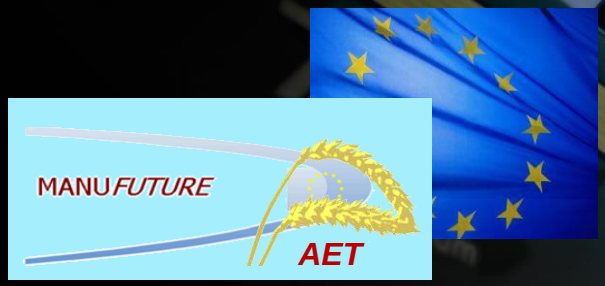
MANU*FUTURE* AET

Agricultural Engineering and Technologies

MANU*FUTURE*-EU

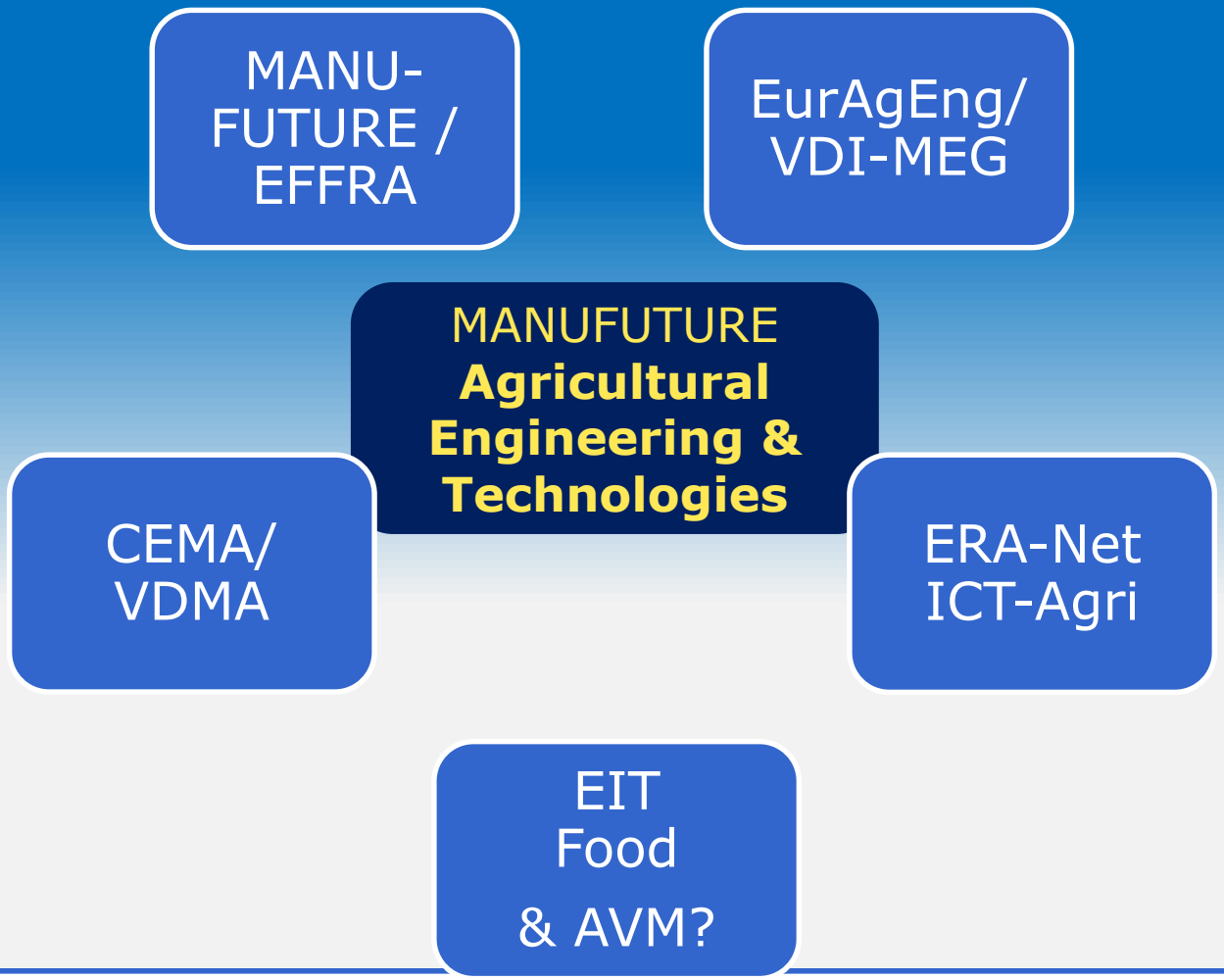


HLG & Workshop presentation

AET Strategic Research Topics 2030

Prof. Dr. Peter Pickel (Speaker)
Jens Fehrmann (Gen. Secretary)

