SOLUTIONS FOR DAIRY FARMING

IoT for remote calibration support of milk samples to guarantee milk safety and quality

Radio and TV feature of artificial intelligence in dairy farming

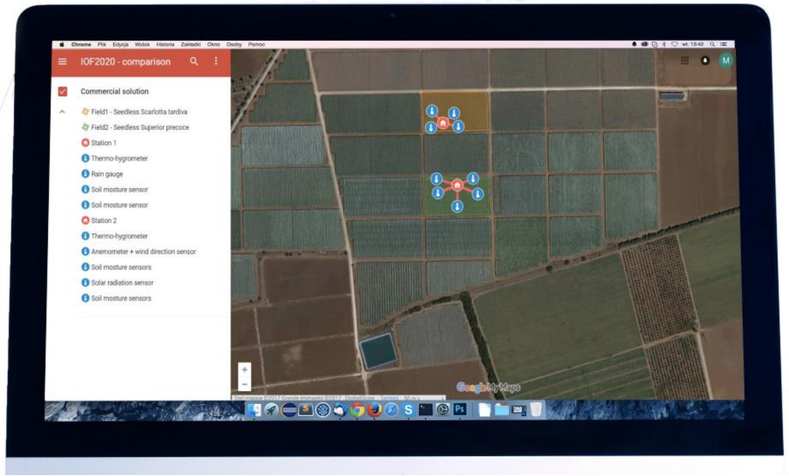


Outdoor beef cattle tracking has rescued a trapped cow in a nature reserve area

- Connecterra raised additional €4.2m for dairy tech
- Dairy farming has 30 deployment sites around Europe

IoT SOLUTIONS FOR FRUIT

NFC tags for crop monitoring

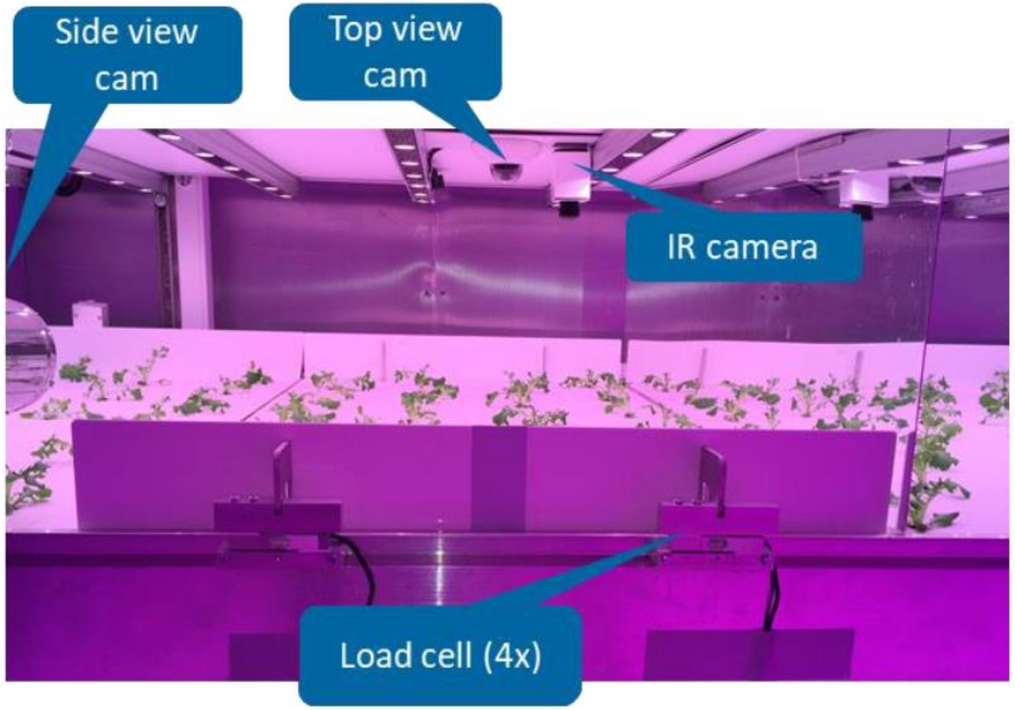


IoT sensors

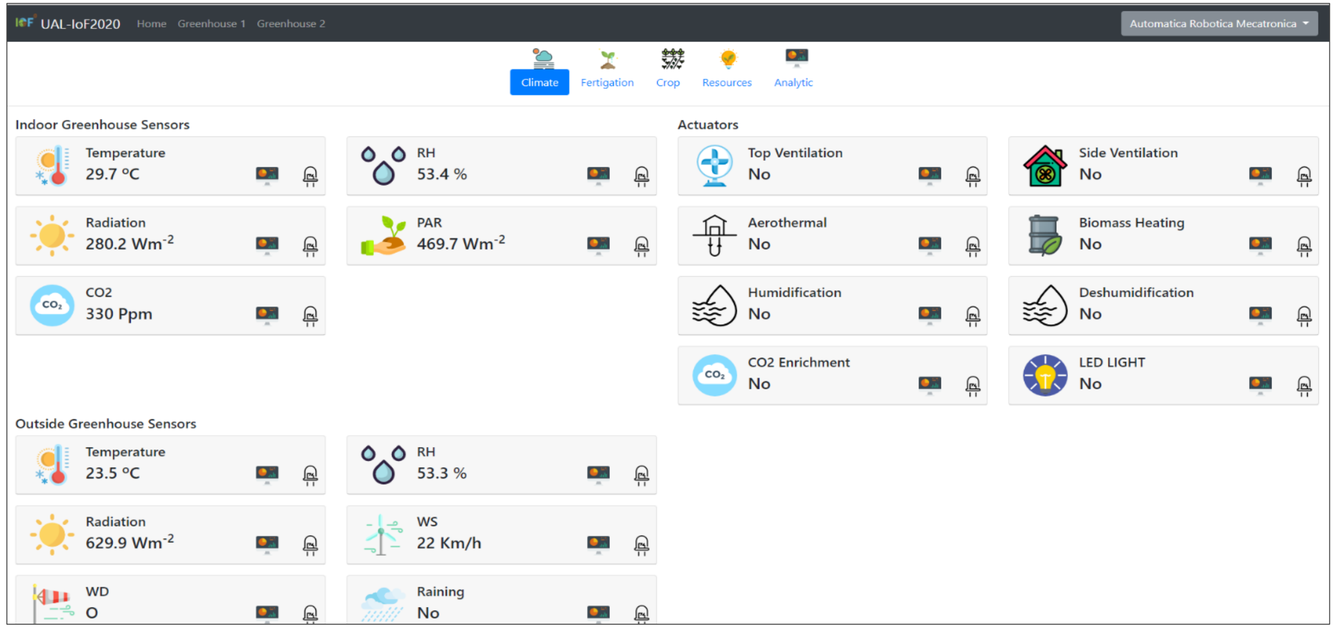
Installations in Romanazzi farm – weather station under the vineyard canopy

- Fruit Trial has more than 50 deployment sites around Europe
- Wine shipping device (Jodyn Live) test extension to USA & China
- Strong Fruit Trial synergies and collaboration
- EuroPool performs large-scale experimentation in real supply chains

IoT SOLUTIONS FOR VEGETABLES



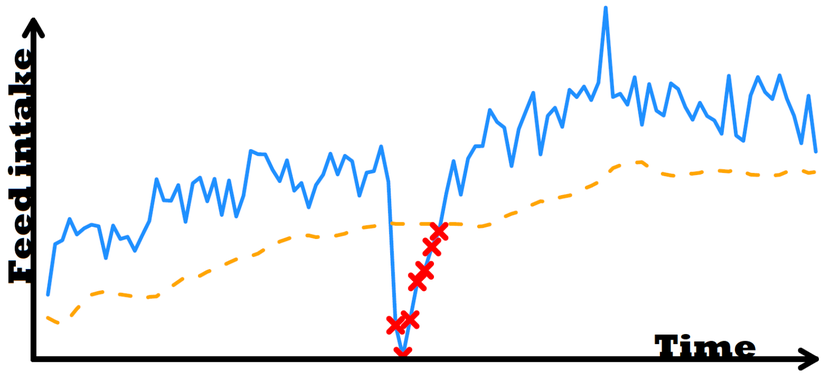
Sensors located in a growth layer in one of the climate cells at Signify

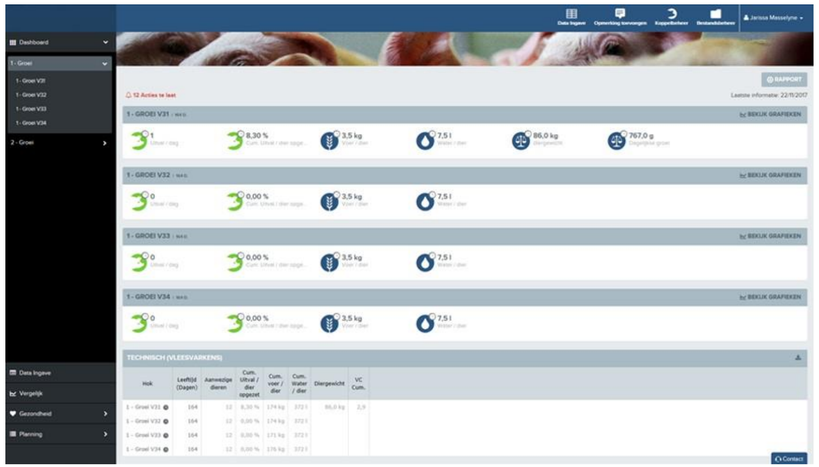


Software tool interface showing greenhouse climate monitored parameters

- Vegetables Trial has 29 deployment sites around Europe
- Full-controlled farming is operating under regulated conditions
- New crops introduced for weeding machines testing

IoT SOLUTIONS FOR MEAT





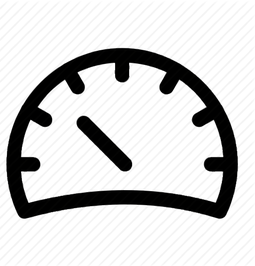
Alerts when the feed intake has dropped under the threshold

- Managed to optimize production, transport & processing of poultry meat
- IK4-TEKNIKER has launched novel transport sensor
- Meat Trial has more than 20 deployment sites

