



Smart Farming in the Cloud

Peter van der Vlugt, CTO - Kverneland Group
AgroConnect Winterseminar, Ede, 26 november 2015

- Kverneland Group / Kubota
- Agricultural Industry / AEF
- The Future of Farming
- Internet of Machines
- Data Management
- Conclusie



- “Broad-liner” fabrikant van landbouwwerktuigen
- Twee merken: Kverneland en Vicon
 - Grondbewerking en Zaaien
 - Gewasbescherming (Crop Care)
 - Gras en Veevoer segment
- Key Technologie: Mechatronics Competence Center
- Sinds 2012 eigendom van Kubota Corporation (Japan)
- → Europese tractoren vanaf 2015 → “Full-liner”



For Earth, For Life




Productimpressie



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Wat valt er op?

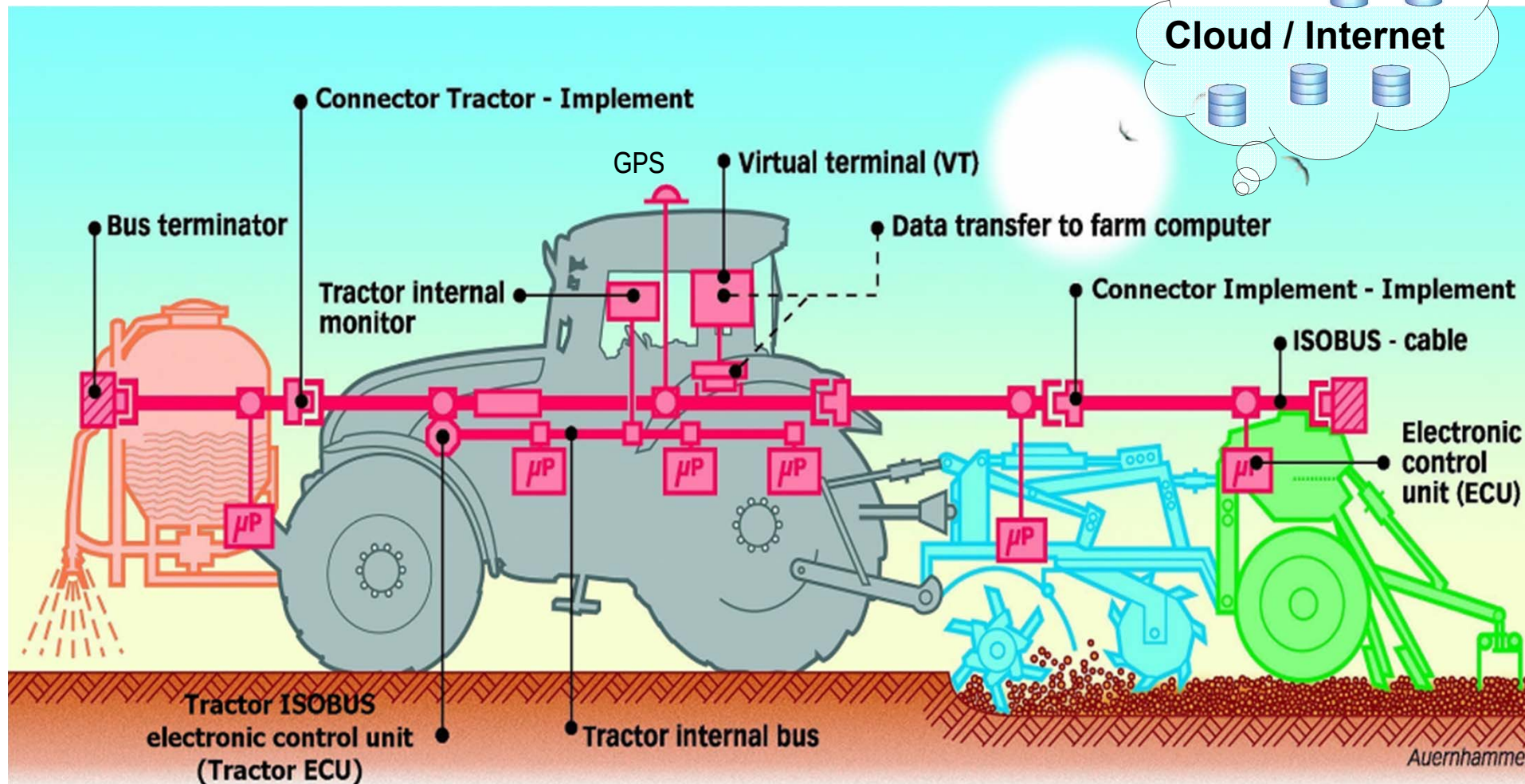


Mixed fleets: Vele merken



Landbouwwerktuigen;

- Rondrijdende lokale communicatienetwerken
- Gebaseerd op standaarden (ISO/AEF/AgGateway)



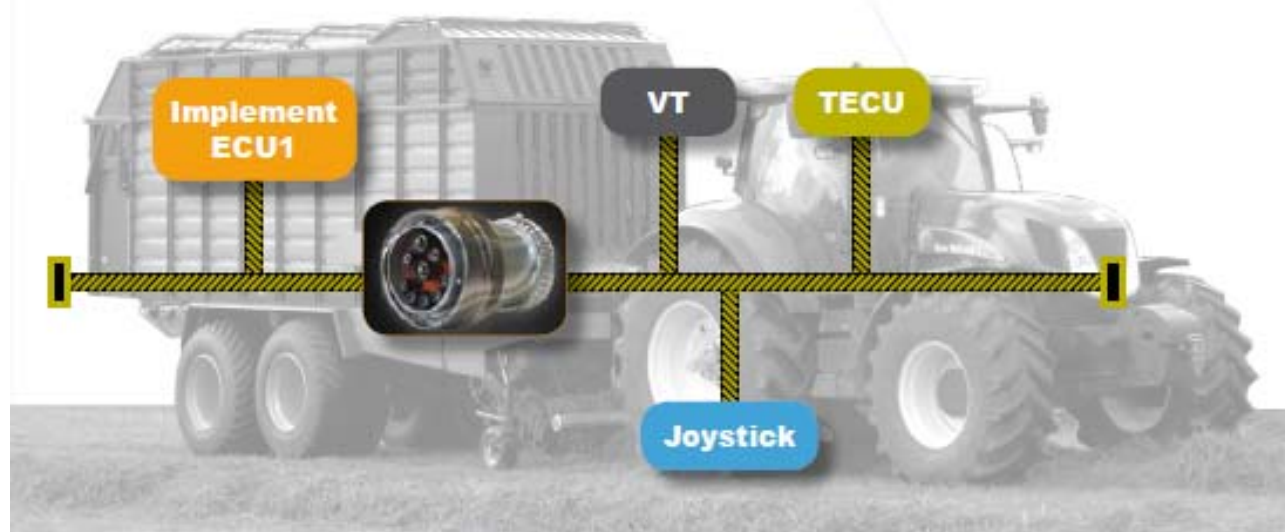
Onderkenning problemen

Midden jaren 2000:

