



TRACTOR INNOVATIONS

Dr. Martin Kremmer

European Technology Innovation Center
John Deere GmbH & Co. KG, Germany

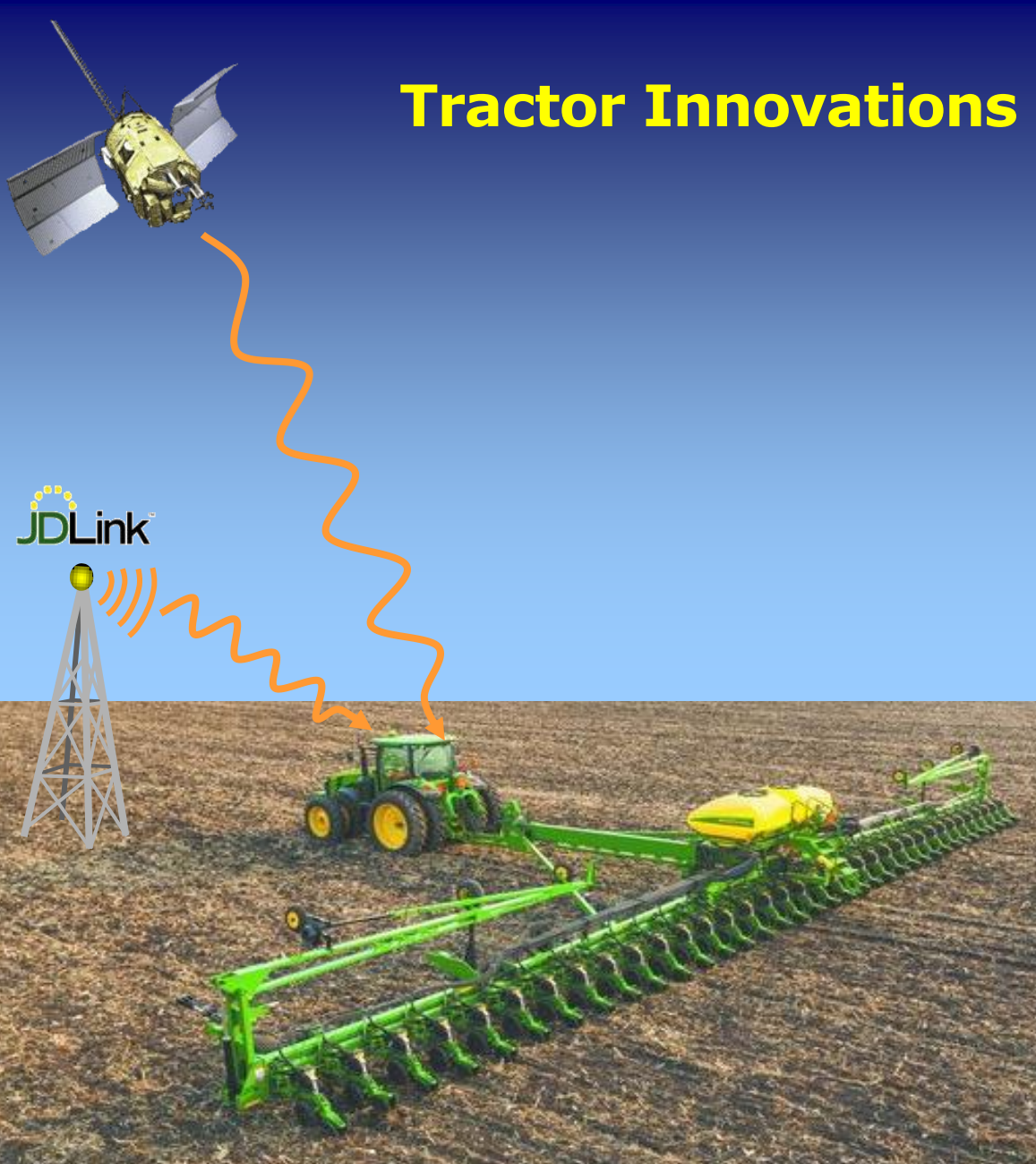


JOHN DEERE

Tractor Innovations

CONTENT

The last Century
The last two Decades