AET‘s Environment



AET‘s twofold view on manufacturing …
Quotation of a grandfather of agricultural engineering

Albrecht D. Thaer wollte, …

dass man die „die Landwirtschaft als eine Fabrik, aber als eine sehr verwickelte Fabrik [betrachtet] und bei ihrer Betreibung alle Regeln [unterlegt], worauf der glückliche Erfolg der Fabriken beruhet.“

Qutotation from 1801 / Zitat von 1801

Agriculture shall be done in a way as if being an industrial manufacturing system, considering the processes of complex industrial production which have to be applied similarly to achieve the same fruitful success as the healthy manufacturing enterprises have

MANUFUTURE AET – ICT Agri – Joint Workshop
Nov. 10th 2017, Hanover

Speakers:

- Dr. Hans-Jörg Lutzeyer, DG RTD, Agri-Food Chain Unit
- Ana CUADRADO GALVÁN, DG AGRI, Research & Innovation Unit
- Prof. Dr. Thomas Becker, Technische Universität München, Interim Director CoLocation Center Central of EIT Food
- Prof. Dr. Peter Pickel, Jens Fehrmann, MANUFUTURE Sub-ETP AET
- Dr. Thomas Engel, Christophe Gossard (AIOTI WG 3 and 6)
- Dr. Reinhard Lafrenz, euRobotics AISBL
- Iver Thysen, Innovation Fund Denmark, Coordinator ERA-Net ICT-AGRI
- Jan Erpenbach, Federal Office for Agriculture and Food (BLE), Project Manager ICT-AGRI
- Prof. Dr. Claus Grøn Sørensen, President European Society of Agricultural Engineers (EurAgEng)
- David Tinker, General Secretary EurAgEng
- Manuela Zude, Leibniz-Institute for Ag. Engineering Potsdam-Bornim e. V. (ATB)
- Dr. Corné Kempenaar, Project Coordinator LSP Smart Farming, Wageningen University & Research (WUR)

MANUFUTURE AET – Other activities

- Representation in Bioeconomy Panel 2013-2015 (DG AGRI et al.)
- Membership in Advisory Board of ERA-Net ICT Agri since 2013
- Representation in EIP Focus Group Precision Farming 2013-2015
- Representation in EIP Focus Group Renewable Energy on Farm 2017-2019

Presentation of AET Activities on

- CECE/CEMA-Summit Sep. 23rd/24th 2015
  (European associations of construction and agricultural machinery manufacturers)
- Workshop "Europe's Opportunity in Digital Agriculture", Jan. 14th 2016 (DG CONNECT)
- Open Workshop on the IoT Large Scale Pilot on Smart Farming and Food Security, Jan. 15th 2016, AIOTI
- Ongoing: Several presentations of activities and funding needs to German government (BMWi, BMEL)
- Permanent alignment with EurAgEng

MANUFUTURE AET in CSA UNIFARM - finalized

Frame conditions:

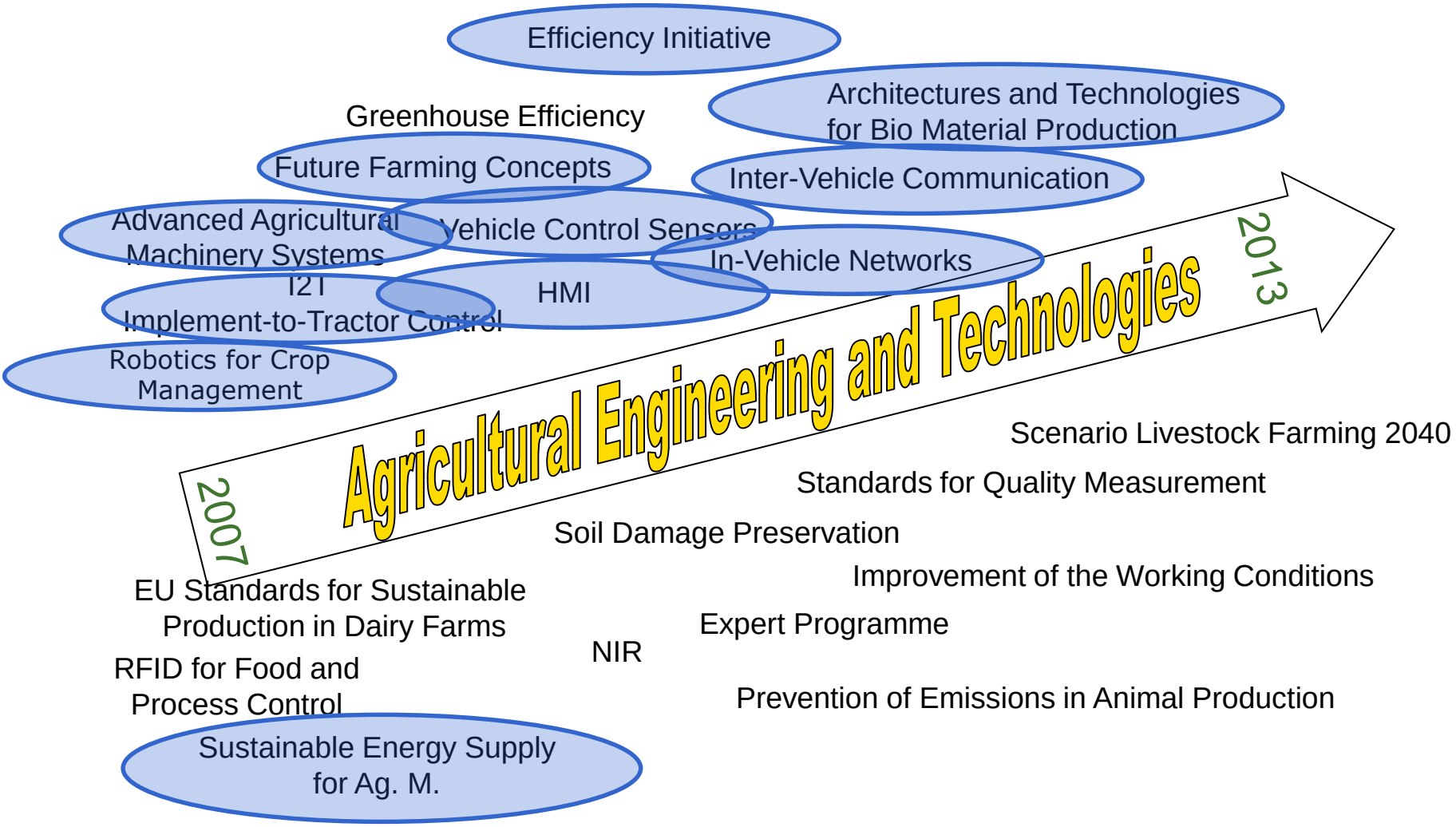
- Duration from January 2012 to March 2014
- **Last meeting in June 2015 (Prague)**
- AET's legal representative: TU Dresden

Main objective:

- Setup and operate a **User forum** to present and defend the needs of farmers in the development of **GNSS applications** and services (automation -> **Smart Farming**, "Farming 4.0")

Strategic Research Topics 2030
Most important chapters

Reworking AET's Strategic Research Agenda (SRA, 2006)



Source: Auernhammer (modified)