- Typische ISOBUS systemen werden in grote aantallen verkocht

Maar.....:

- Er was maar 1 test instituut: DLG, en nog steeds incompatibiliteitsproblemen
- Niet afgestemde, ongestructureerde benadering naar de markt
- ISOBUS 'prepared' of 'light', maar wat betekende dat nou...?
- In de praktijk: Klanten verloren het vertrouwen in ISOBUS!





Oprichting van AEF

- Agricultural *Industry* Electronics Foundation
- Opgericht op 28 October 2008 door
- 7 grote Agricultural Equipment fabrikanten en 2 Associations





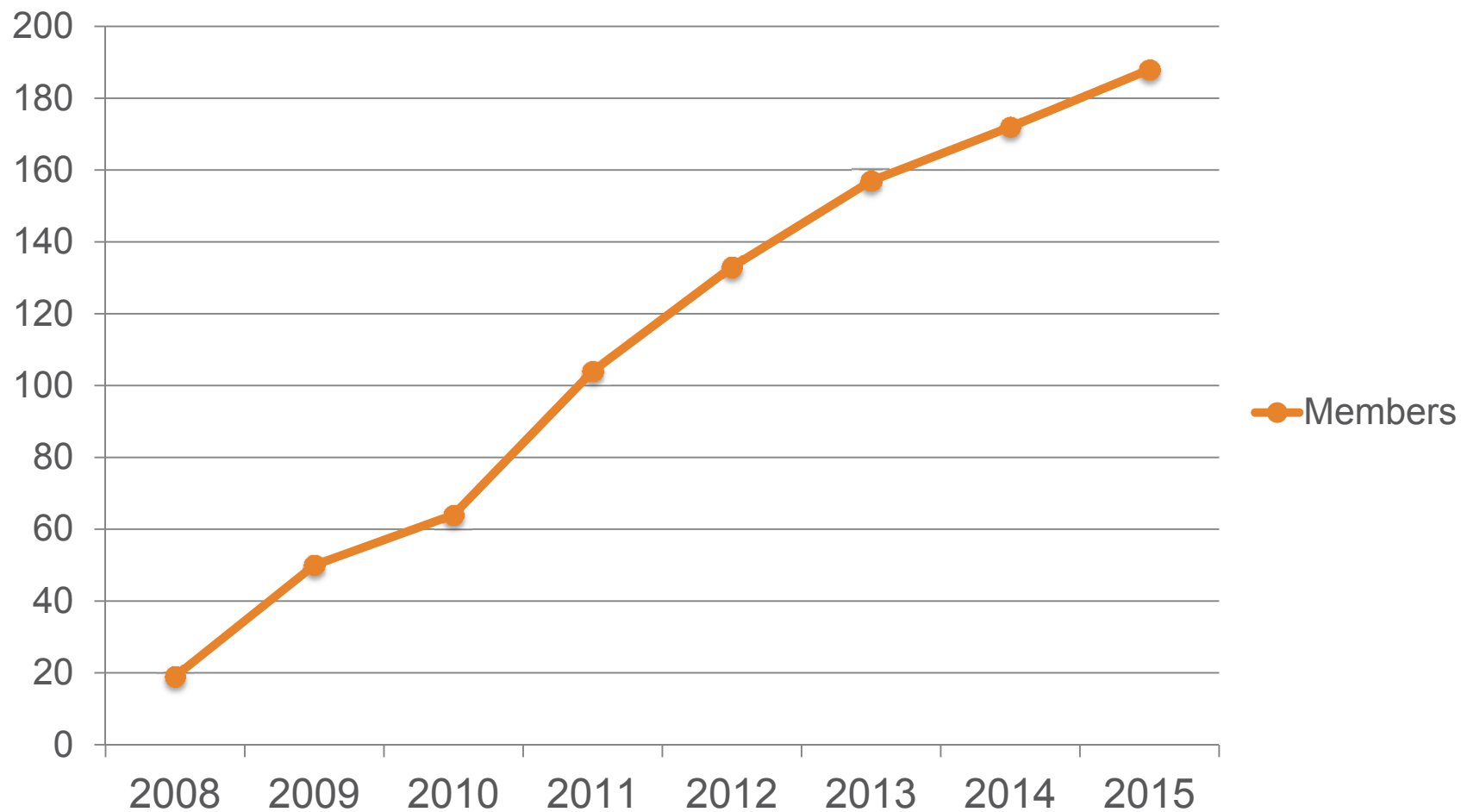
AGRICULTURAL INDUSTRY
ELECTRONICS FOUNDATION

AEF founding members



ASSOCIATION OF
EQUIPMENT MANUFACTURERS

Groei van AEF



AEF leden per land

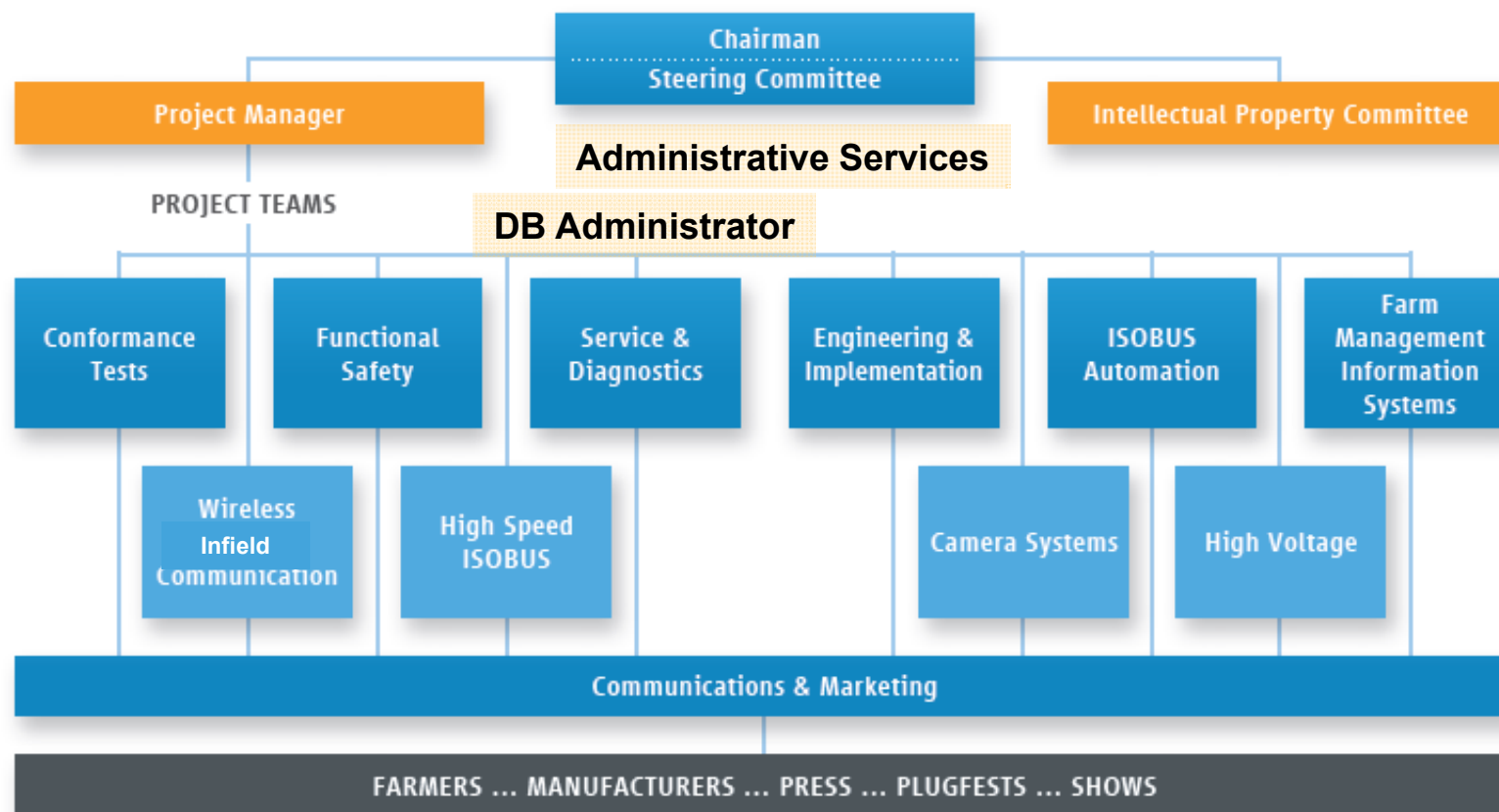
#	Country	Percent	Quantity
1	Germany	40 %	75
2	North America	17,5 %	33
3	Italy	9,5 %	18
4	France	9,5 %	18
5	Netherlands	4 %	8
6	Finland	3 %	5
7	UK	3 %	5
8	Japan / Korea	3,5 %	7
9	Austria (3) / Belgium (3)	3 %	6
10	Other countries	7 %	13
Total	Countries: 21	100 %	188

AEF organisatie



AGRICULTURAL INDUSTRY
ELECTRONICS FOUNDATION

Peter van der Vlugt, Kverneland Group
Marcello Mongiardo, CNH



AEF Project Teams

Project Teams

- PT1: Conformance Test
- PT2: Functional Safety
- PT3: Engineering & Implementation
- PT4: Service & Diagnostics
- PT5: ISOBUS Automation
- PT6: Communication & Marketing
- PT7: High Voltage
- PT8: FMIS software
- PT9: Camera Systems
- PT10: High Speed ISOBUS
- PT11: Wireless Infield Communications

Team Lead

Jaap van Bergeijk - AGCO

Peter Münch - JD

Rudolf Buschmeier - Müller

Norbert Schlingmann - Claas

Hans Jurgen Nissen - JD

Carsten Hühne - Kverneland

Harald Dietel - STW

Matthias Rothmund - Horsch

Gerald Klein – Motec

Andreas Möller - Anedo

Christian Rusch - Claas



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The Future of Farming



1 billion people more to feed within the next 13 years.
Food production must increase by at least 70% by 2050.