Today's Examples
A look ahead



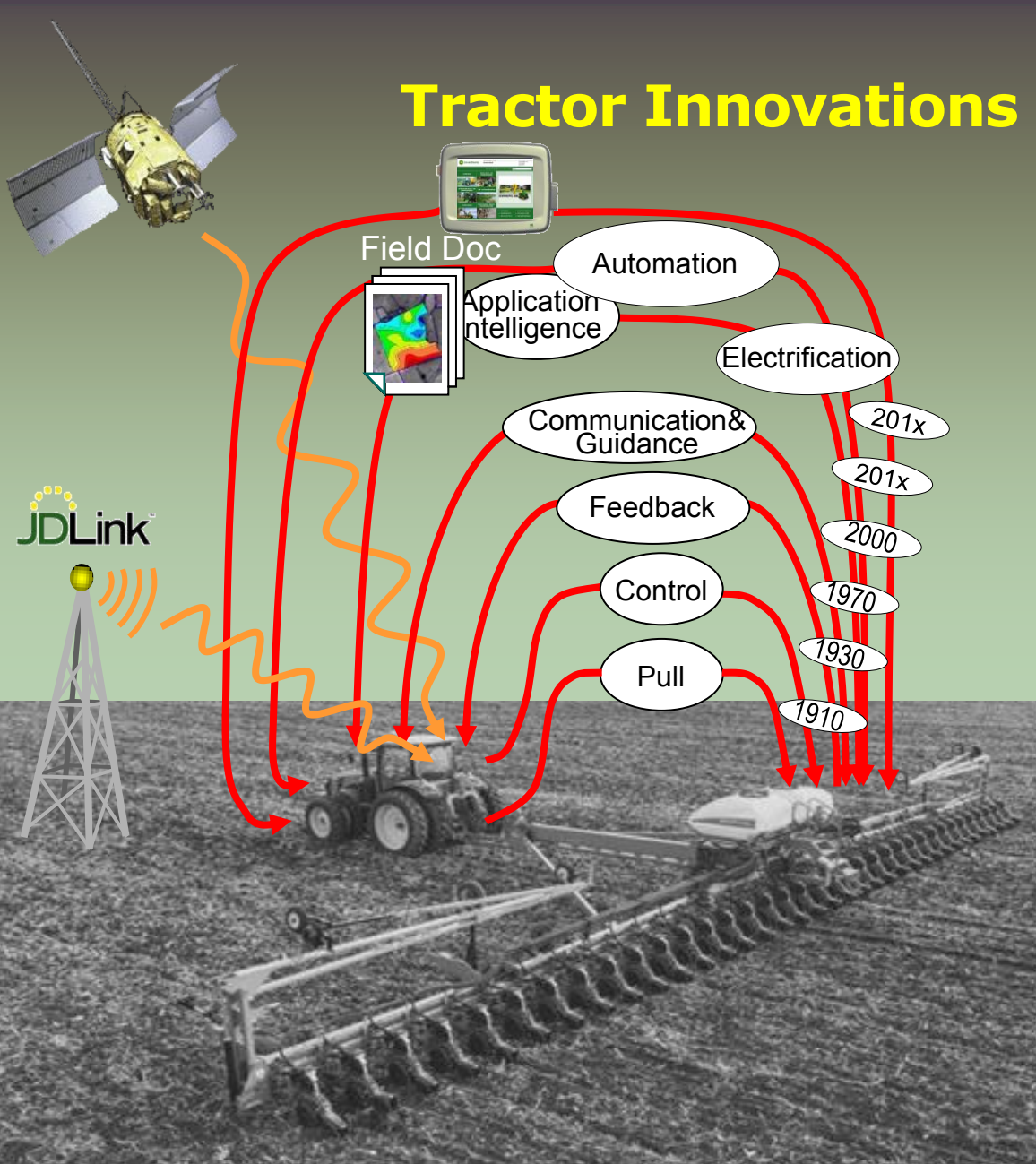
Tractor Innovations The last Century

- **Tractor & Subsystems**



Tractor Innovations

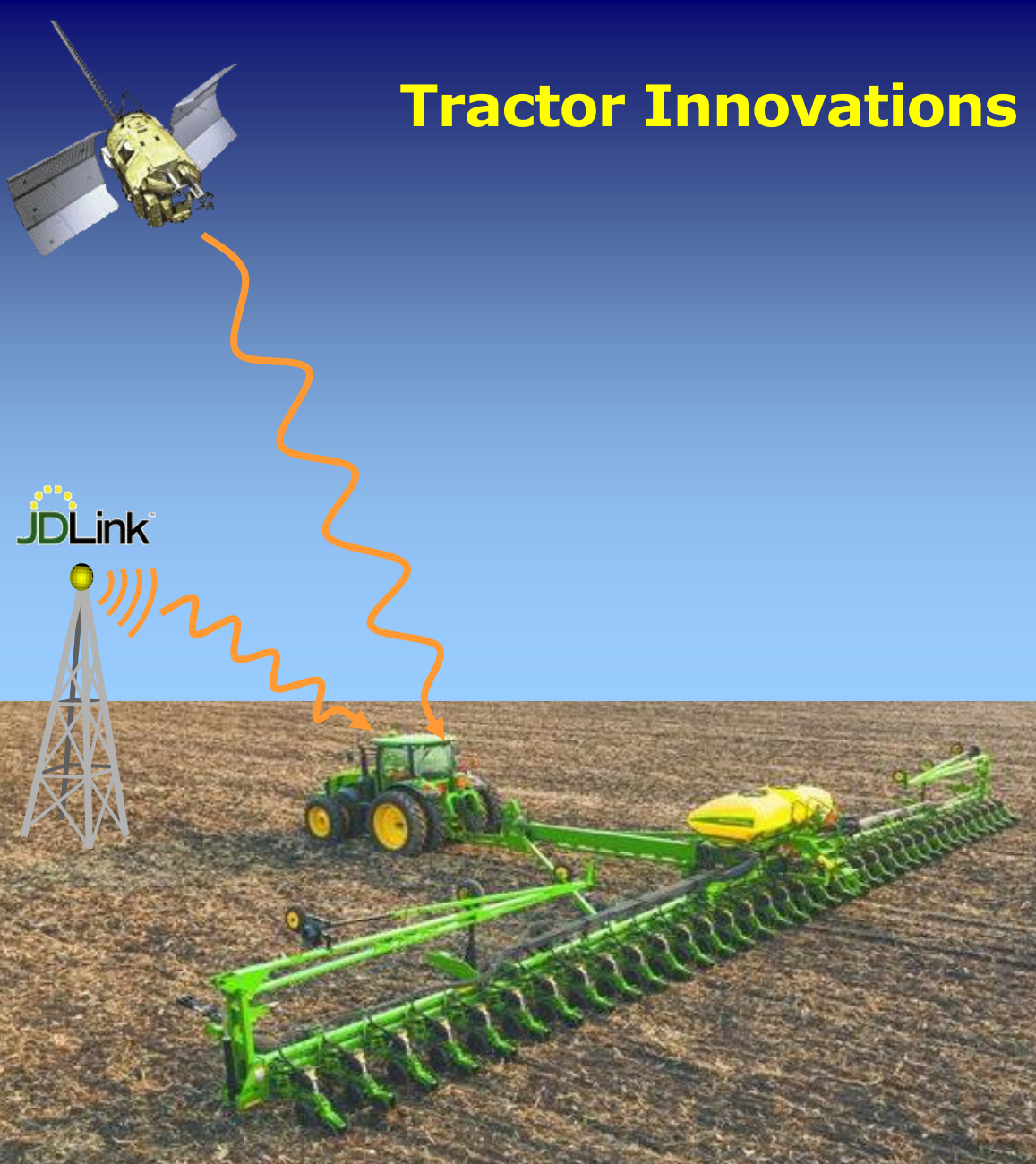
The last Century



• Tractor & Subsystems