Agricultural technologies

Trends

- Sustainability
- Autonomous operation
- Electrification
- IoT

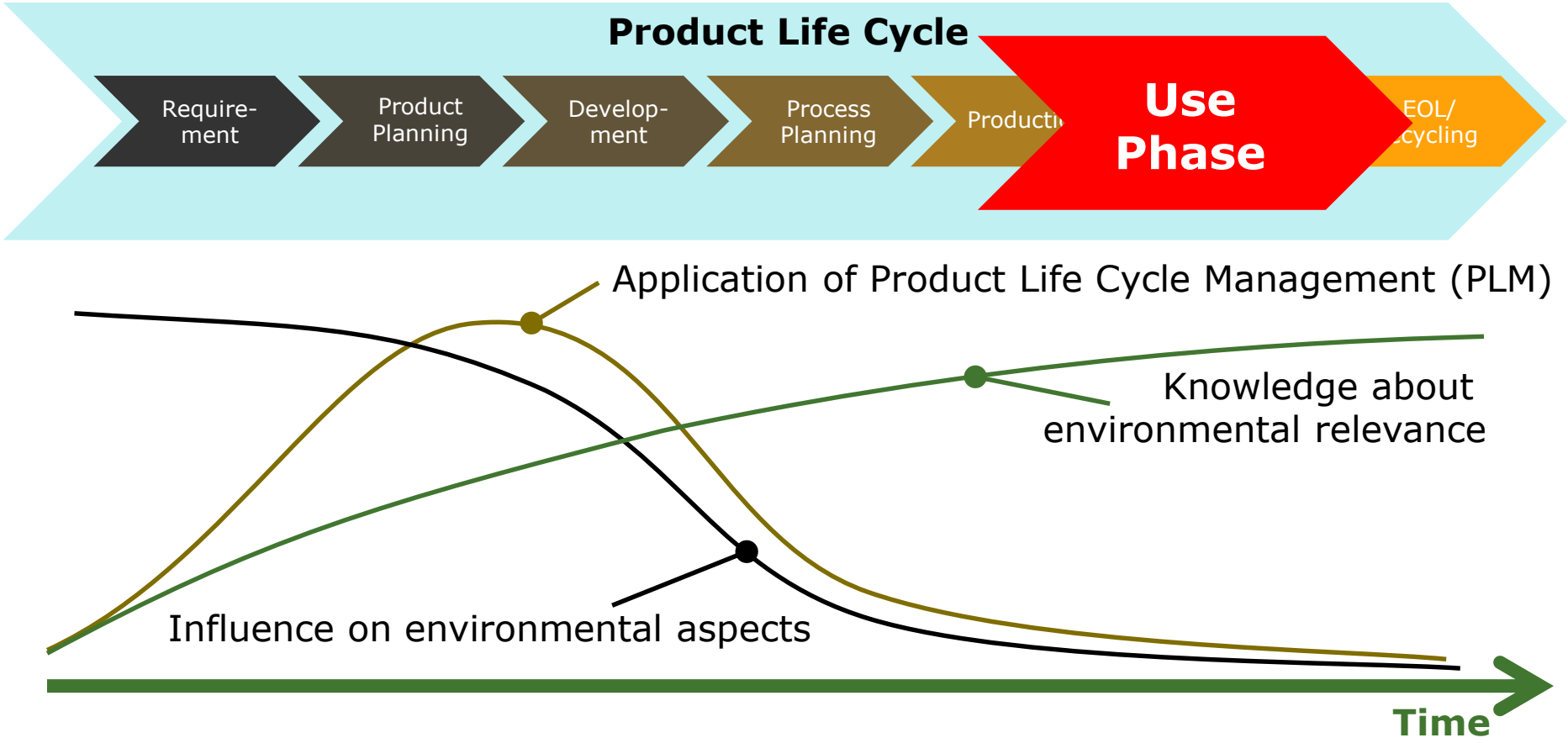
“Our” Grand Challenges

Guiding Principle for Agricultural Technology