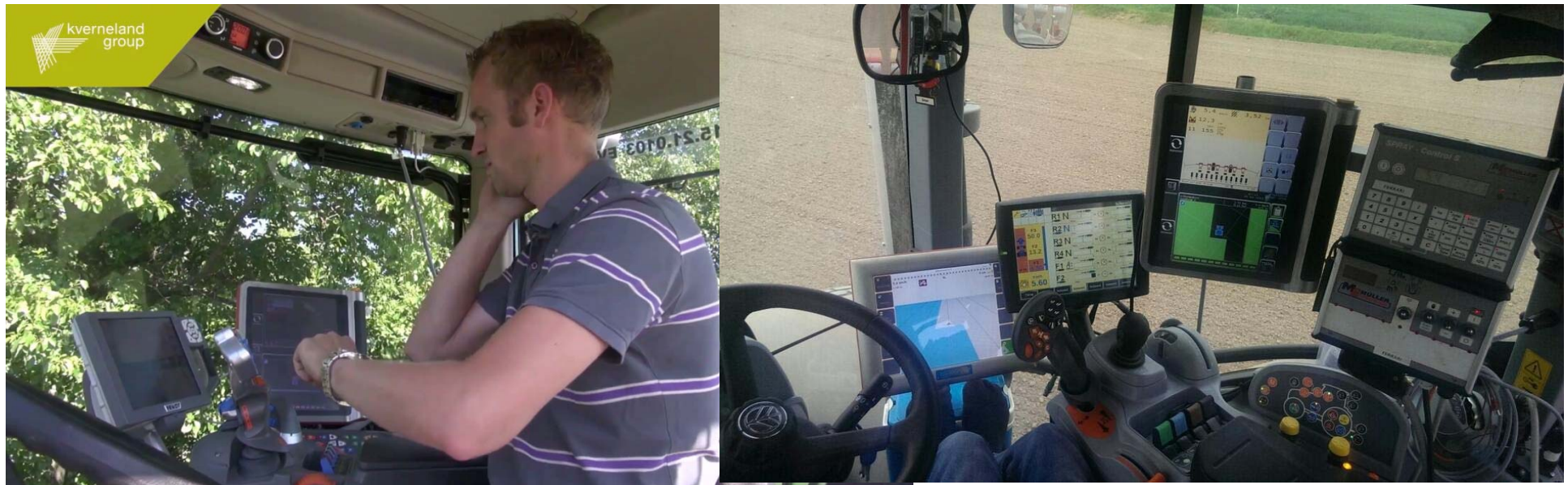
The Future of Farming



Smart equipment

De tractor als mobiel kantoor

- De professionele boer bedient zijn geavanceerde machines vanuit zijn 'mobiele kantoor': De tractor cabine
- Alle connectiviteit voorhanden: Machine Terminals, Smartphones, Tablet....
- Draadloze communicatie middels Wifi of 3G/4G mobiele netwerken
- Maar: Hoe verbindt hij nu alle Netwerken, Data en Apps aan elkaar?



Precisielandbouw!

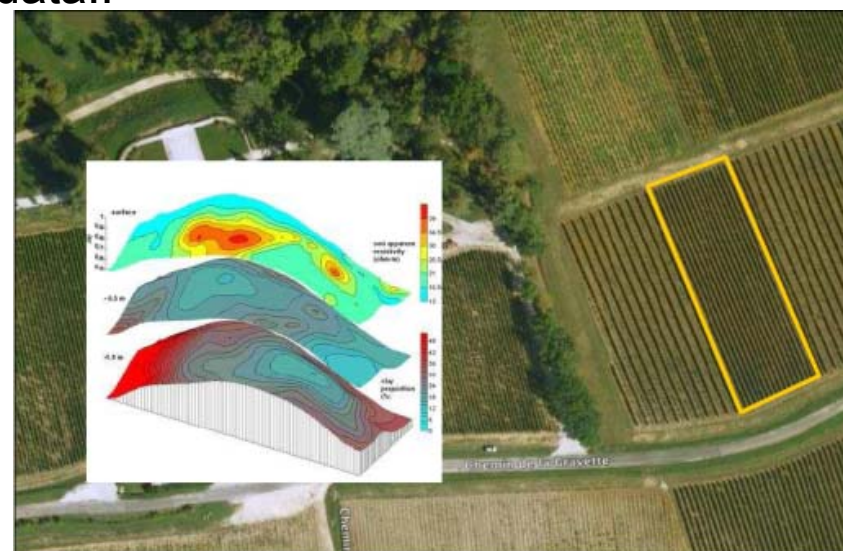
- Intelligente machines die op de cm² nauwkeurig werken met:
 - (RTK) GPS & AutoSteer
 - Slimme sensoren
 - Geavanceerde regelingen
 - *Nu nog...: Online & connected*



Geavanceerde sensoren

- Vocht en gewicht gewas
- Mobiel weerstation
- Gewasscan (NDVI/Biomassa etc)
- Vision / Camera systemen
- Drone technologie
- Integreren van data in **Cloud** Apps

→ Bron van enorme hoeveelheden data!!



1. Farm Data Management

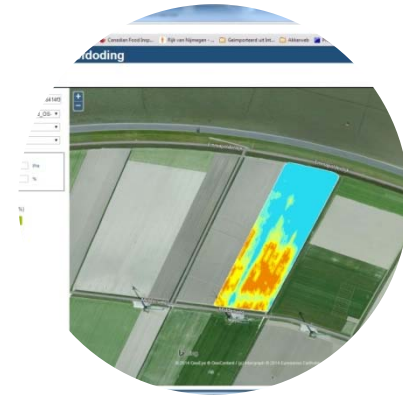
- Uniforme Data Uitwisselingsstandaarden
- Internet (Company) Portals
- Field maps, weer- en agronomisch advies
- Fleet Management en Service Management
- Big Data en Business Modellen
-

2. Smart Equipment

- Volgende generatie Tractoren en Werktuigen
- Altijd online en verbonden (IoT / IoM)
- Autonome voertuigcombinaties en robotisering
- Geavanceerde Werktuig-Tractor combinaties (TIM)
-

3. Smart Sensors en Output devices

- Geavanceerde sensor technologieën
- Precisie en plaatsspecifieke sub-m² bewerkingen
- Real-time bewerkingen en remote processing
- ...