IoF2020 DEPLOYMENT SITES OVERVIEW

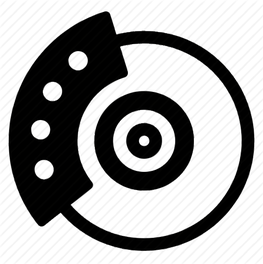
5 TRIALS - 33 USE CASES

BREAKS AND ACCELERATORS FOR DEVELOPMENT



ACCELERATORS

- Increased awareness for food safety & transparency
- Ease of use and affordability, value-for-money, ROI, novel business models
- Vertical and horizontal integration across value chains, fear-of-missing-out
- Traction with investors

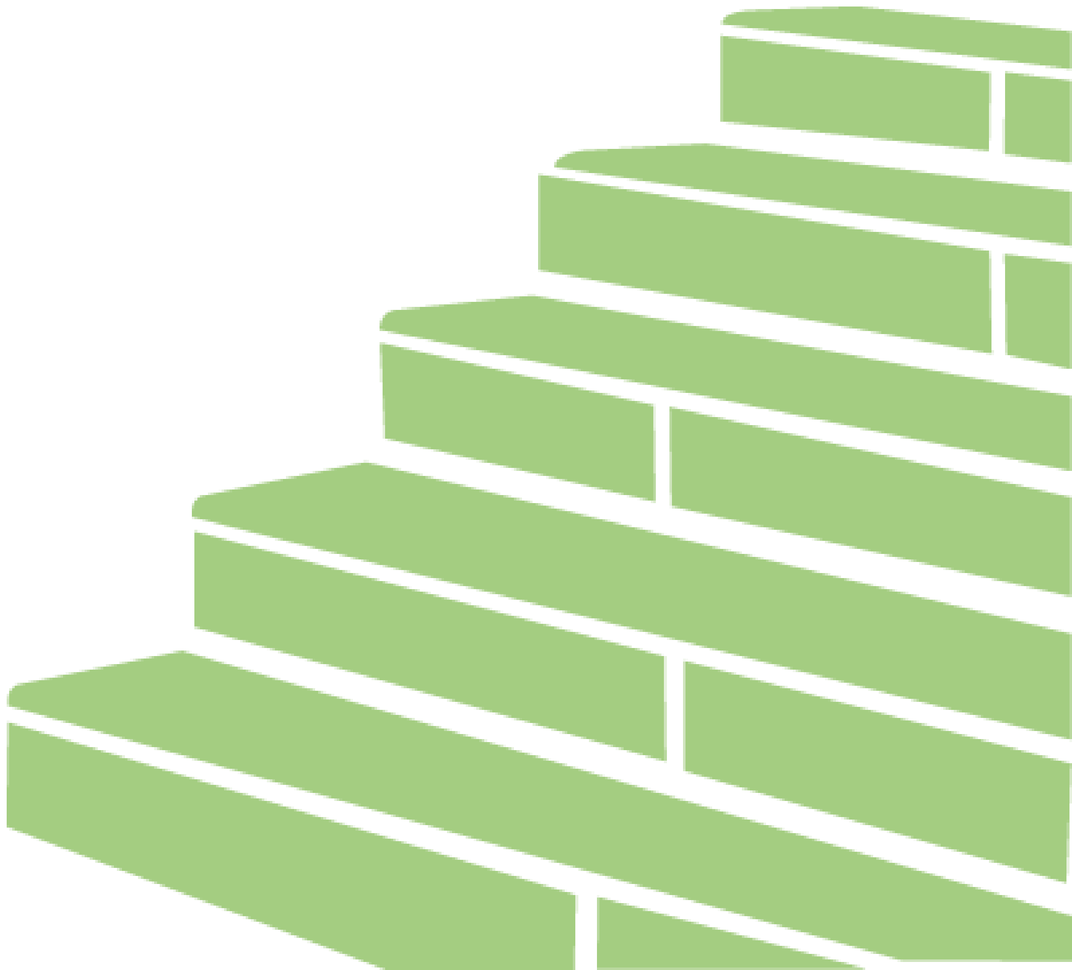


BREAKS

- Interoperability challenges
- Perceived security and privacy risks
- Data ownership issues
- Barriers on global trade of agri-food products
- Rural wireless and broadband coverage

NEXT STEPS

- Exploitation & monetization,
- Actively engaging with end-users,
- Scaling up,
- Global expansion.



THANK YOU

Any questions?

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HARALD SUNDMAEKER

Technology Lead of IoF2020

Senior Researcher at ATB Bremen

Technical Challenges of IoT Deployment in the Agri-food Sector

INTERNET OF FOOD & FARM

IoT Week 2019

IoT Deployment and Business Challenges for the Agri-Food sector: What lies ahead ?

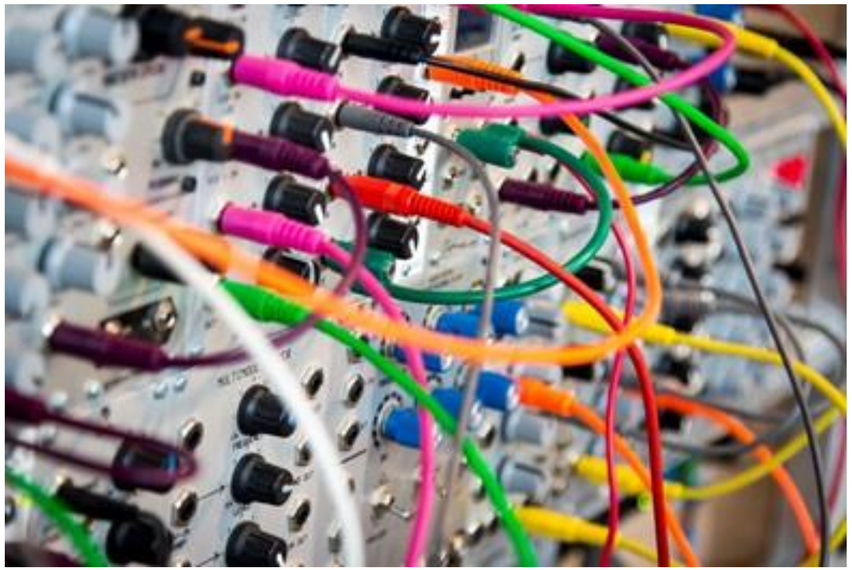
Aarhus, 19.06.2019 – Harald Sundmaeker – ATB, IoF2020 Large Scale Pilot Project

Institut für angewandte Systemtechnik Bremen GmbH

IoF2020 – What does it mean?

IoF2020 – what does it mean?

- Diverse agri-food sectors addressed for IoT validation
- Heterogeneity of IoT based solutions
- From large industry to small farmers
- From small scale experimentation to large scale deployment
- Complexity!



UC1.1
Within-field Management Zoning
Sensors for precise field management
NL, DE, BE, FR, UK, PL

UC1.2
Precision Crop Management
Precision of satellite images by sensors
FR

UC1.3
Soya Protein Management
Production DSS for higher protein levels
AT, IT

UC1.4
Farm Machine Interoperability
Data exchange btwn machinery & FMIS
NL, DE, DK, BE, FR, AT, RS, RO, UA, IT

UC1.5
Potato Data Processing Exchange
Data exchange btwn field & processing
NL, BE, PL

UC1.6
Data-Driven Potato Production
Smart farming using telemetric stations
CY, PL, UA, EL

UC1.7
Traceability for Food and Feed Logistics
Secure transport of bulk goods
BE, NL, PL, FR, BG, RO, ES, SI

UC1.8
Solar-powered Field Sensors
Sensor-based farm management
DE, RO, HU

UC1.9
Within-field Management Zone Baltics
Macro- and micro-nutrient analysis
LT, LV, NL

UC2.1
Cow Grazing Monitor
Roaming herd tracking, grazing manager
BE, NL

UC2.2
Happy Cow
Improve dairy farm productivity
NL, BE, DE, IE

UC2.3
SilentHerdsman+
Health monitoring of dairy cows
UK

UC2.4
Remote Milk Quality
Remote sensor calibration for dairy labs
NL

UC2.5
Lameness Detection through Machine Learning
Early lameness detection in cattle
IE, PT, IL, ZA, UK

UC2.6
Precision Mineral Supplementation
Precision livestock farming at dairy farms
DK, LT, LV, DE

UC2.7
Smart Precision Cow and Cattle Monitoring
Animal welfare monitoring
HU, PL, CZ, SK

UC3.1
Fresh Table Grapes Chain
Precision farming, shelf-life extension
IT, EL

UC3.2
Big Wine Optimization
Sustainable high quality wine production
FR, IT

UC3.3
Automated Olive Chain
DSS and quality tool for olive oil
ES, EL

UC3.4
Intelligent Fruit Logistics
Smart sensing in whole logistic chain
DE, NL

UC3.5
Smart Orchard Spray Application
Optimize plant protection spraying
ES, HU, PL, PT

UC3.6
Beverage Integrity Tracking
Monitor whole distribution channel
IT, PT, RO

UC4.1
City Farming of Leafy Vegetables
Full automated vertical farming
NL

UC4.2
Chain-Integrated Greenhouse Production
Data integration in greenhouses
ES, IT, NL, EL, TR

UC4.3
Added-value Weeding Data
Edge-computed plant sensing on video
NL, AT

UC4.4
Enhanced Quality Certification System
Sensing as data sources for certification
IT, ES

UC4.5
Digital Ecosystem Utilization
DSS with data sharing farm-to-fork
EL, SI, CY

UC5.1
Pig Farm Management
Feed conversion & health optimization
BE, NL

UC5.2
Poultry Chain Management
Flock uniformity, feed conversion, health
ES, BE

UC5.3
Meat Transparency and Traceability
Trustful event tracking
NL, DE

UC5.4
Decision Making Optimization in Beef Supply
Data exchange across value chain
BG, HR, IE, IT, ES, PT