More with less

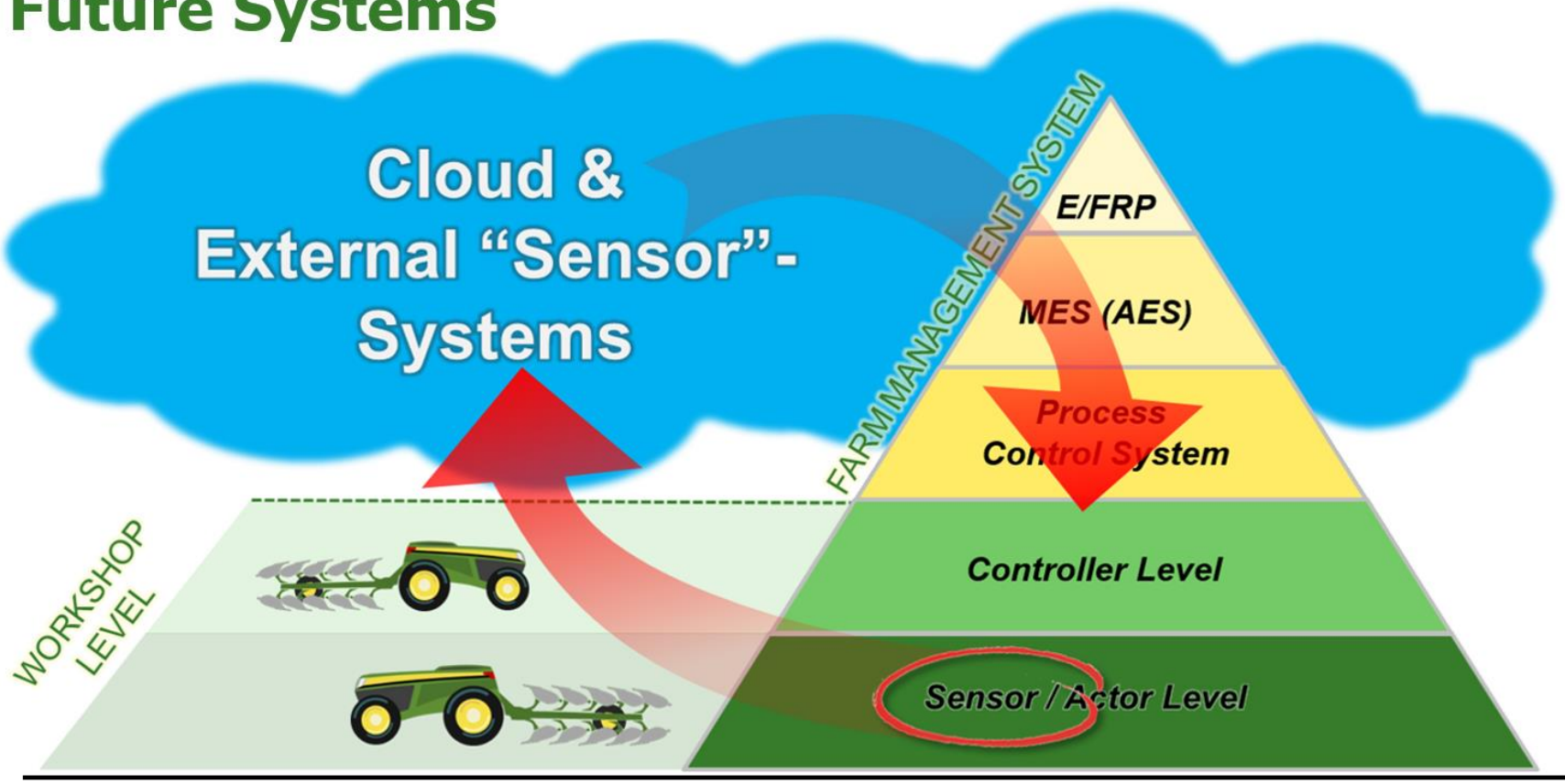
Independence

Early Environmental Management



Defining Eco-Effectivity **Understanding Eco-Efficiency**

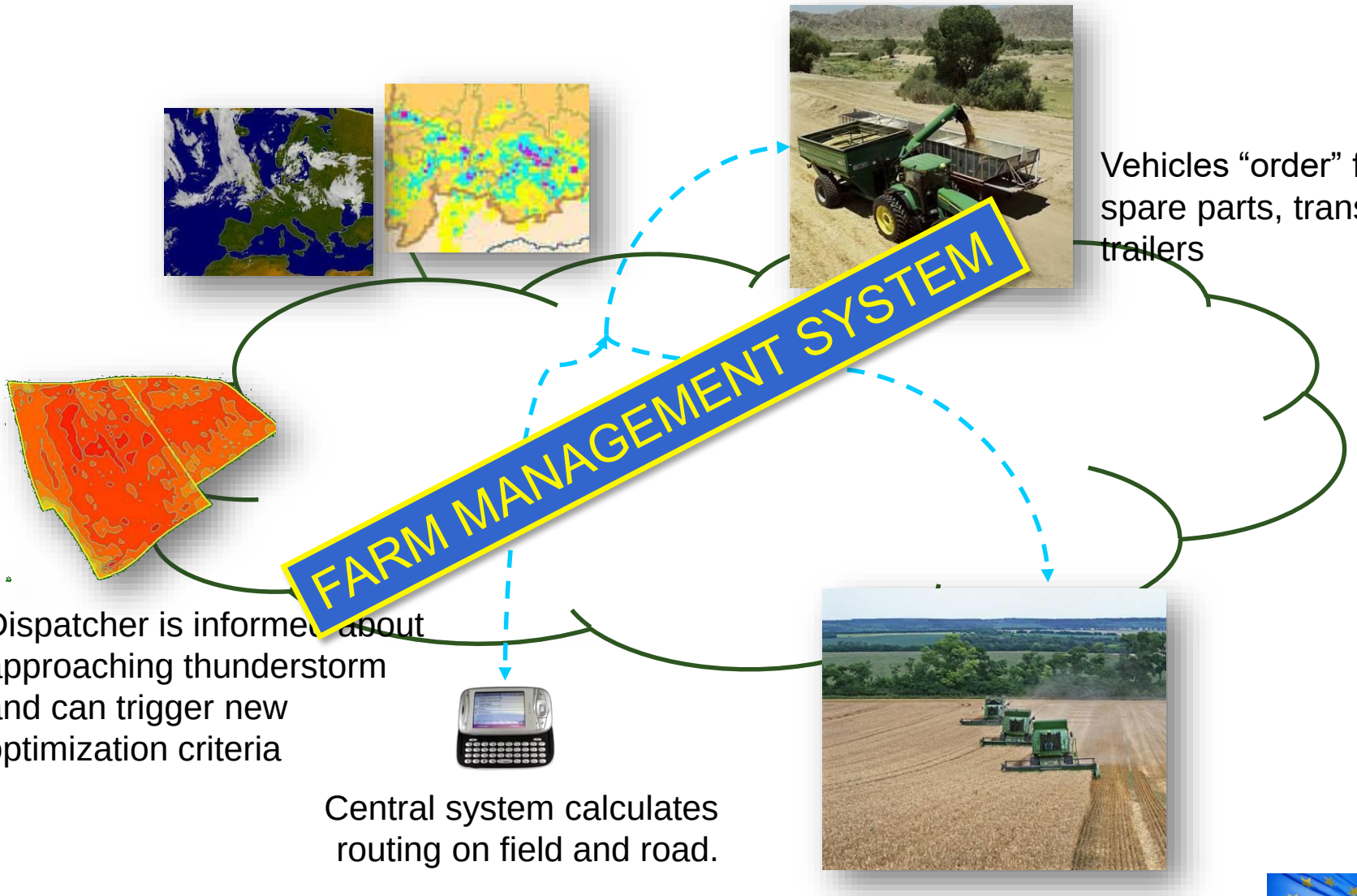
Future Systems