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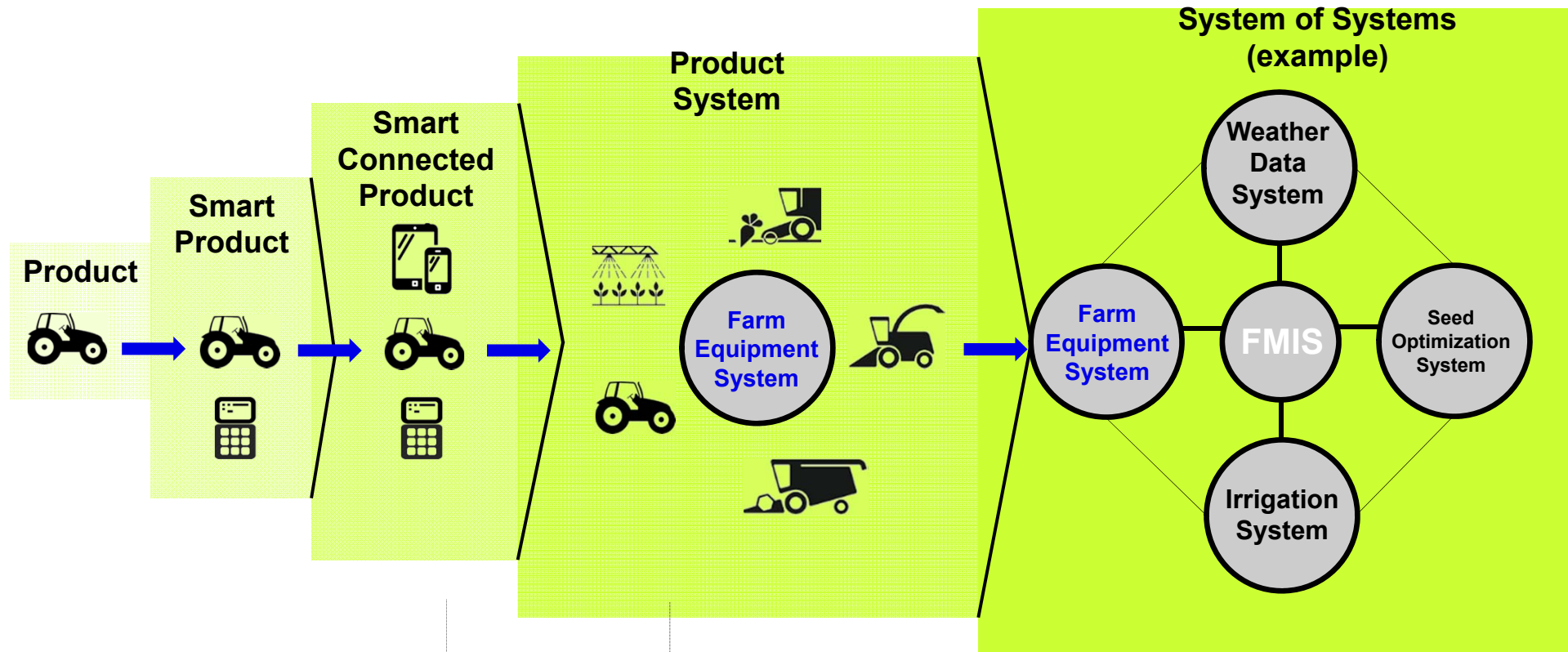


Internet of Machines (IoM)

Machine → Smart Machine → IoT / IoM →

Fleet Management →

Data Management / Big Data

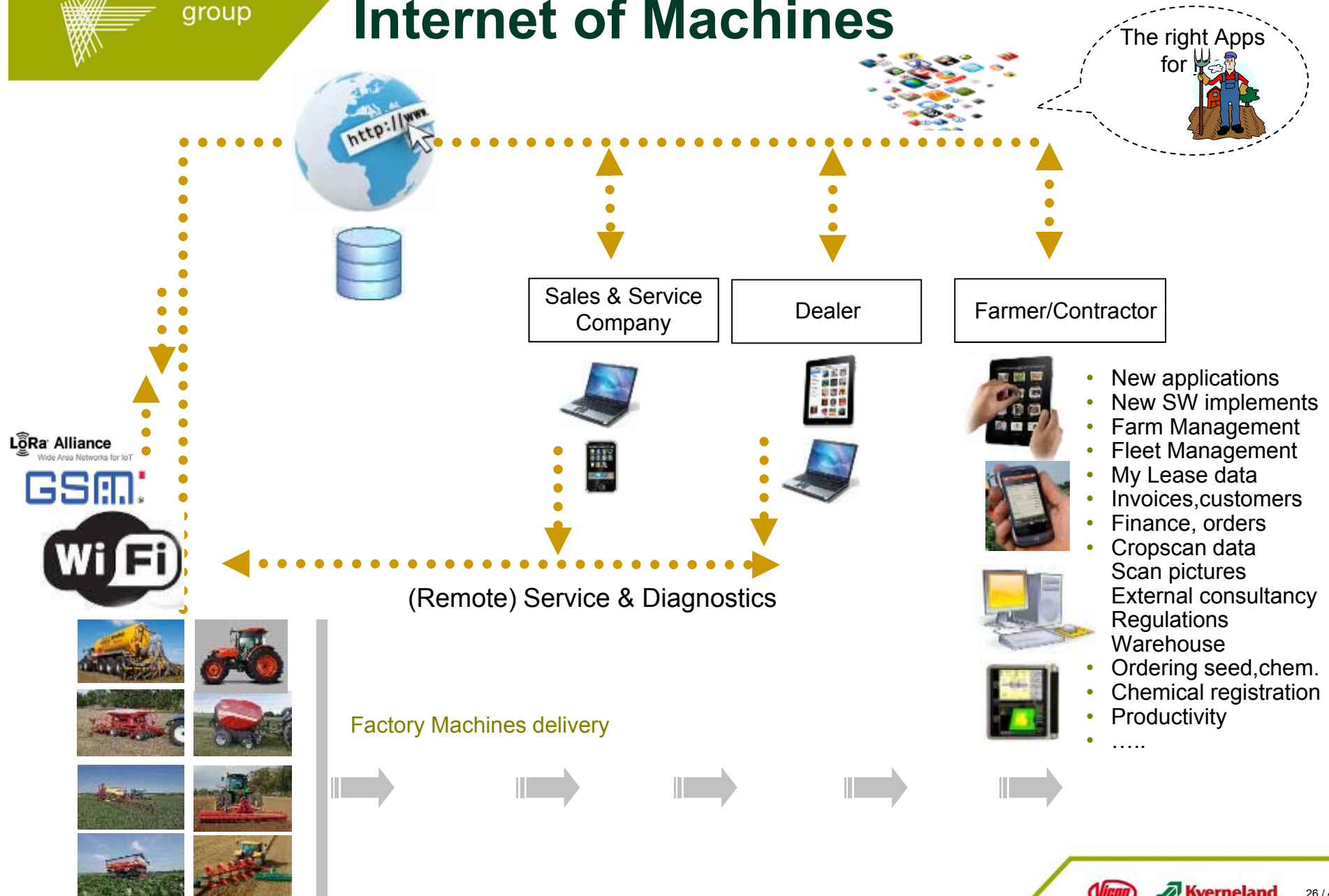


Source: Harvard Business School, 11/2014

2015

* FMIS = Farm Management Information System

Internet of Machines



iFarmer?