UC5.5
Feed Supply Chain Management
Integral feedstock management
ES, UK, DE

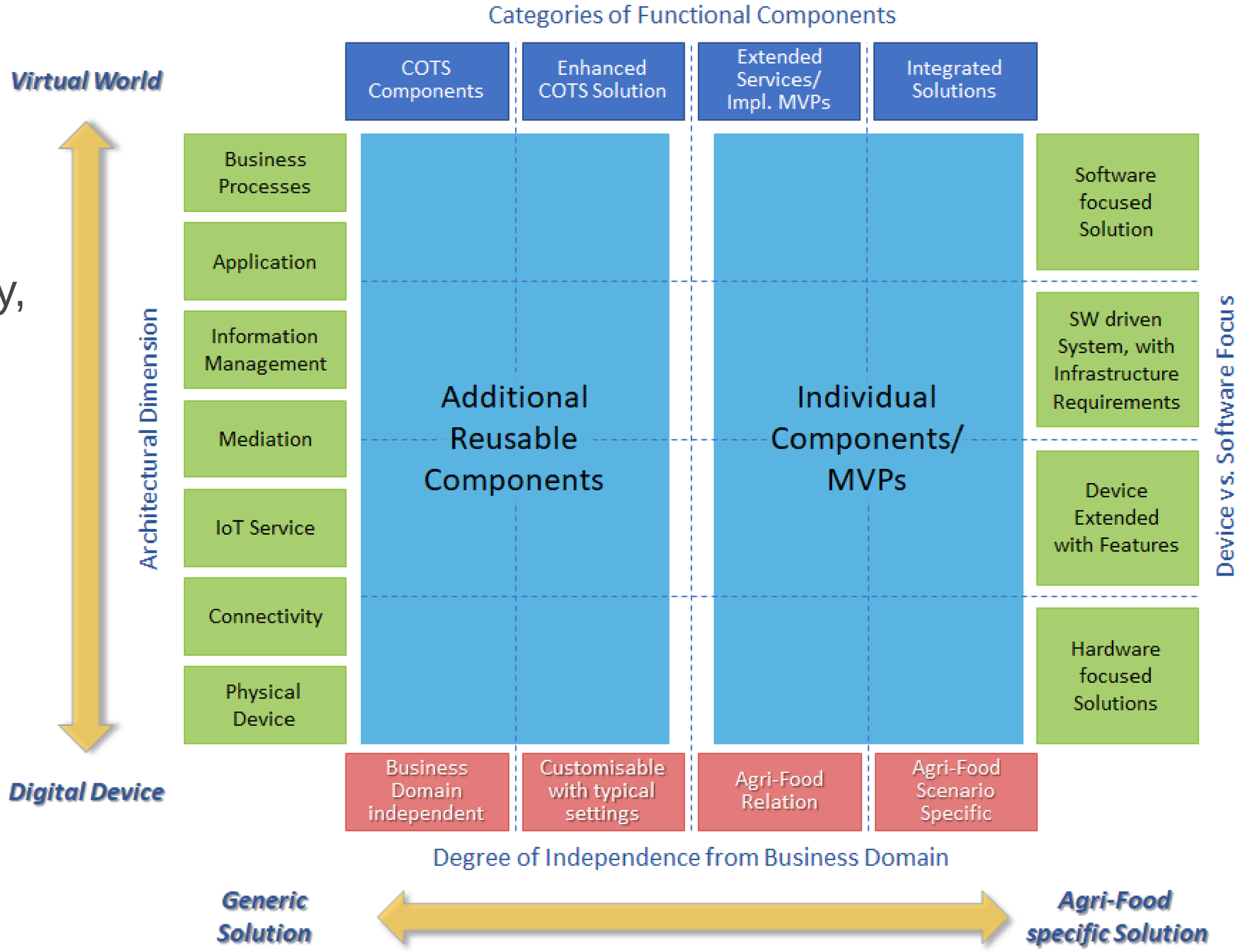
UC5.6
Interoperable Pig Tracking
Livestock health monitoring for pigs
SE, ES, CH

IoF2020 use-cases

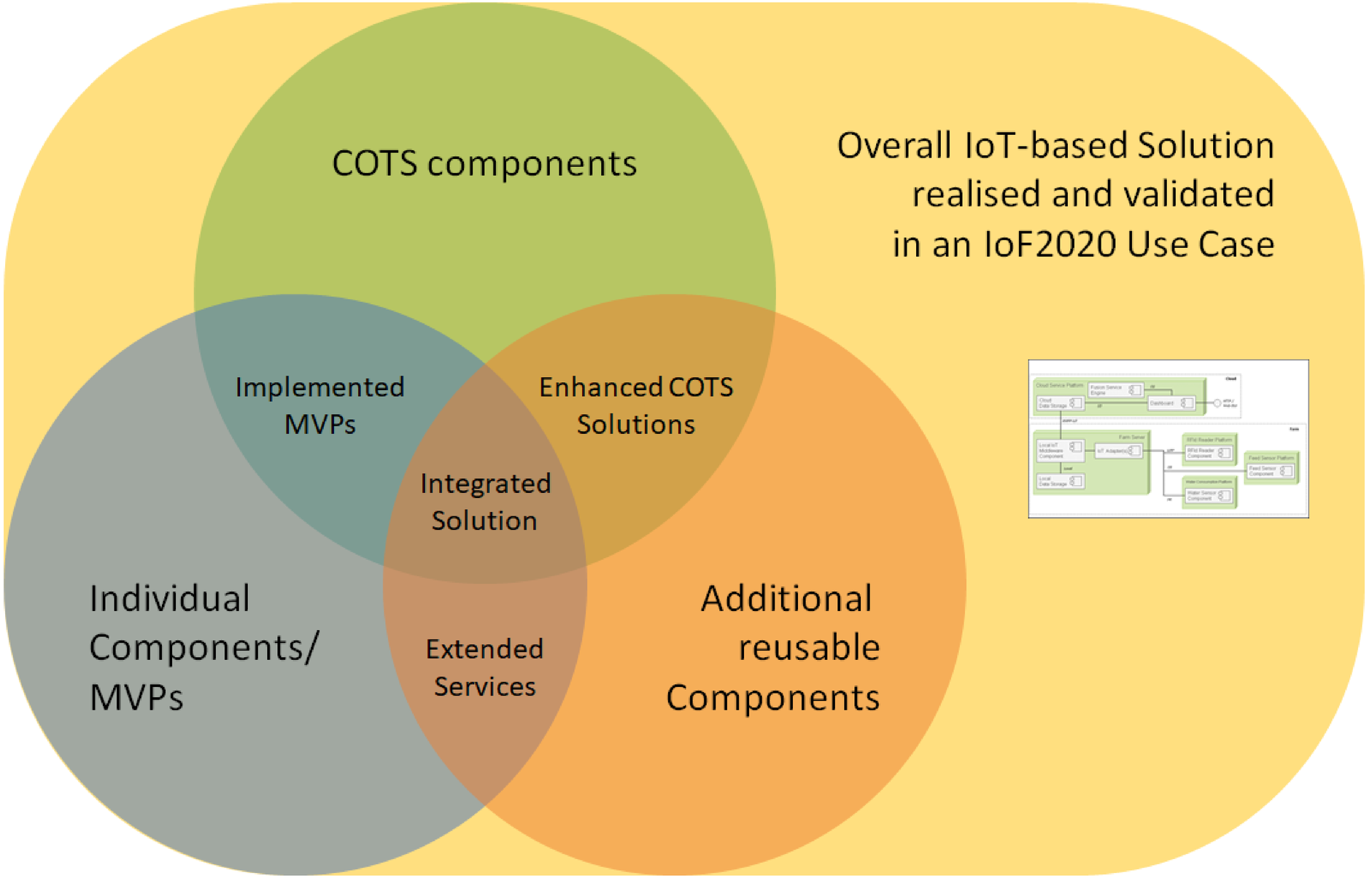
Here is an overview of the use-cases

Structure for UC Analysis

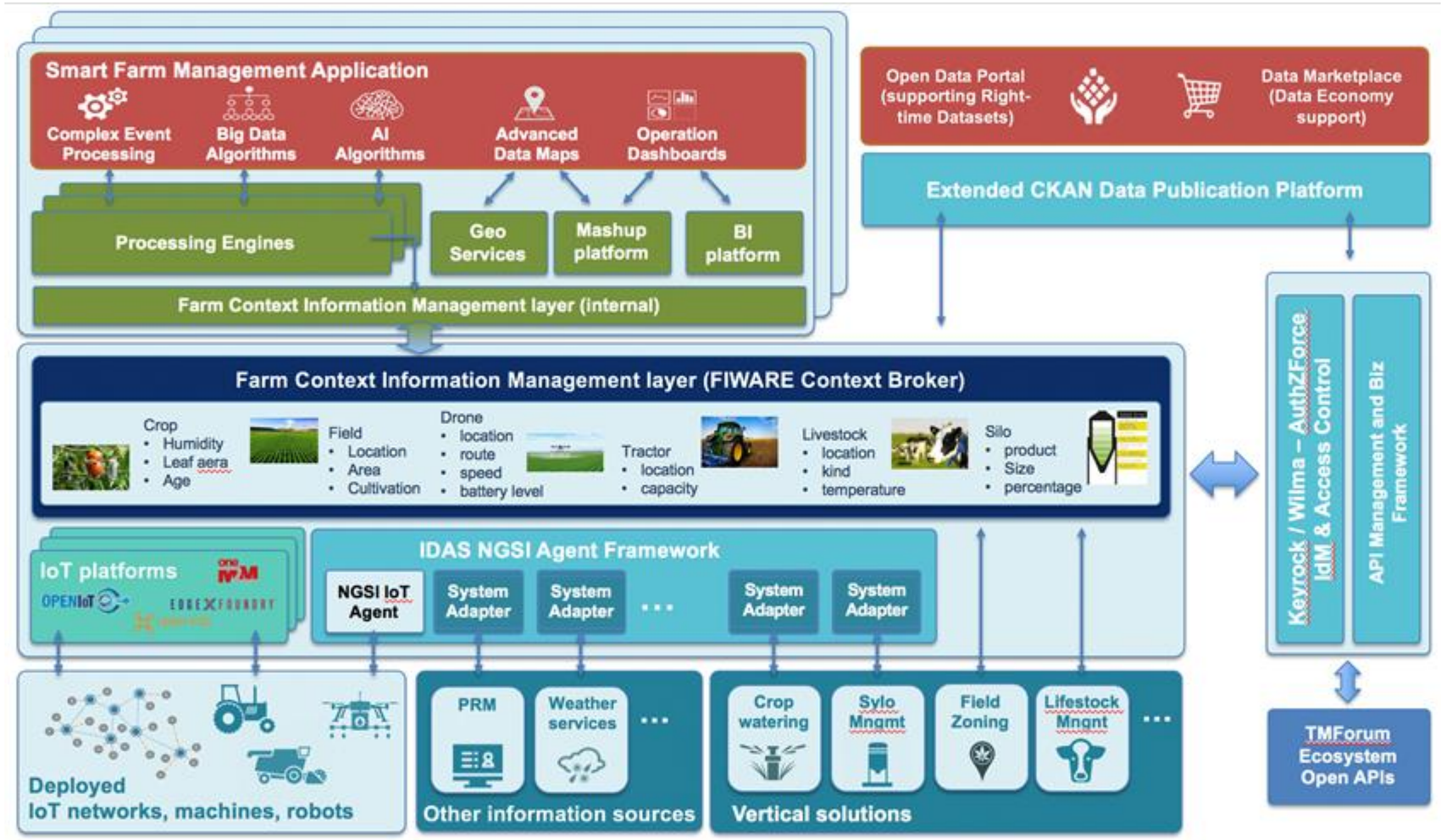
- Aiming to understand the degree of reusability, outside the use case scope.
- Are there potential synergies between use cases?