Adaptive Agricultural Production Systems providing

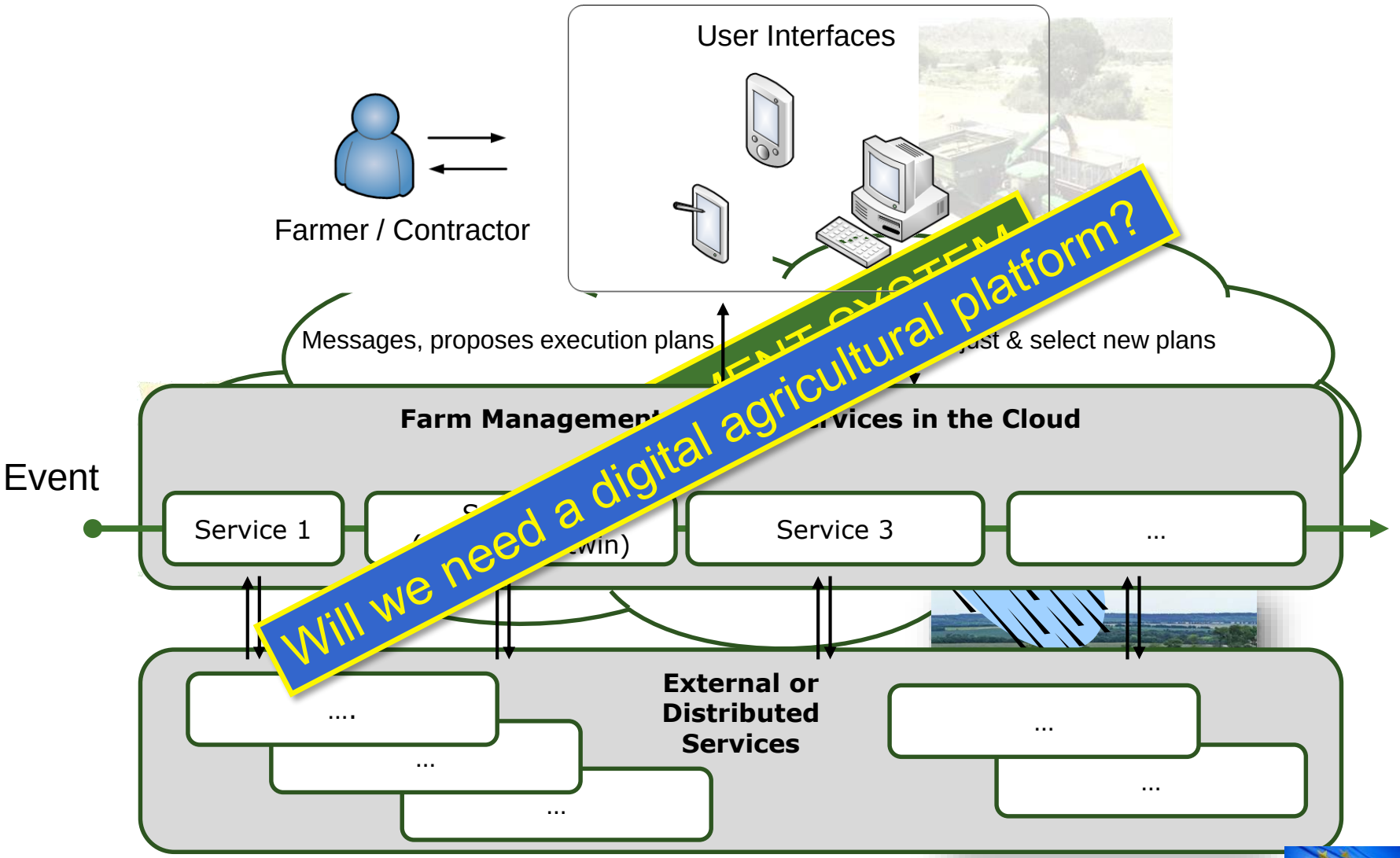
- Technical intelligence (such as self optimization)
- Self reconfiguration
- Defect compensation / zero defect operation