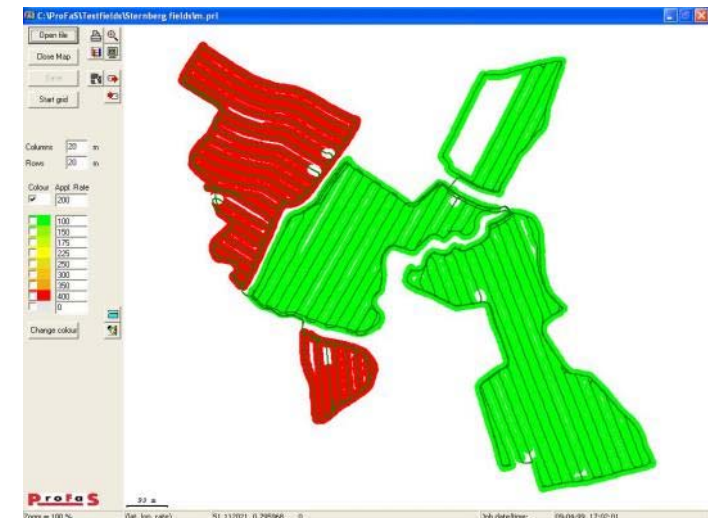


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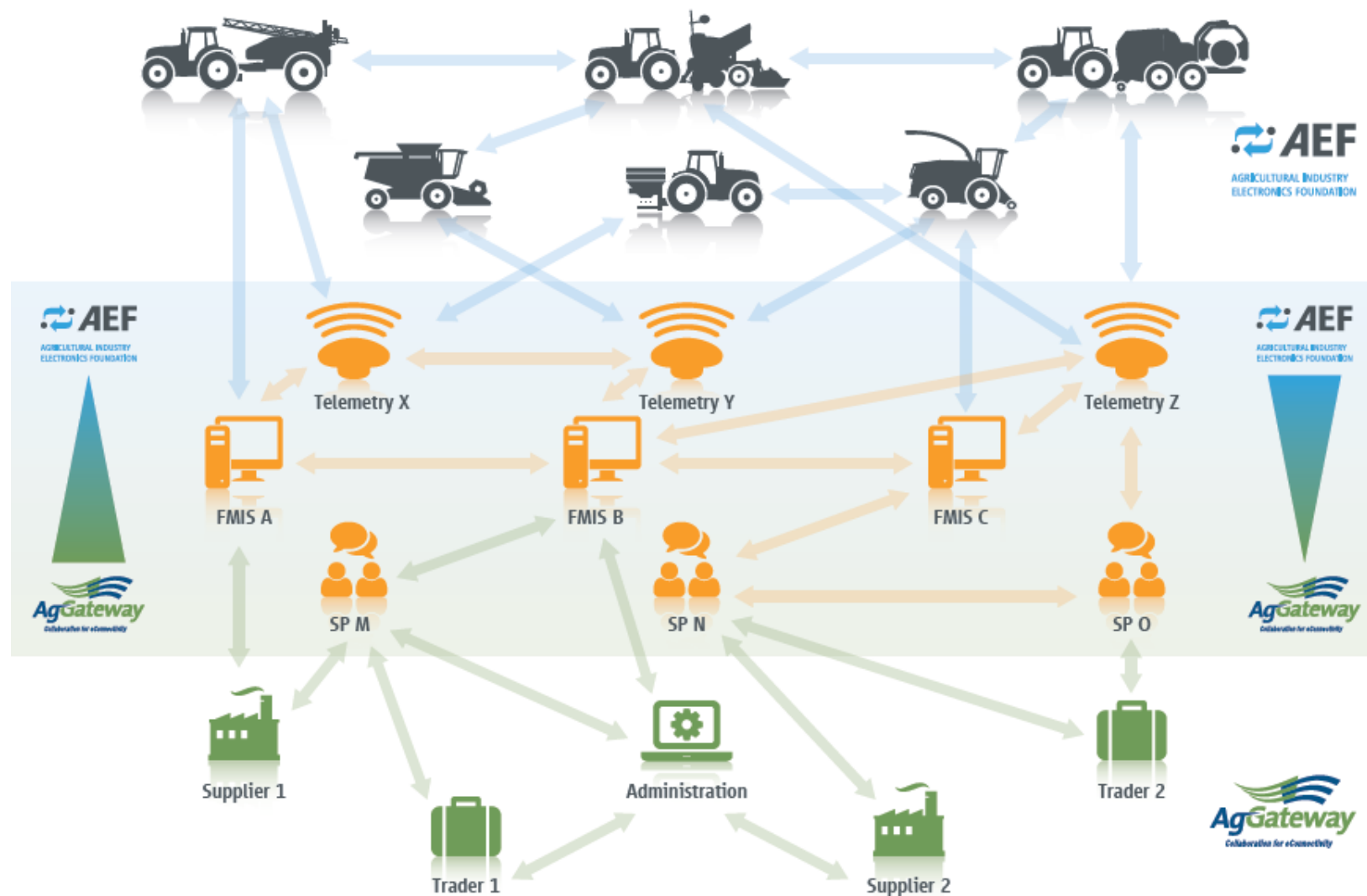


FMIS=Farm Management Information Systems

- Data exchange between FMIS and equipment
- Liaison with other organizations:
 - AgGateway
 - FMIS manufacturers
 - Scoping / Who does what?
- Participate at Plugfests
- **2015:**
 - AEF Conformance Test use cases
 - Define new LOG Functionality
 - Extended Data Interface (AgGateway)