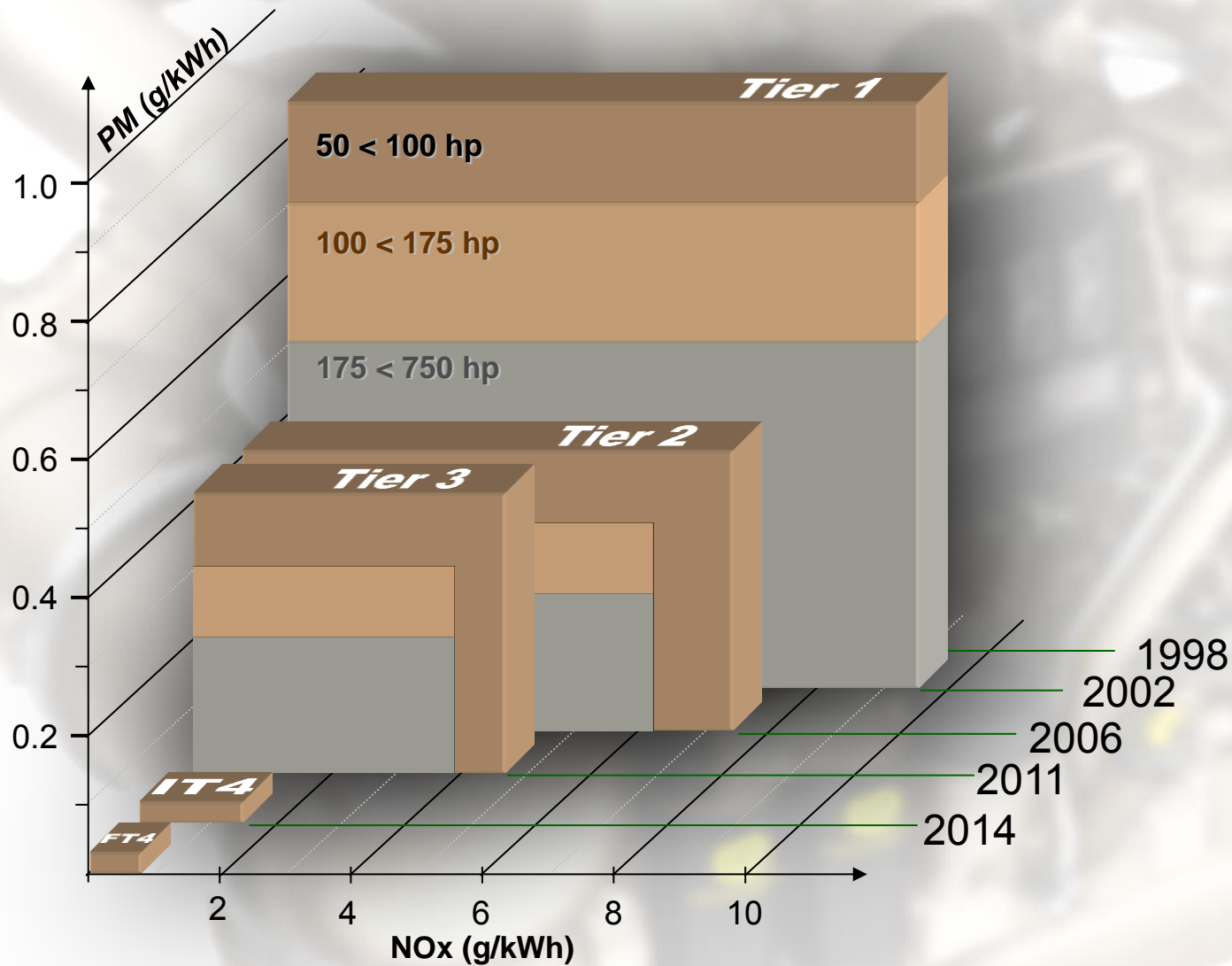
Tractor Innovations

The last two decades



- **Tractor & Subsystems**
- **Emission Regulations**

Legal Requirements



Example IT4 – Challenge and Opportunity

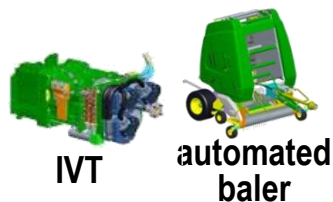