Development of Farm Management System

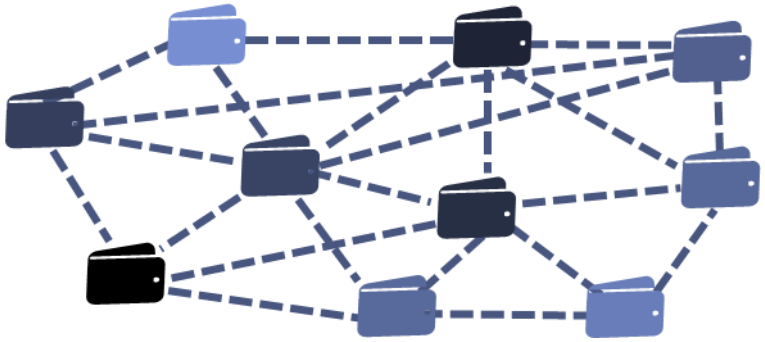


Source: Hahn (modified)

Future Operation

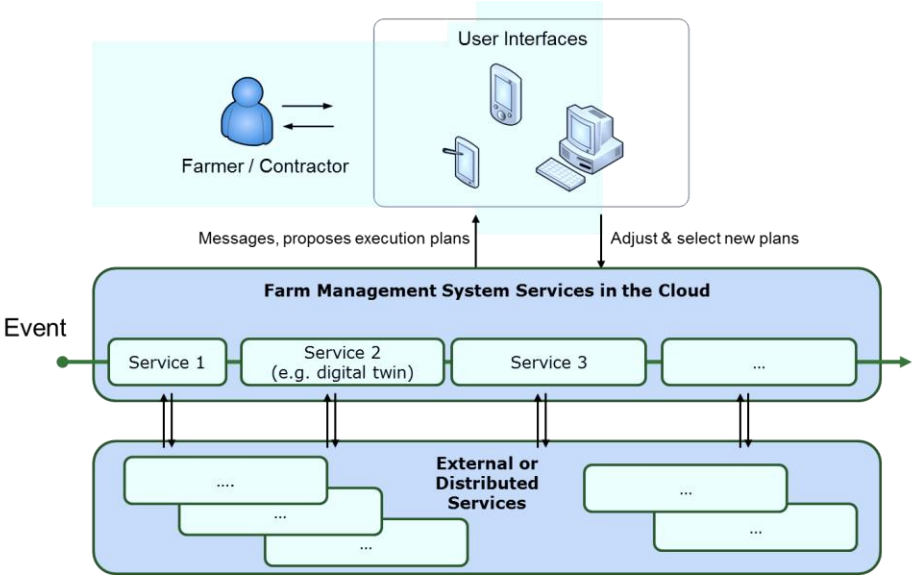


Strategic technology needs



Digital Transformation needs research and developments in:

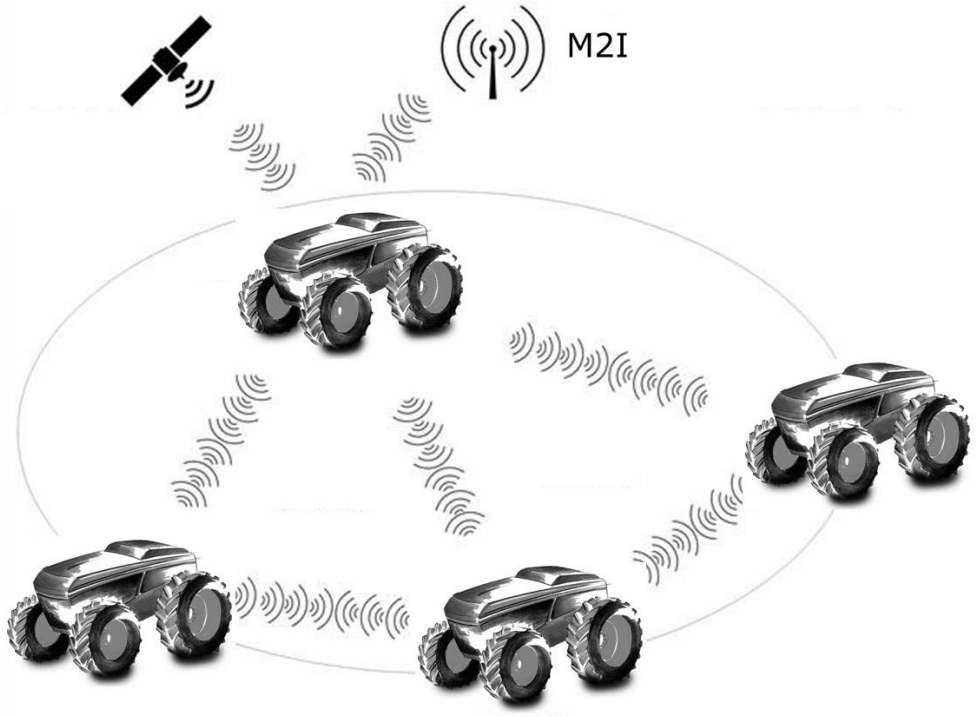
- Blockchains / traceability (agricultural product information)
- Decision ~~support~~ systems
- Farm Management ~~Information~~ Systems
- Process information and evaluation
- Digital farm twins
- Platforms?