AEF versus AgGateway



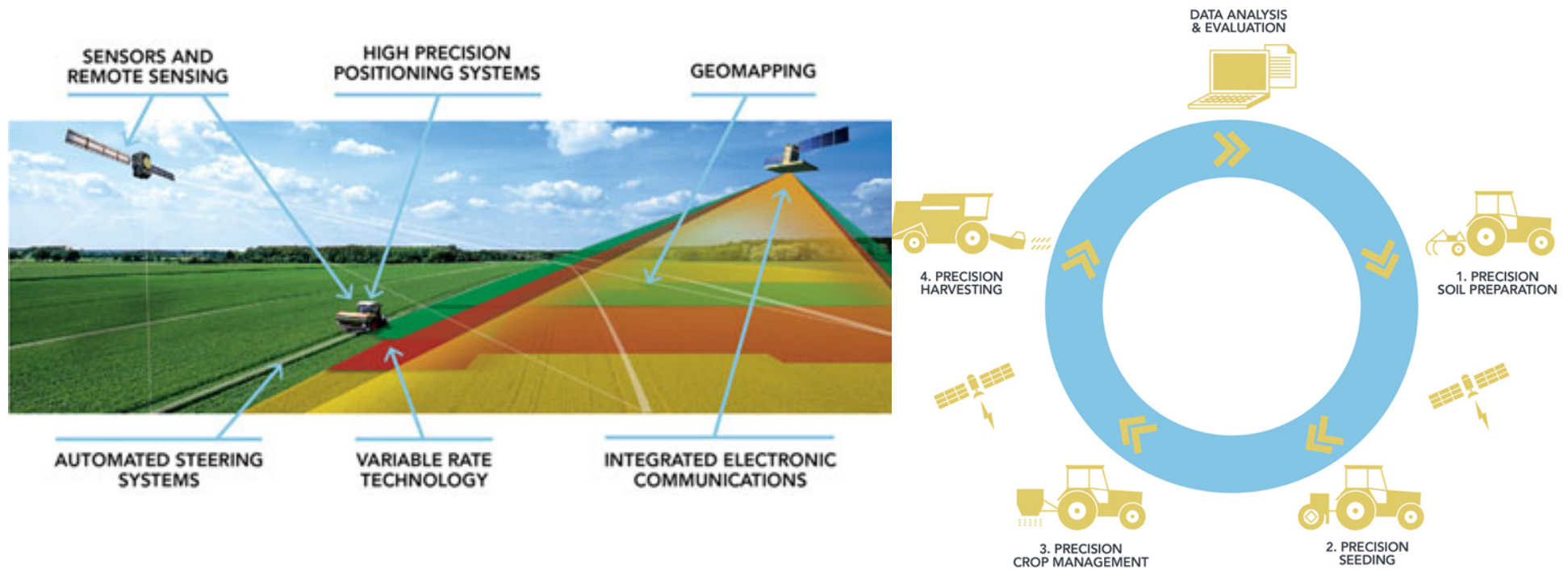
A silhouette of an oil pumpjack is shown against a purple and blue gradient sky. The pumpjack is a large mechanical structure used for extracting oil from the ground. The image is used as a background for a text overlay.

DATA

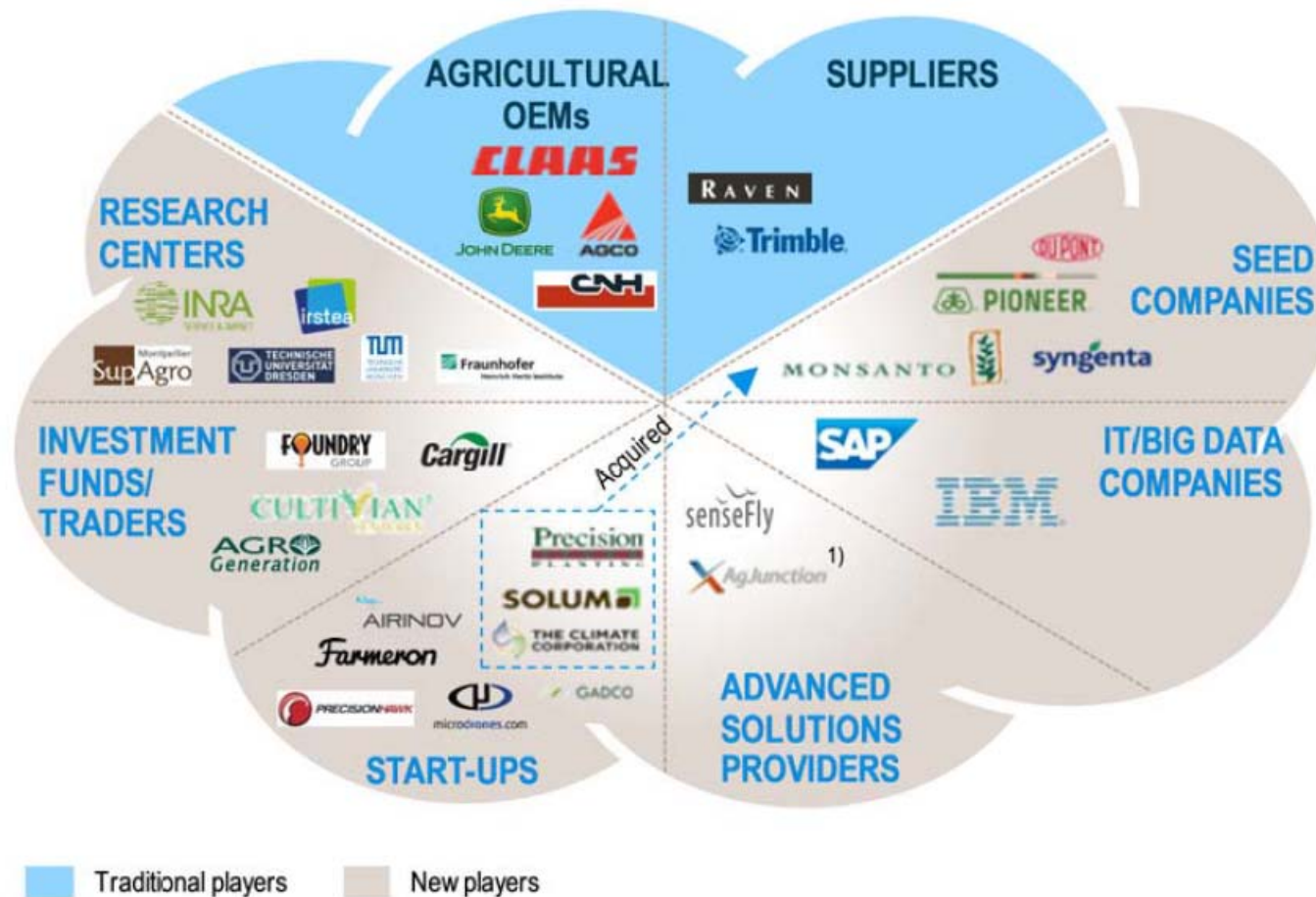
is the new oil

Data Management, toekomst?