Type of Results vs. Realistic Possibility for Reuse!?



Smart Farm Management Systems: an open approach

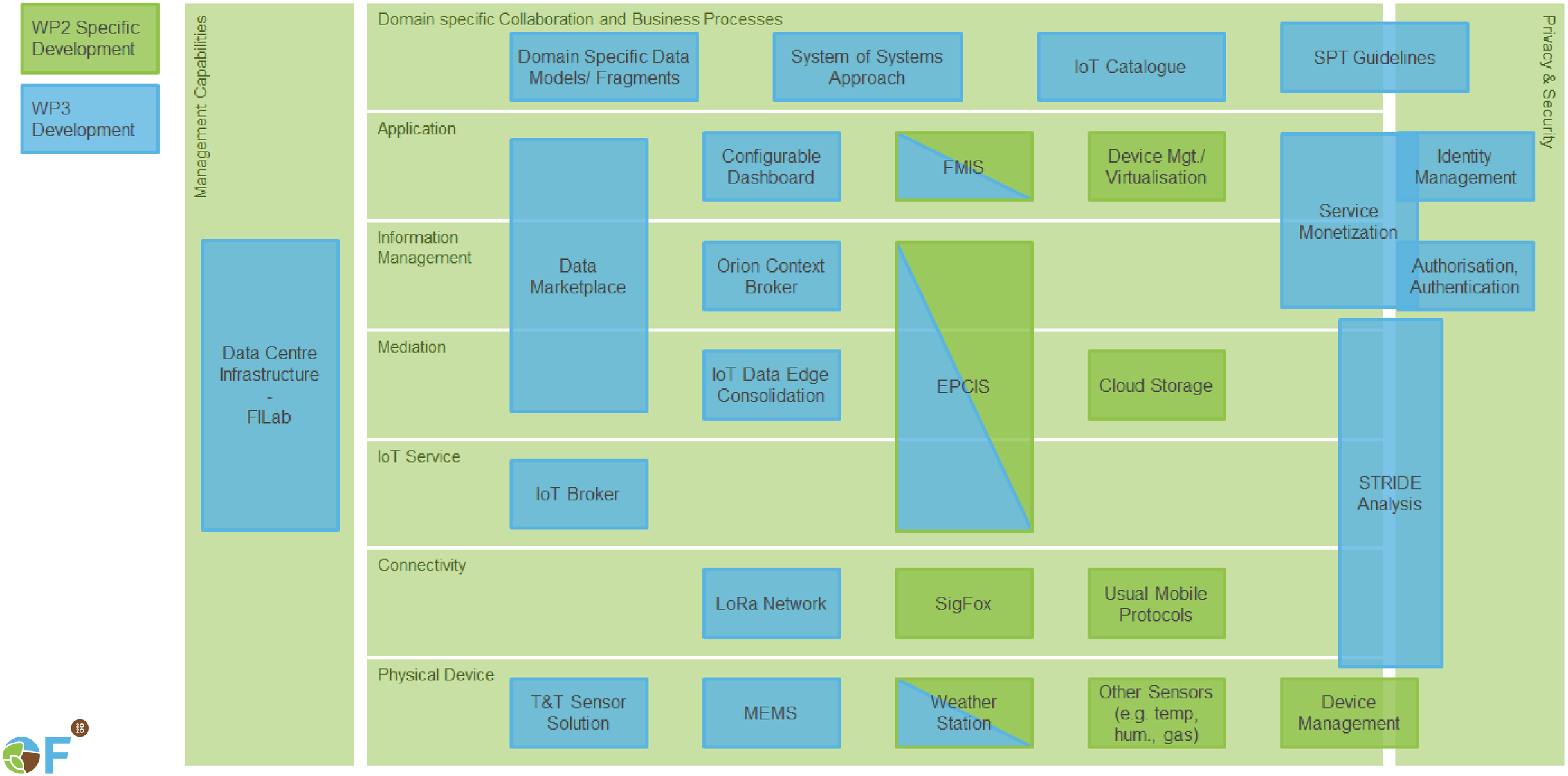


- FIWARE Orion Context Broker technology as open, neutral and standard-based data integration technology
  - Easy integration in architecture of Farm Management systems
  - “only once” integration of farm vertical solutions
- Common Information Models easing interoperability and replaceability of solutions:
  - Farm Management systems
  - Vertical solutions
- Integration with data publication and marketplace platforms based on open standards

Key Technical Challenges for IoT Deployment

- Interoperability and granting/limiting access to data
- Costs vs. quality
- Accuracy of sensors & Battery lifetime
- Availability of communication networks
- Communication bandwidth
- Size of components
- Harsh environment (e.g. impact of vibration, humidity, temperature)

Reusable components relevant in the IoF2020 use cases

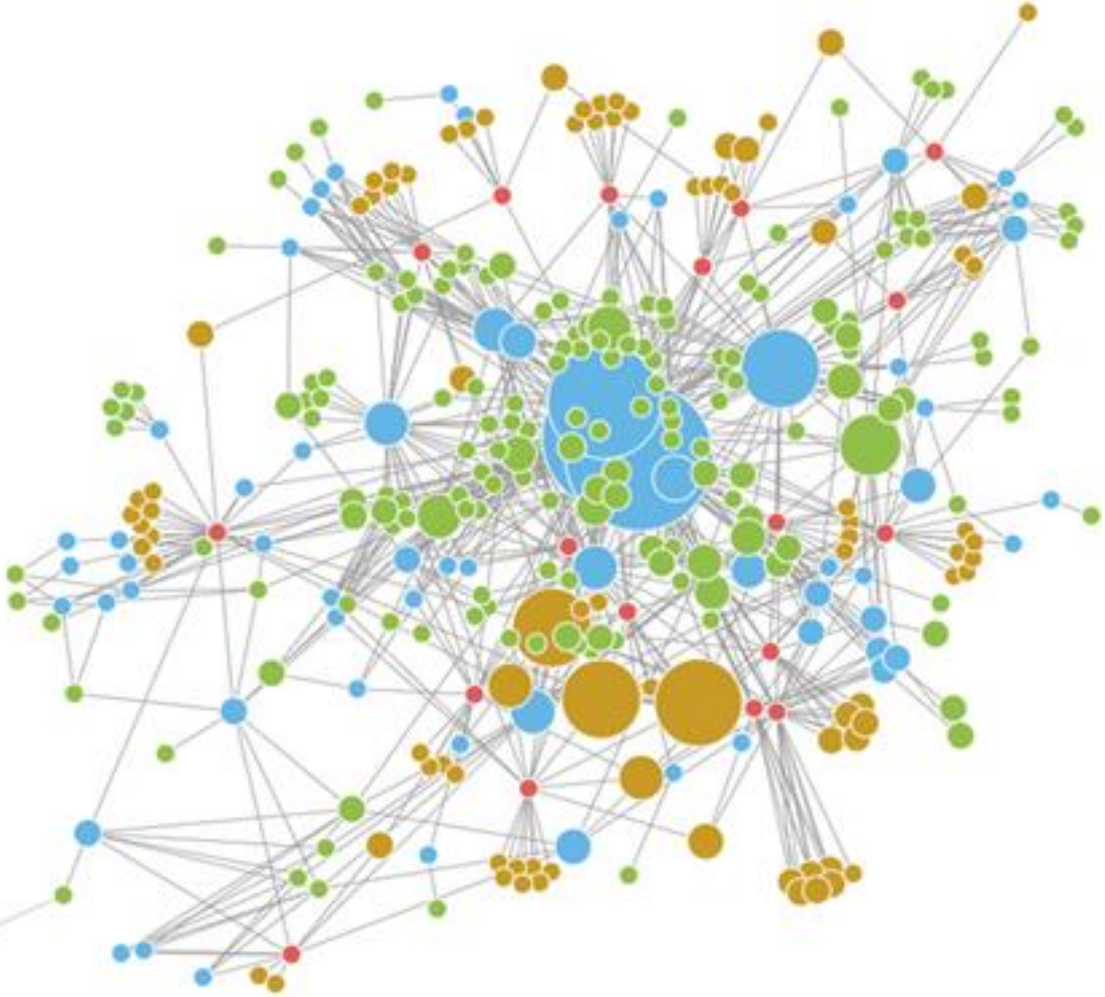


www.iot-catalogue.com

IoT CATALOGUE

IOF 2020

IOF2020 CASE STUDIES | NOW AVAILABLE IN IOT CATALOGUE



This diagram represents all the actual relations that IoT Catalogue currently has. The proportion of the bubble represents the number of relationships that every element have.