Strategic technology needs

Connectivity

- Internet of things, communication between everything
- Introduction 5G standards
- Extended positioning services
- Digital villages
- Secure farming



Strategic technology needs

Automation / Robotics needs developments in:

- Autonomous processing
- Imagery and Sensors
- Human Machine Interfaces
- Concepts for remote operations
- M2M/M2I communication

Strategic technology needs

Machine Concepts for further increase in efficiency/performance

Compact Units of harvesting or processing machines

Separation of infield processes

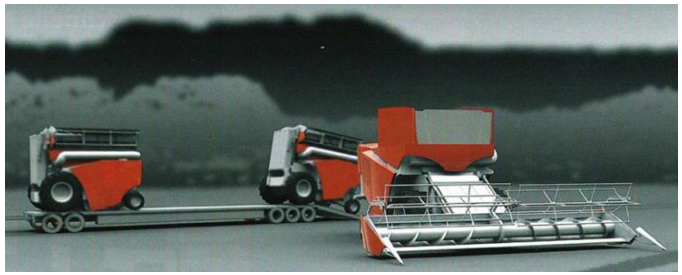
Enabler are:

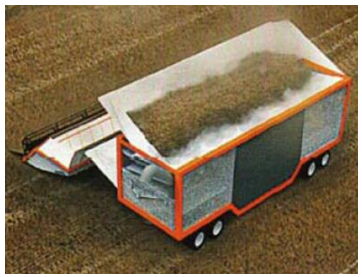
Connectivity / M2M Communication

Digitalization, new operator concepts

Modular Set-up

Future need to increase efficiency and productivity





Strategic technology needs

Farm Concepts for agricultural production and energy supply

New technologies allow the establishment of new farming structures

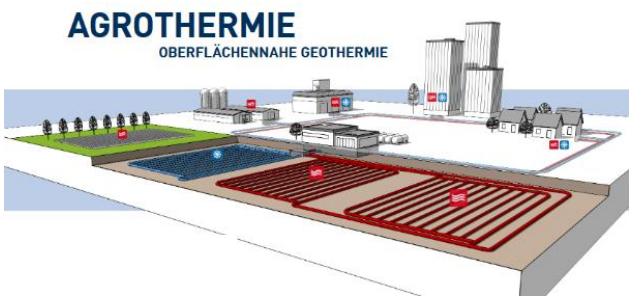
Smaller autonomous machines and decision-making systems for site-specific farming

Urban or vertical farming

Integrated energy and agricultural production

Combination of Agro-Photovoltaics and plant production

Combination of agrothermic technology and plant production

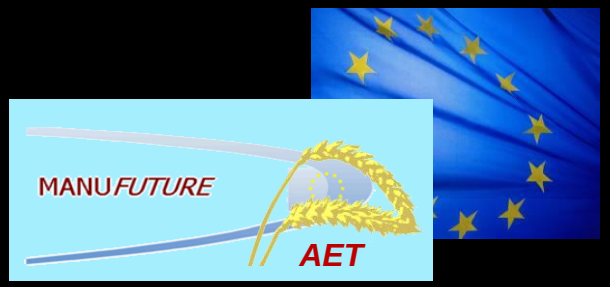


Strategic technology needs

Integrated Energy needs developments in:

- Energy management in rural areas
- Concepts for combination photovolatik and plant cultivation
- Alternative fuels (biomass), energy transmission
- Electric and hybrid drive trains, combination with renewable energy sources
- Methane gas combustion engines / mobile Methan-Gas supply and storage

Thank your for your attention!



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