AG (Re)Evolution

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Siena, Tuscany
May 08th, 2018
Company Structure

Agricultural Equipment

Construction Equipment

Commercial Vehicles

Powertrain

Financial Services
The Agricultural Evolution

1.0  Mechanization
- Introduction of tractors
- Increase in efficiency
- But labour-intensive system
- Relatively low productivity

2.0  Green Revolution
- New agronomic management practices
- Use of fertilizer and pesticide
- Improve seed quality
- Increase yield

3.0  Precision Ag
- Guidance systems
- Yield Monitoring
- Variable Rate Application
- Telematics
- Data management

4.0  Digital Farming
- Farm Management system in real time
- Added-value services
- Automation capabilities
- Improve Agri processes & food value-chain (data platforms)

1900  1950  1990  2010  Time
Precision Technologies

Planning

Soil Management

Seeding / Planting

Application

Harvesting

Which allows them to...

Make informed decisions and select the right seeds & fertilizers

Guide the correct paths and manage in-field variability

Guide the correct paths and manage application rate

Plant/ Fertilize / Spray only where needed

Mapping & Data Collection

Enablers:
- Sensors
- Positioning
- HMI & Usability
- Wireless communication
- Mechatronics
- Path planning
- Web & cloud computing

The connection between all stages is the data stream

Need for Off-Board Tools

Results:
- Knowledgeable Farm Management Decisions
- Machine/Operator Efficiency
- Lower Input Costs
- Higher Yield Production
- Optimized Systems
Off-Board Digital Tools

- ISO-XML
- Machine Data Analysis
- API
- Remote Assistance
- Data Sharing
- Farm/Fleet Management

CNH Defined / Fully Integrated
Vehicles are equipped with a device very similar to a computer that is able to collect vehicle data (such as odometer, working hours, fuel consumption, etc.) and operational data (such as agronomic information, driving style, etc.).

Data flowing from vehicles are transmitted through a telecom network to a Cloud storage and infrastructure… … and are made available for elaboration and statistical/historical analysis… … and in the end are published to be used for any purpose by a specific business platform

Business platforms provide business-specific applications based on vehicles' data to offer to the customers value-added telematic services, improving customer operations as well as enabling 3rd party services integration.

Customers can easily access the applications provided by the business platforms wherever they are, should they control their fleets or verify the driving style of their drivers or understand the status of the yield or plan maintenance operations, or…
CNH Industrial Ecosystem

DATA

Agriculture Data Owner
- Agrochemical
- Government & Research Institutes

Other Data Sources
- Demand
- Published
- Weather
- Crop inputs
- Crop output
- Imagery
- Genome
- Geospatial
- Regulatory
- Statistics and reports

CNH Industrial

CNH Industrial Ecosystem

PLATFORM

CNH Trusted Cloud platform
Create global, secure data exchange and transactional platform for all agriculture data from seed to fork

GTM

Ecosystem empowered Ag value chain

Agriculture Value Chain
- Agrochemical: Seed, Herbicide, Fertilizer
- Ag Equipment: Tractor, Irrigation, Drones
- Farmer: Plant, Livestock
- Co-ops: Consultants, exporters
- Food & Bev: Food, biofuel, raw material
- Distribution: Retail distribution, export
- Retailer: Grocery, mass merchants
- Consumer: Individual, consumer groups
AgTech: Startups and Unconsolidated Offerings

- Highly Dynamic space, with new entrants daily enabled by **Traditional Companies, Venture Capital and Private Equity**
Remote Assistance: a sample scenario

1. Reduce downtime with proactive alerts from connected devices.
2. Address issues faster by remotely monitoring devices and keeping customers in the loop.
3. Reduce maintenance costs by dispatching the right technician only when needed.
4. Ensure your service techs are fully equipped to deliver a first-time fix.
5. Gain enhanced visibility into product, service, company performance and customer satisfaction.
Remote Assistance: a sample scenario
1. **IoT & Cloud** are the enablers to exploit vehicle’s connectivity, providing value added services such as **Control Room** and **flexible maintenance plans**.

2. **Edge** technology will provide the vehicle with enhanced computing capabilities allowing services such as **Coordinated Vehicle Control** and **Advance Machine Auto-Setting**.

3. **Artificial intelligence** will extend the set of services provided on the vehicle offering **the next step of Autonomous Vehicles** through cognitive capabilities.
CNH Industrial Roadmap to Autonomy

Data/Software:
- Telematics Fleet management
- Data Management
- Services
- Environmental sensing
- Artificial Intelligence
- Automated Operations
  - Unmanned operations
  - Systems' Auto-settings
  - Machine processes automation
- Autonomy
  - Unmanned Machine with Artificial Intelligence

Single Machine Management:
- Hardware
  - Guidance
  - Yield Monitoring
  - Application Control
  - Machine Control

Logistics and Tasks Management:
- Services

Agricultural Ecosystem:
- Data Management
- Services

Time:
- 1990
- 2010
- Now

Hardware:
- 12
CNH Industrial Autonomy Milestones

**LEVEL 1**

**GUIDANCE**
*All manned vehicles*

1999 +

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**LEVEL 2**

**COORDINATION & OPTIMIZATION**
*All manned vehicles*

2018 +

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**LEVEL 3**

**OPERATOR ASSISTED AUTONOMY**
*Manned back-up*

2020 +

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**LEVEL 4**

**SUPERVISED AUTONOMY**
*In-field supervision of unmanned vehicles*

2023 +

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**LEVEL 5**

**FULL AUTONOMY**
*No local supervision*

2025 +
Evolution to Autonomy

Access & Control
Hardware Components

Environmental Perception
Hardware Components

Remote Monitoring
Software

Machine Communication
Hardware Components

Planning
Software

Autonomy
Take decisions based on analytics and artificial intelligence

Available now
The Autonomous Concept Vehicle

https://www.youtube.com/watch?v=ALmqer120qM