• ICT Problems • Products • Value Proposition • Use Cases

Sustainable IoT Catalogue presenting components & lessons learnt that facilitate realisation of IoT based solutions

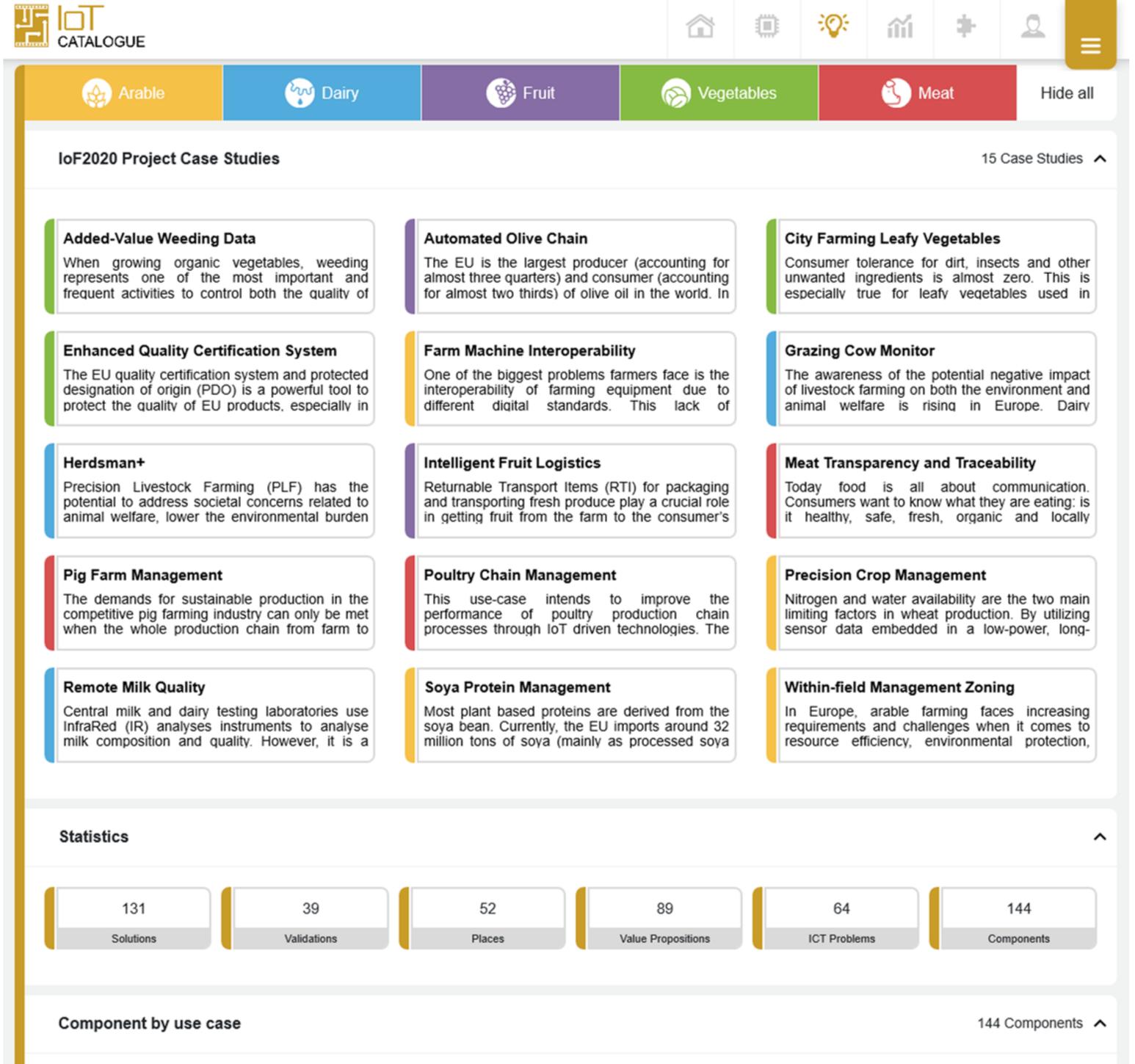
IoT CATALOGUE

www.iot-catalogue.com

Different ways to access information

- Listing the IoF2020 use cases
- Enabling search by components
- Mapping of solutions with value propositions, ICT problems, functions and target scenario
- Identifying the team behind

www.iot-catalogue.com



Let’s also discuss detailed questions directly

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INTERNET OF FOOD & FARM

IoF2020 is funded by the Horizon 2020 Framework Programme of the European Union. Grant Agreement no. 731884. Visit iof2020.eu for more information about the project.

IOTWeek

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Co-Lead of IoF2020 Use-case on Interoperability

Head of Research Unit at Aarhus University

THE IMPLICATIONS OF IOT FOR THE AGRICULTURAL MACHINERY SECTOR

CLAUS GRØN SØRENSEN

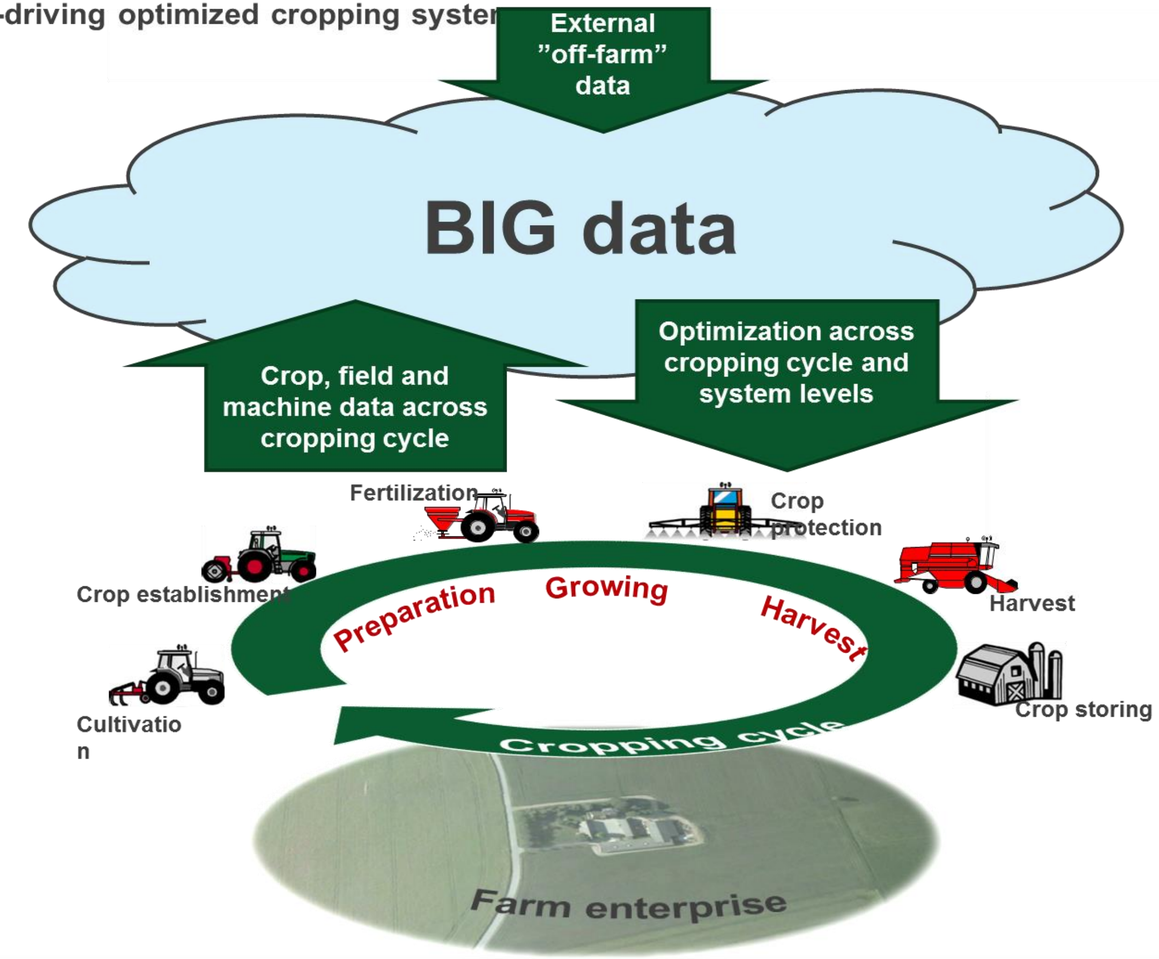
MICHAEL NØRREMATK

AARHUS UNIVERSITY

June 19, 2019

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement №731884

Data-driving optimized cropping syste



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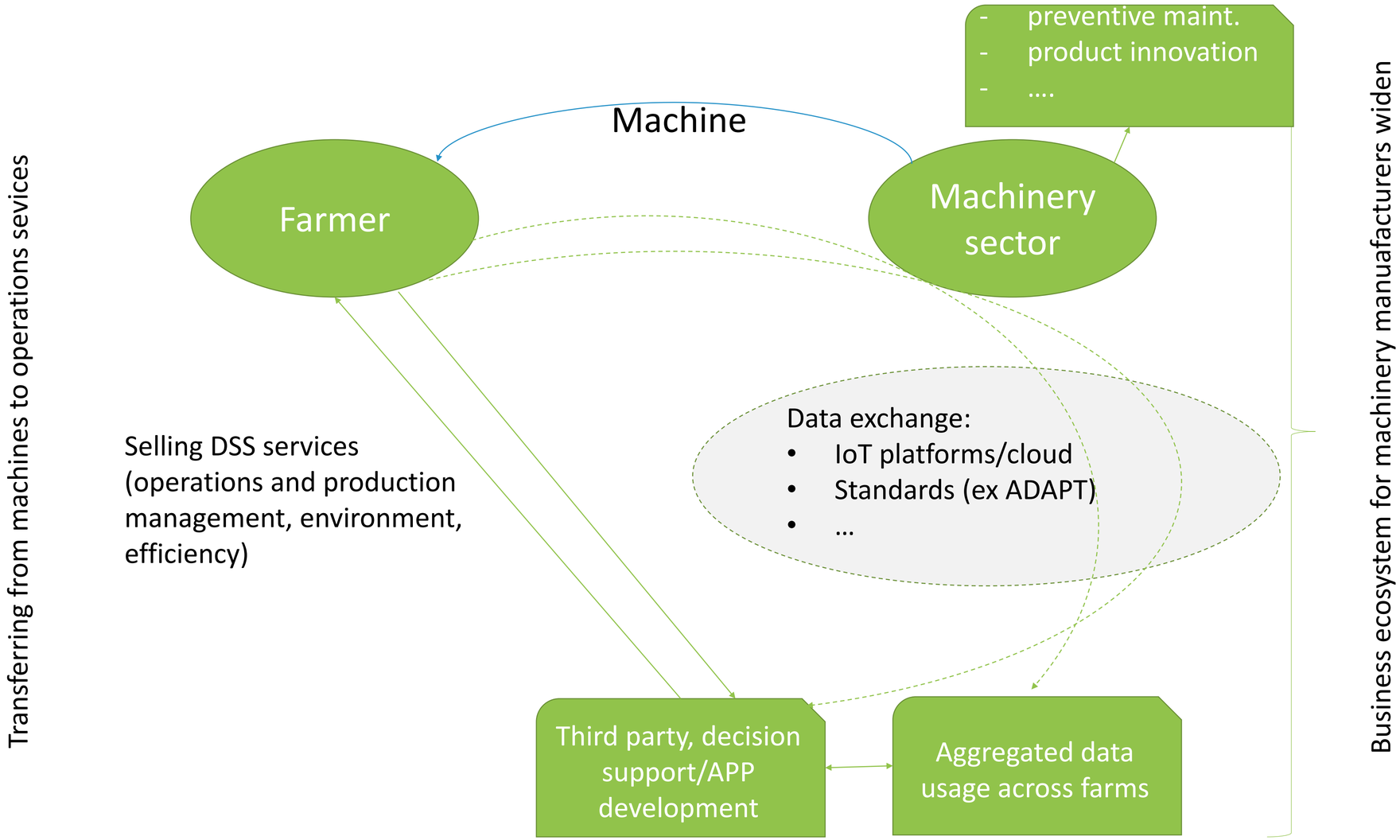
Popular business models