Legal Impact



Fuel Efficiency



Productivity



Comfort



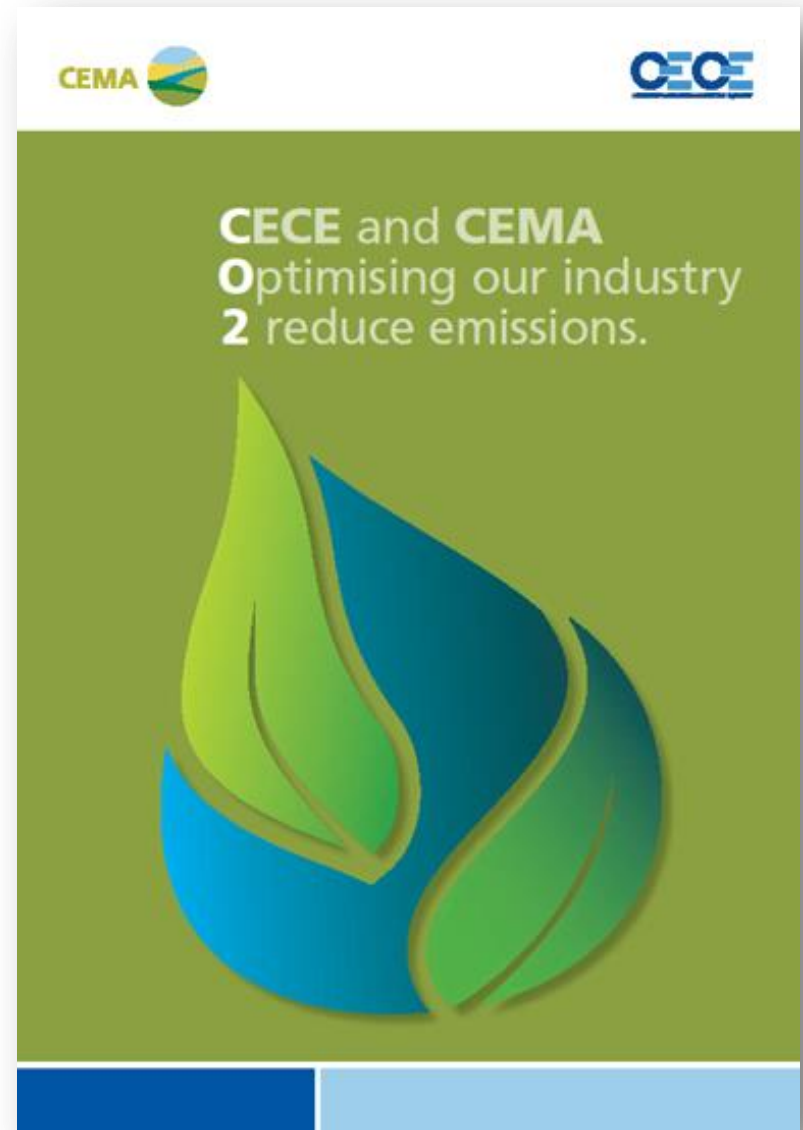
Technology Leadership Image



Political frame conditions in EU

Point of view of agricultural and
construction machinery industry

- EU stage V, VI, VII ...
- (Voluntary) mandatory reduction of fleet CO_{2,eq} emissions
- Reduction of Ag diesel subsidies
- Mandatory ecodesign & environmental product certification
- Renewable Energy Directive 2009/28/EC