“Data is the new Crop!”



→ Andere businessmodellen



Farming 4.0: Taking off now...



Media & Tech Network
Open data economy

Can open data prevent a global food shortage?

With the world's population set to grow to nearly 10 billion by 2050, pioneering farmers look to open data for eco-friendly solutions

Sponsored by:

ODINE Open Data Incubator Europe
About this content

Sean Hargrave

Wednesday 2 September 2015 12:56 BST



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Save for later



China is turning to open data after promising to cut the use of pesticides. Photograph: STR/AFP/Getty Images

As the world goes from seven billion mouths to feed to nearly 10 billion by 2050, the pressure is on to produce 70% more food than today without harming the



Unlocking the Next Evolution: Monsanto Providing Multiple Solutions to Farmers in the Seed, in the Bag and in the Field

Data Management discussie

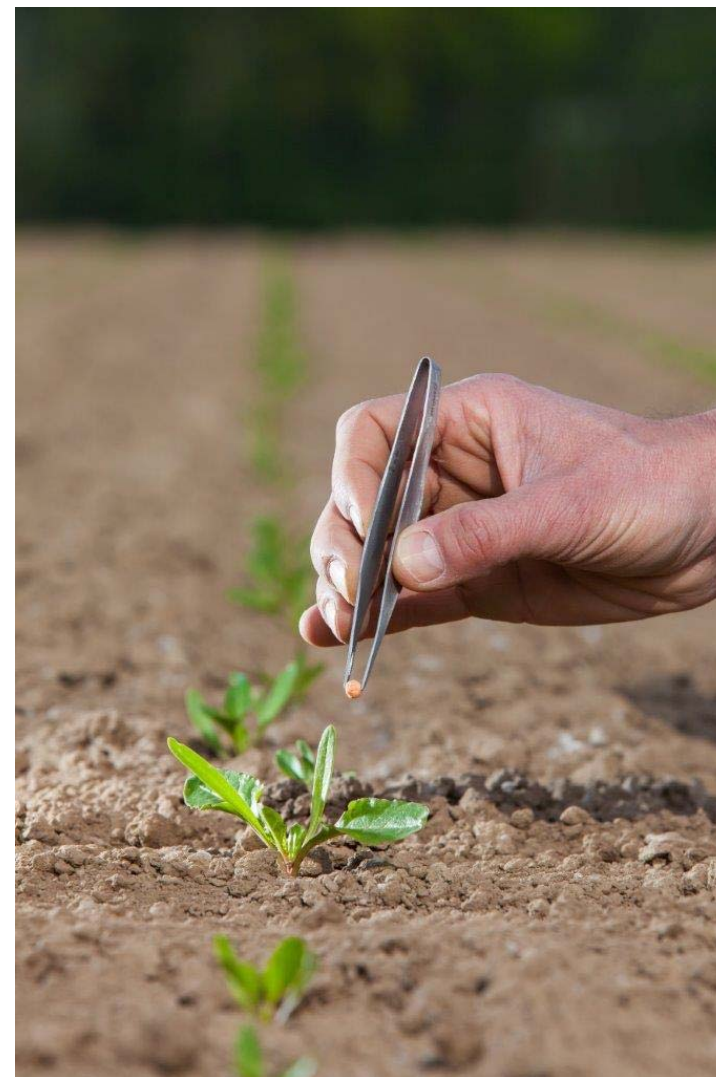
- Probleemstelling: “Wat ISOBUS was voor de werktuigen, is gestandaardiseerd Data Management voor probleemloze data uitwisseling!”
 - Standaarden nodig voor uitwisseling van **alle** data
- AEF / AgGateway werken aan Guidelines en standaarden, evt naar ISO toe
- Andere problemen; Ownership of data, veiligheid, encryptie, toestemming gebruik door derden, machineportaal..... Of nationaal of internationaal?
- Of kansen; Wat is mijn data waard....? Wat kan ik er mee en wat kunnen anderen ermee?
- Een aantal grote initiatieven/producten;
 - MyJohnDeere.com (JD)
 - 365FarmNet (Claas)
 - F4F (meer gedreven door de chemicals)
 - DKE (Initiatief van 14 werktuigfabrikanten)
 - Akkerweb (NL)
 - Fispac Foundation
 -
- **Data Hub initiatieven zijn nodig voor compatibele data uitwisseling**

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Conclusie

- Ag Industrie **verandert** in rap tempo
- Slimme machines met centimeter **precisie**
- Geavanceerde **sensortechnologieën**
- Landbouwmachines worden **IoM**
- Enorme hoeveelheden **data**
- “Data wordt het **nieuwe gewas**”
- **Standaardisatie** en afstemming is hard nodig



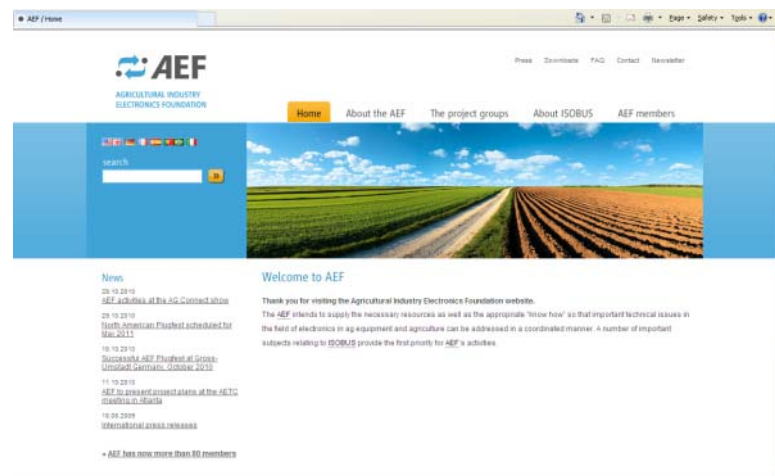
Meer met minder voor meer!



**Smart equipment
for sustainable agriculture**

Precision farming: producing more with less

- **AEF website:**
www.aef-online.org
- Please sign-up for **Newsletters**
- Member subscription on website
- AEF booth on all major Ag shows
- AgGateway website:
www.aggateway.org





Bedankt voor uw aandacht!

Meer informatie op: www.kvernelandgroup.com