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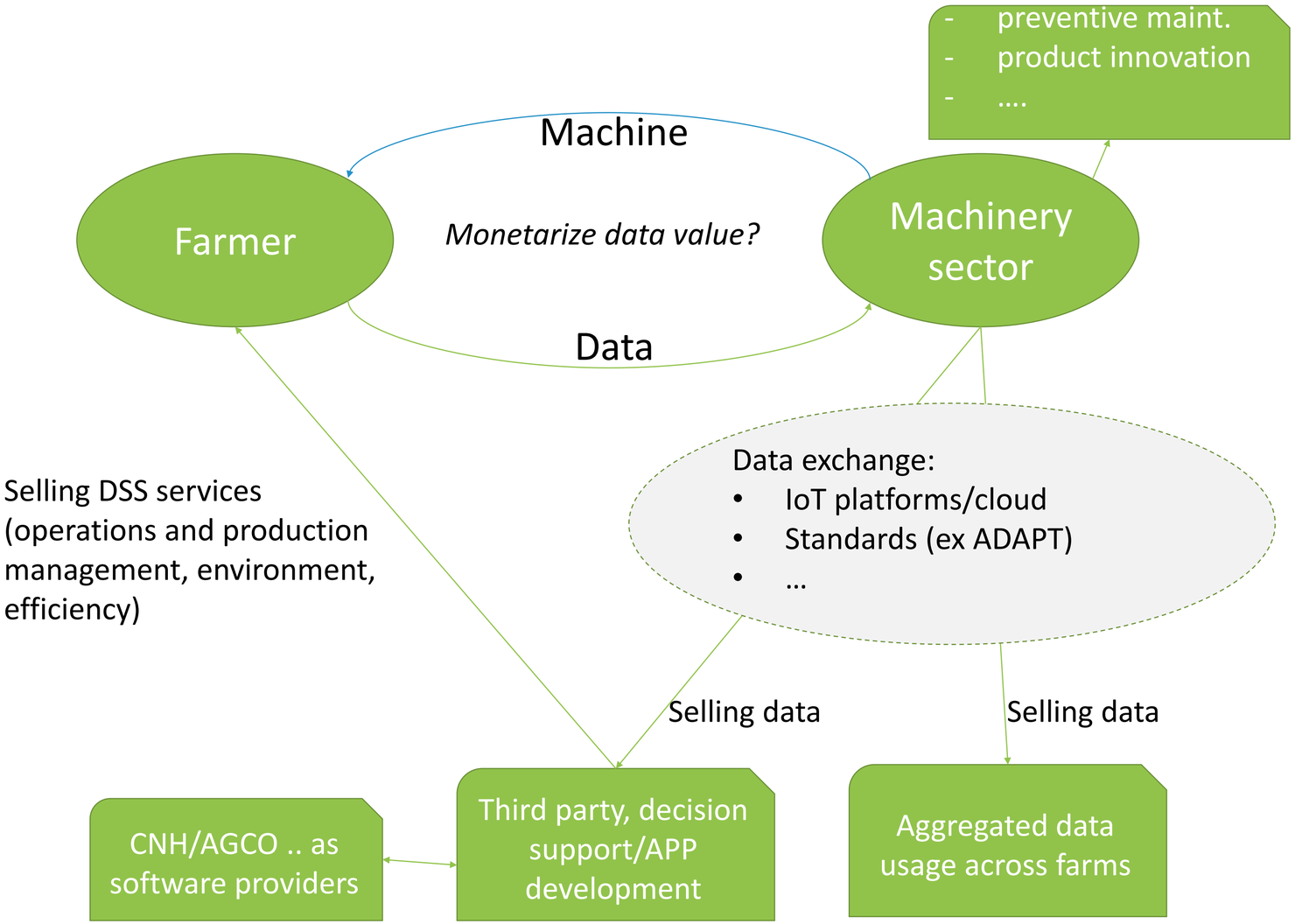
Vision business models and ecosystems!



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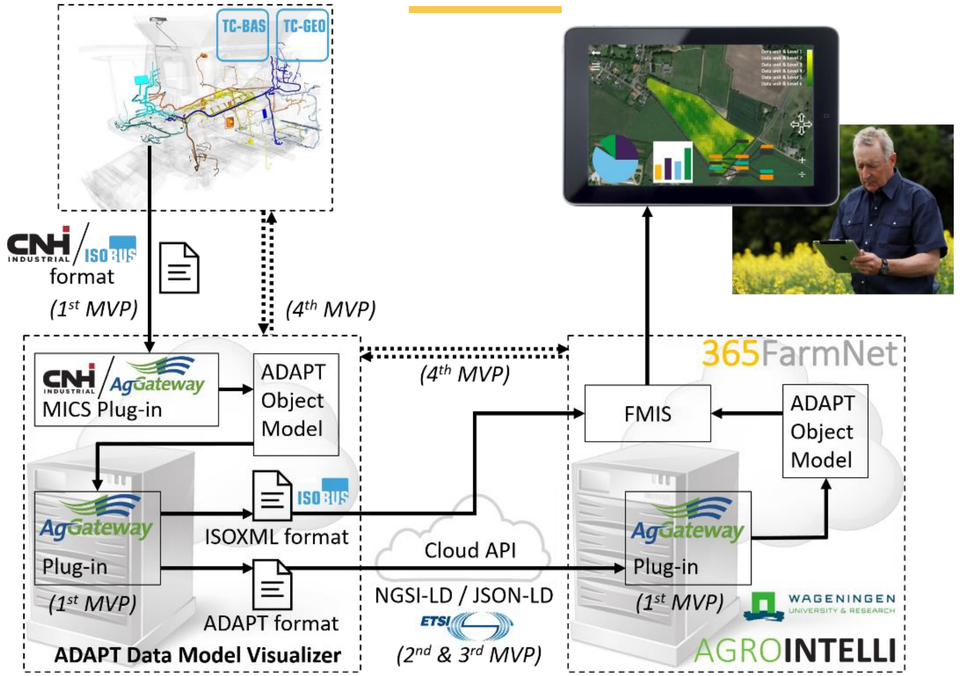
IoT Product/Solution Impressions



OFFLINE INTEROPERABILITY → **REAL TIME COMMUNICATION** → **FMIS APPLICATION**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement №731884

New prospective benefits/business models

- collect data and measurement about the production -> *agronomic input for management and promoting sustainability*
- connecting agricultural data with their manufacturers -> *predictive maintenance, guarantee claims..*
- smart farming technologies will pave the way for *autonomous systems* (robots, self awareness, supportive IT systems, etc.)
- basic data sales - on-farm tests, product innovation, etc.
- vehicle data sent on-line valuable both for the vehicle value chain (dealers, insurance, complaint issues, etc.) and for external actors
- ”Power/functionalities on demand” - on-line via apps and factory or dealer updates

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement №731884

Key takeaway points

- Extending from electro/mechanics to ICT/IoT
- Extending from product focus to IoT platform business/services
- Change of company culture/mindset
- Technical challenges/connectivity
- Current workforce re-education/re-training
- Privacy/security
- Monetarization of data value/data ownership
- Multi-branded fleets/cross-domain scenarios
- Damage to the brand from IoT system failures
- Initial business failure due to initial small data samples