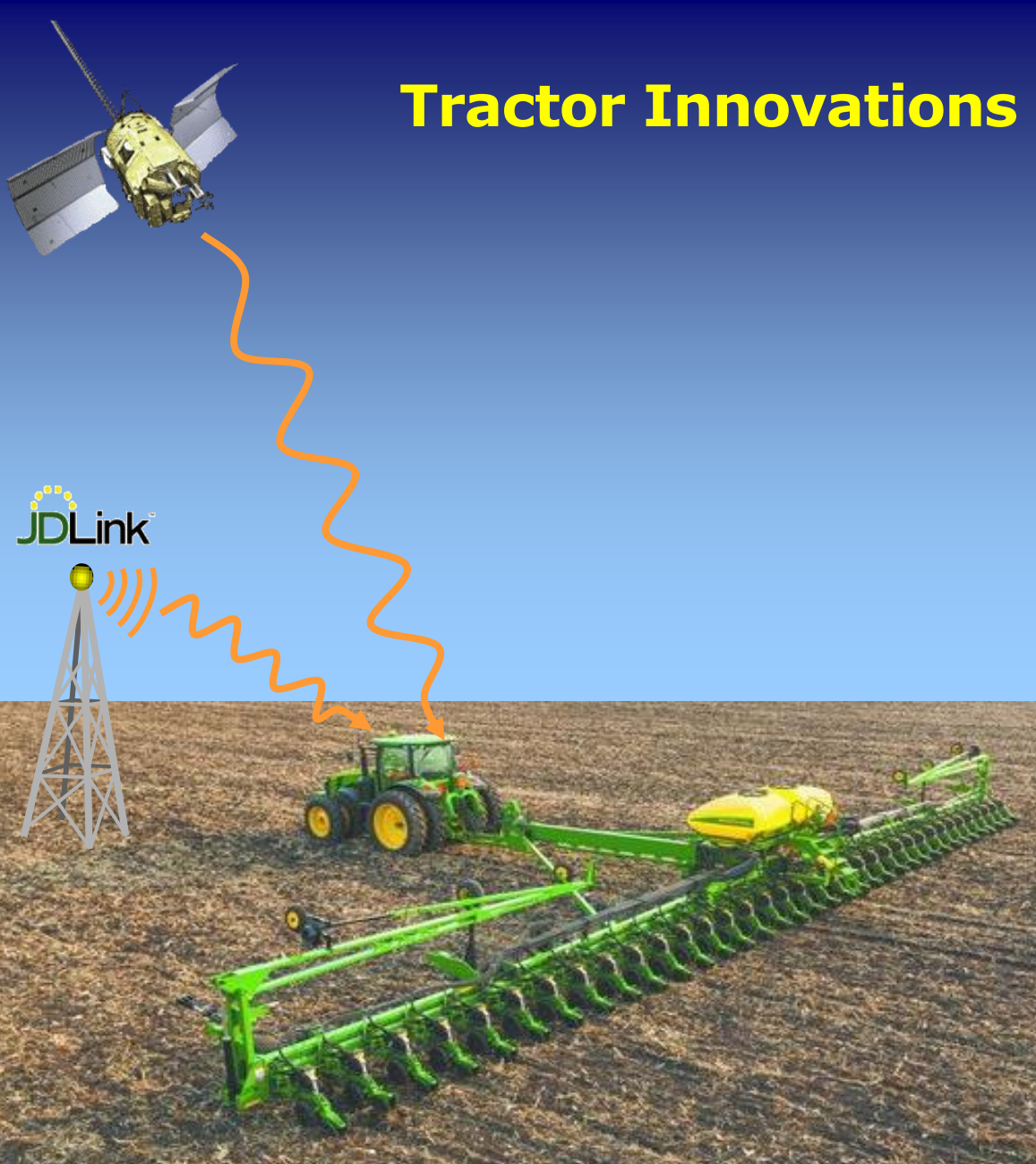


Tractor Innovations

Today's Examples



- Tractor & Subsystems
- Emission Regulations
- **Electrification**
- **Automation and autonomous Operation**
- **Solutions**



Example1 – HYBRIDISATION/ELECTRIFICATION

John Deere *BatteryBoost*



Grid-Plug-in Hybrid System

Battery Exchange Concept

Renewable Energy Utilisation

Sustainability (Self-supplied Energy)

Electrical Engine Boost for lower hp tractors



Example2 – AUTOMATION

John Deere *AutoConnect*

AutoBackup

No driver interaction
Transmission control
Steering control

AutoConnect

Mechanics
PTO
Hydraulics
Pneumatics
Electrics
ISOBUS

AutoSetup

ISOBUS implements



Example3 – SOLUTIONS

John Deere *Exact Emerge*



Integrated High Performance Corn Planting Solution

Electrified Tractor-Implement Combination

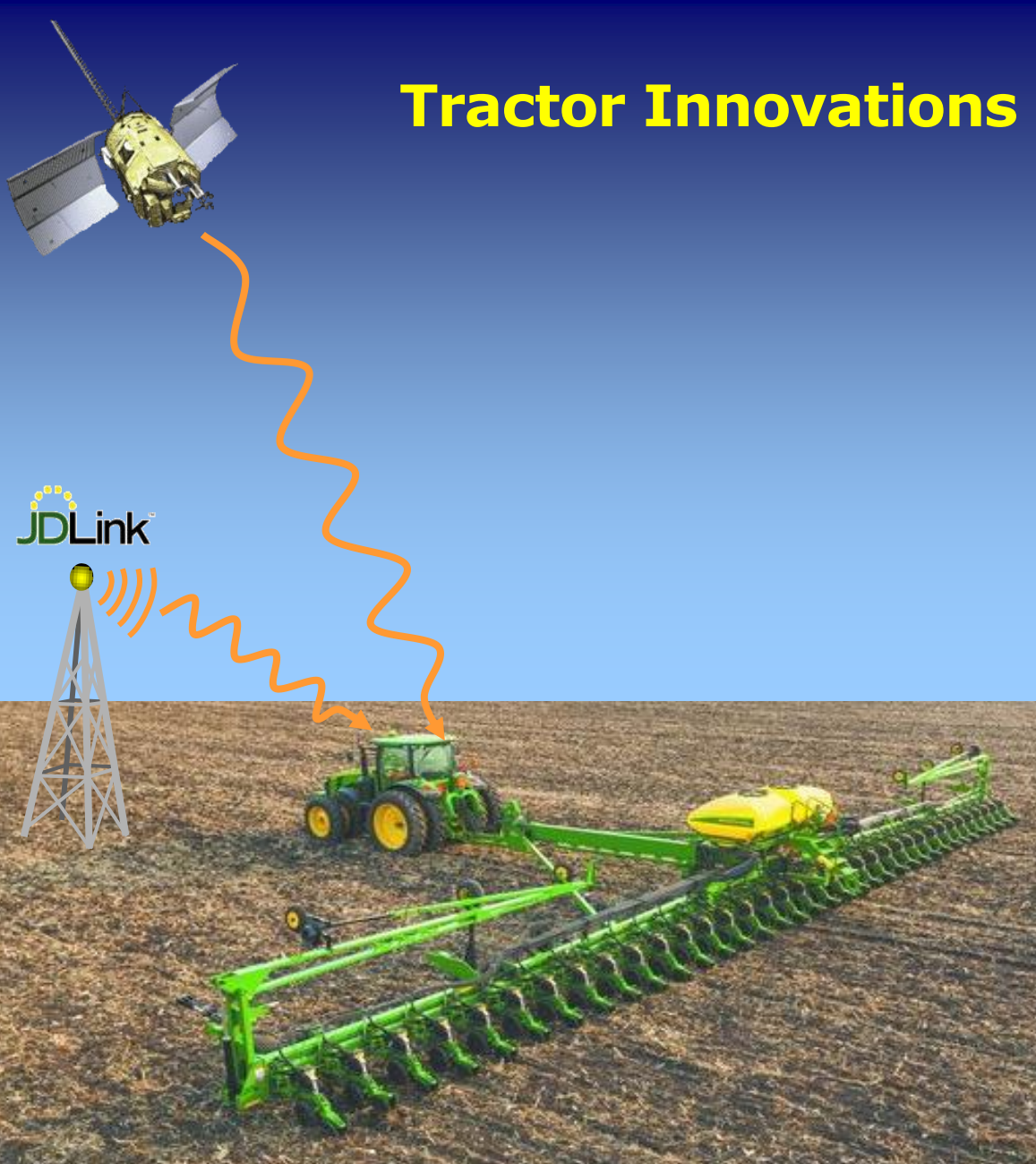
New EE Seed Metering & Brush Belt Delivery
Tractor load transfer & active Downforce Control

Advanced Precision Farming Solution

WDS (Wireless Data Server), RDA, HD Mapping



Tractor Innovations A Look ahead



- Tractor & Subsystems
- Emission Regulations
- Electrification
- Automation and autonomous Operation
- Integrated Solutions
- A look ahead

(Tractor)Innovations in the near future



Getting the most out of each machine:

Further developed self-optimizing machines that use all available capacity while preserve the maximum yield potential



Multiple machines working together:

A farming operation that operates like a world class factory, getting the right inputs, in the right place, at the right time



Make decisions enabled by information:

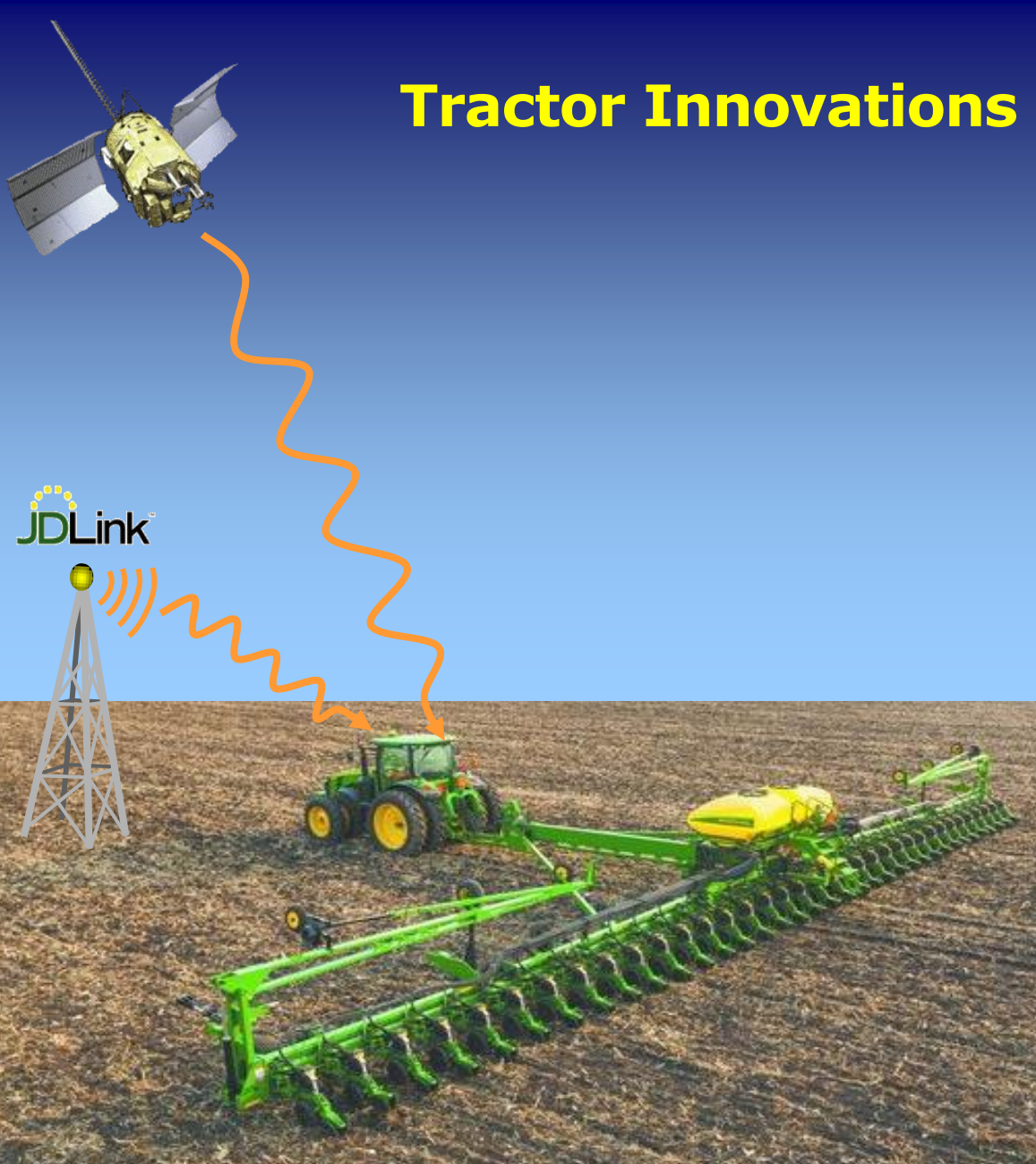
Seamless flow of data between the operation, decision makers, and back to the operation, enabling customers to meet their production system goals

MACHINE OPTIMIZATION

LOGISTICS OPTIMIZATION

AG DECISION SUPPORT

Tractor Innovations Summary



- Tractor & Subsystems
- Emission Regulations
- Electrification
- Automation and autonomous Operation
- Integrated Solutions
- A look ahead
- Farm Forward



JOHN DEERE