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IOTWeek

KLAUS-HERBERT ROLF

Communication partner at 365FarmNet

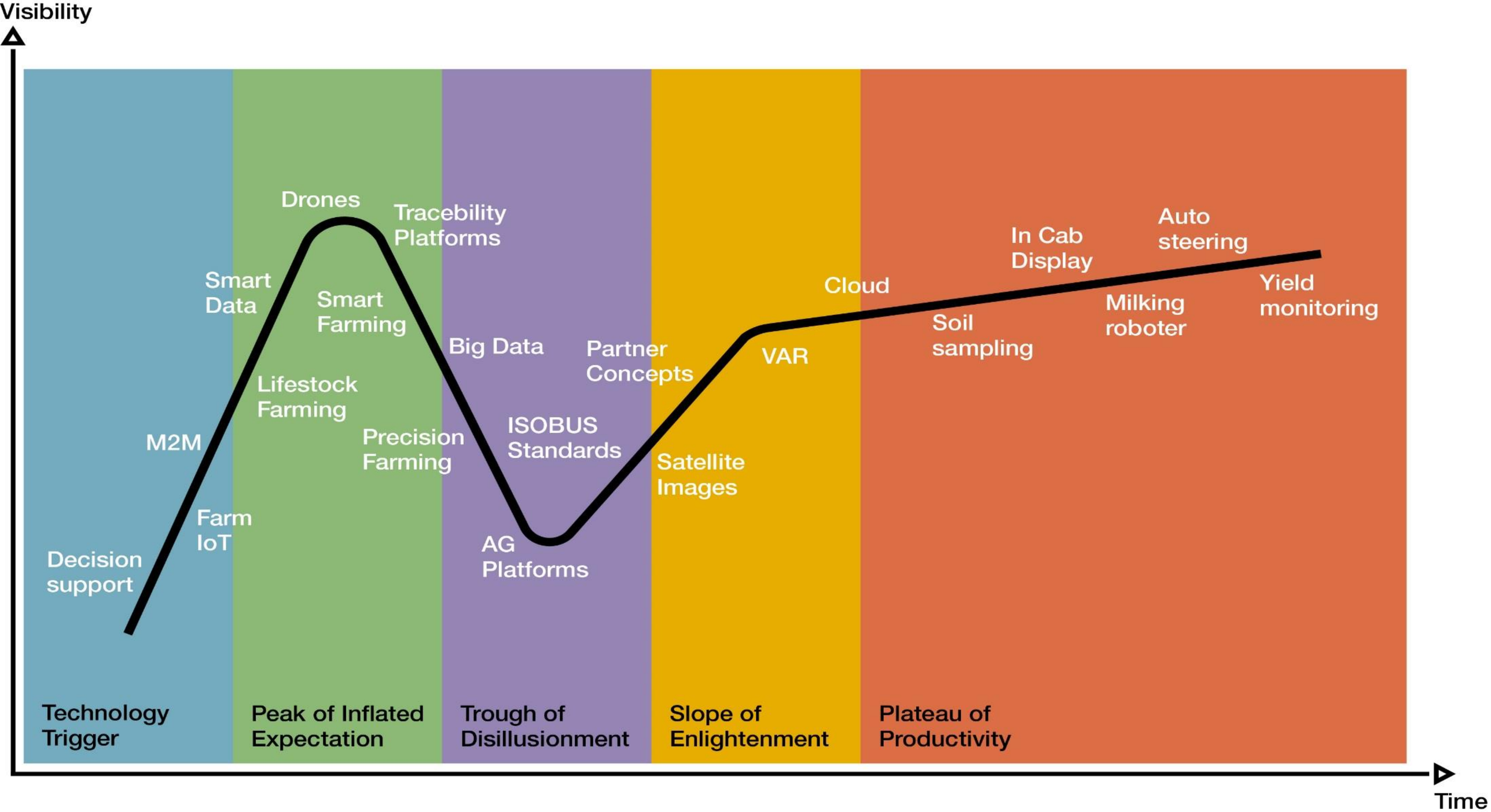
Network Manager bei CLAAS KGaA

IoT Deployment and Business Challenges for the Agri-Food sector

- what lies ahead?

Klaus-Herbert Rolf

365FarmNet



Source: Gartner & 365FarmNet

Technical challenge – Limitations

Social challenges – Transparency

365 days a year from anywhere

Automated documentation

Data entry and information by mobile device

Cross Compliance

Visualizing evaluations

Data entry and information by mobile device –

> 365FarmNet always at hand

365Crop App

365Cattle App

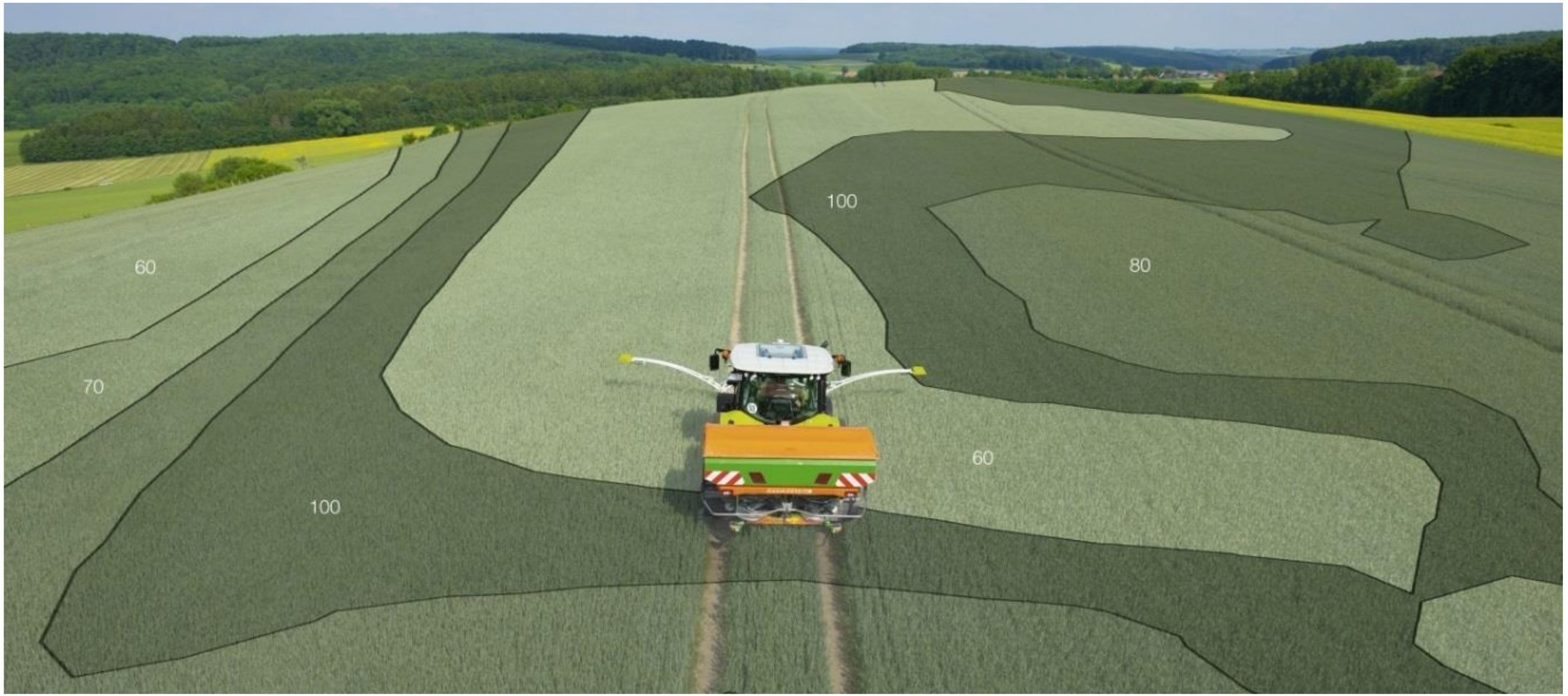
365Active App

Visualizing evaluations –

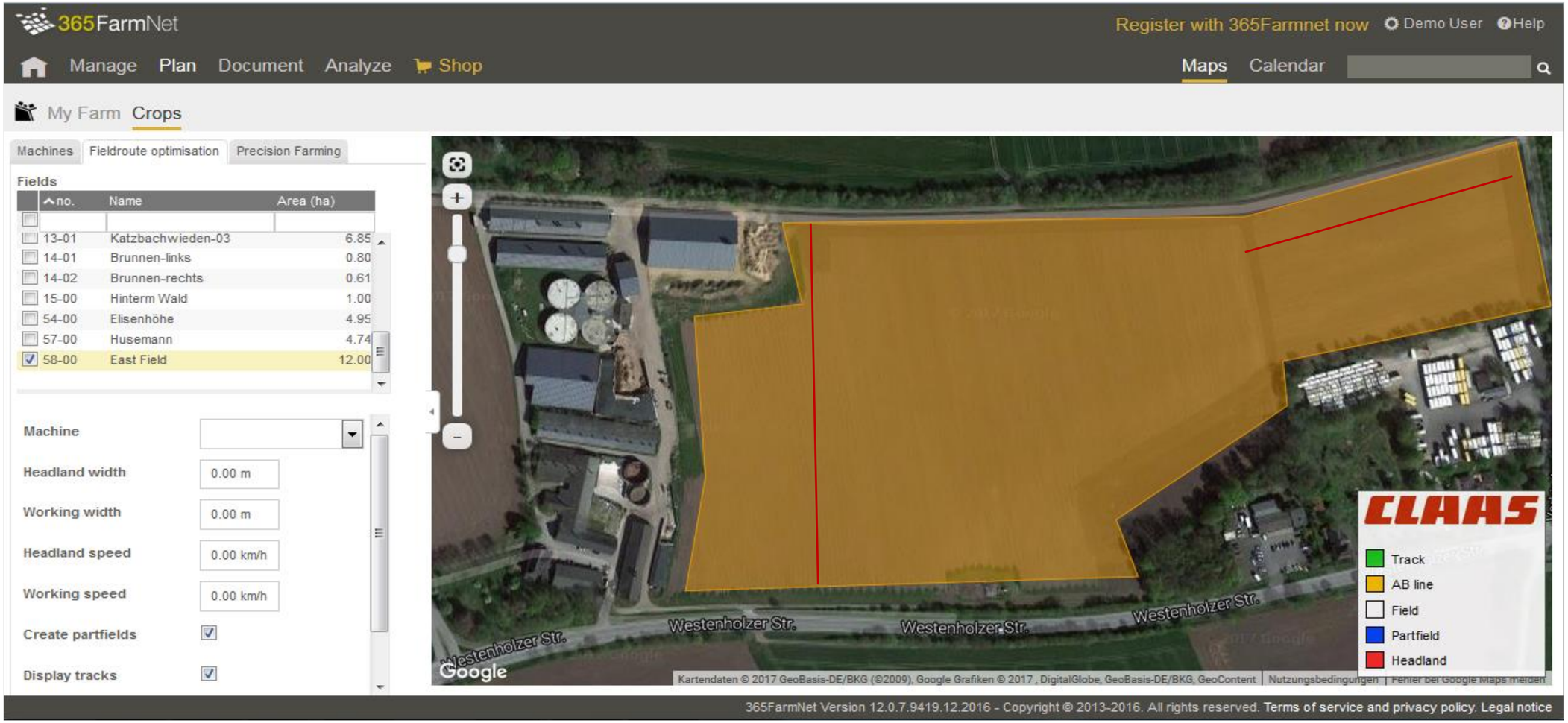
> Change the perspective

Visualizing evaluations –

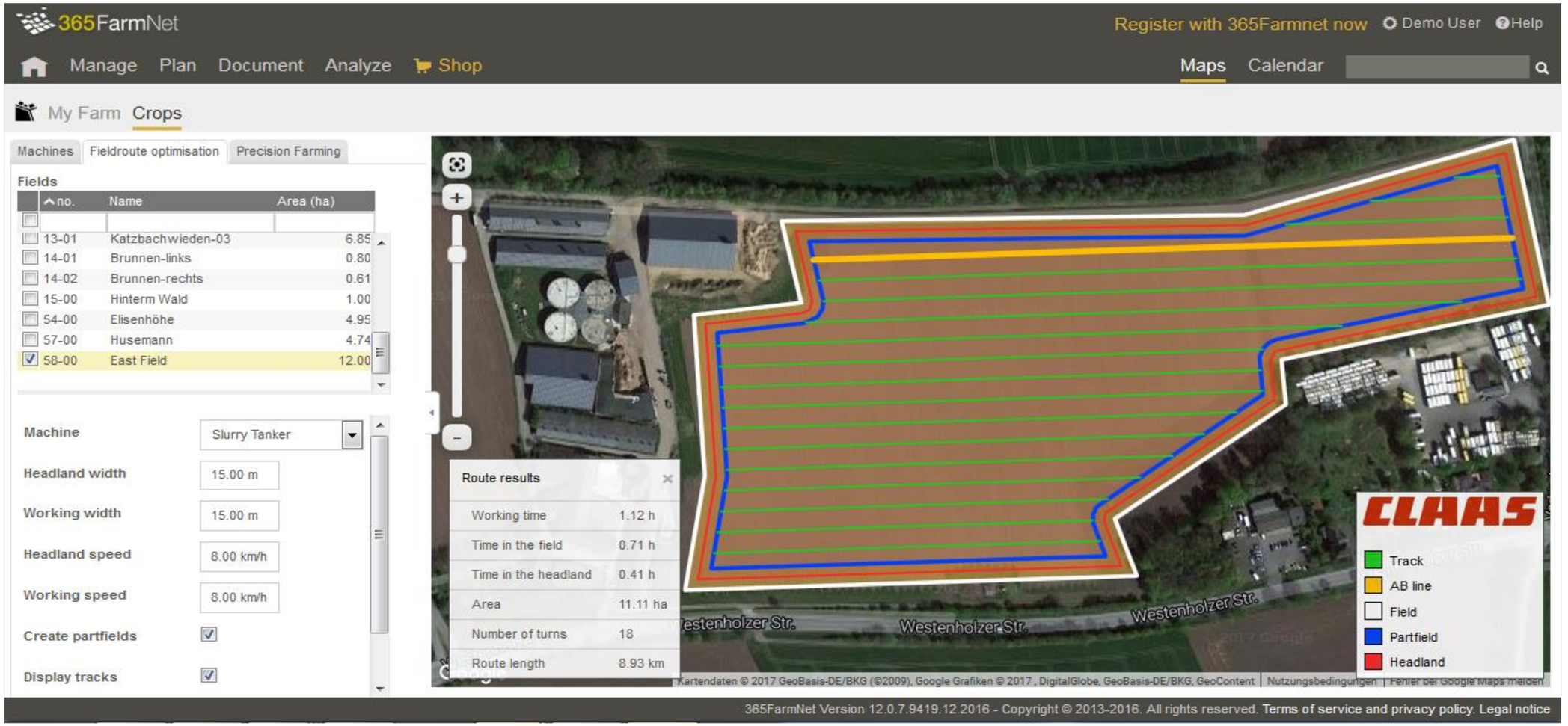
> Sensors – Reduce and optimize the input



Component: Field optimization



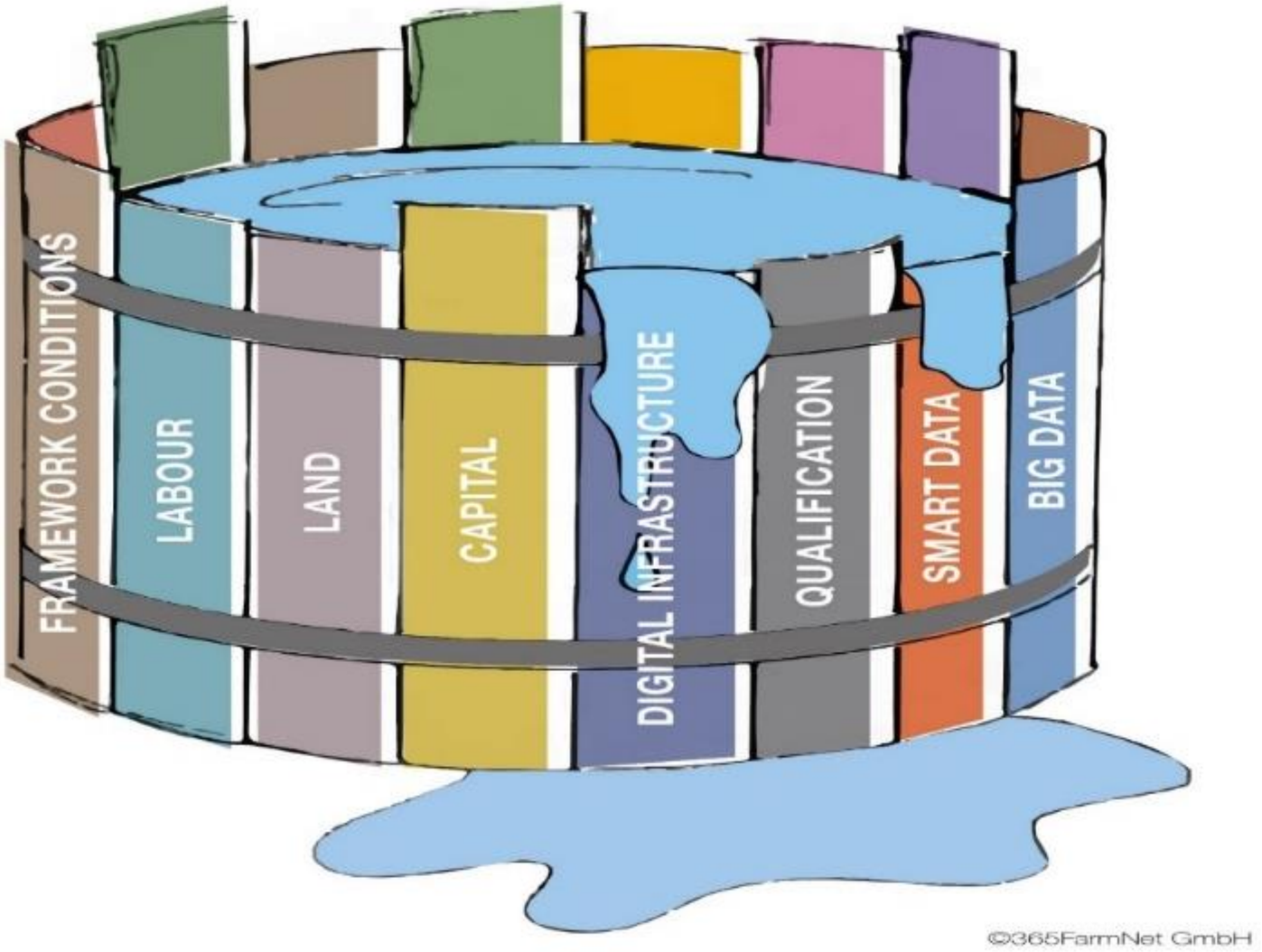
Result of a machine with a working width of 15 Meters



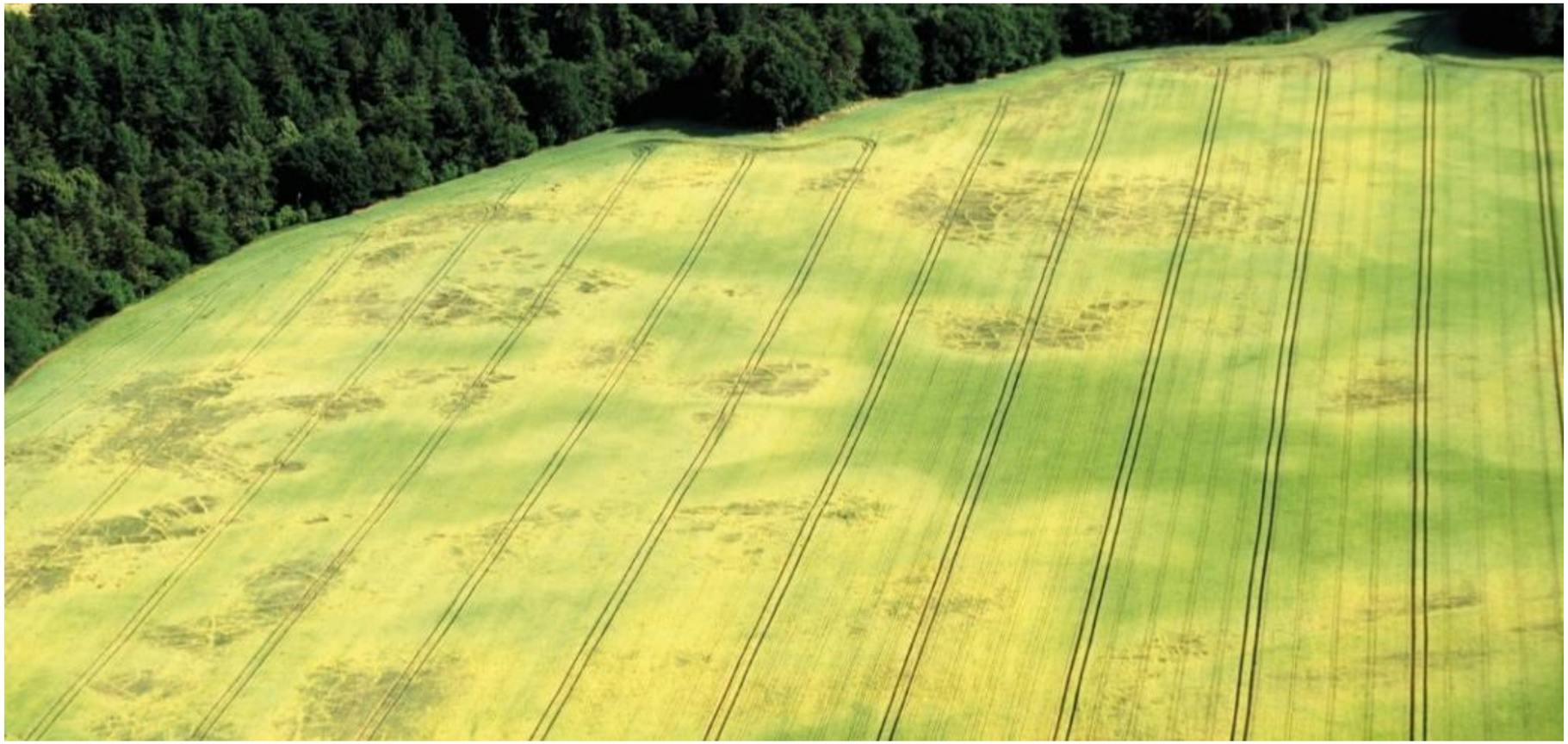
Partnership concept

Machines | Equipment | Prognoses | Consulting | Sensors | Analysis

Conclusion and future prospects



The challenge of the future: more intelligence on the m2



365FarmNet

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AARHUS UNIVERSITY

KLAUS-HERBERT ROLF
CLAAS & 365FARMNET

PANEL DISCUSSION

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ALEXANDER BERLIN
BERLIN THINKING

LAST SLIDE

THANK YOU!