

THE FUTURE OF IRRIGATION MANAGEMENT BEYOND REMOTE CONTROL

BRUNO PERRONI – LINDSAY CORPORATION

EIA SPRING
IRRIGATION FORUM
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THE PRESSURE ON AGRICULTURE TODAY



Climate
Variability



Resource
Scarcity



Labor
Shortages



Yield
Pressure

In a world where growers face increasing pressure from climate variability, resource scarcity, and labor shortages, AI is emerging as a critical enabler, processing massive amounts of data in real-time and turning it into actionable insights, without constant manual input.

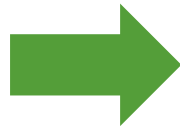
HOW AI IS TRANSFORMING IRRIGATION & IRRIGATION MANAGEMENT



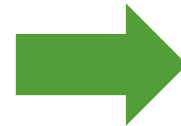
Tabela de Leitura de Tensiômetros (kPa)

Data	Estação de controle nº 1		Estação de controle nº 2		Estação de controle nº 3		Tensão média		Chuva / Irrigação (mm)
	Raso	Profundo	Raso	Profundo	Raso	Profundo	Raso	Profundo	
1									
2									
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Manual data collection & Processing



Automatic data collection & Basic Processing



Advanced data collection & Process and real-time insights – Plant as a sensor

AI AS A CATALYST FOR SMART IRRIGATION

- ✓ Process massive amounts of real-time data
- ✓ Turn data into actionable insights automatically
- ✓ Determine ideal irrigation timing, volume & schedule
- ✓ Consider soil moisture, weather, crop stage & history
- ✓ Reduce cognitive burden on growers
- ✓ Enhance precision and eliminate guesswork

*Irrigation = most resource-intensive area of farming.
Knowing when, where & how much to irrigate is critical.*

KEY APPLICATION IN IRRIGATED AGRICULTURE



Predictive Analytics

Leverages historical data, real-time field inputs & environmental conditions to forecast outcomes. Determines ideal irrigation timing, volume & schedule reducing hours of manual calculation.



Crop & Soil Monitoring

Remote sensing + AI enables precise monitoring via satellite imagery, drone surveys & ground sensors. Detects anomalies: pest outbreaks, nutrient deficiencies, water stress at scale.



Weather-Driven Decisions

Hyperlocal field-specific forecasting adjusts irrigation schedules, predicts disease pressure & fine-tunes planting timelines beyond regional averages.

TRANSFORMING IRRIGATION MANAGEMENT

Water is one of our most valuable and vulnerable resources. AI allows us to use it smarter, applying only what is needed, when and where it is needed.

Water Use Efficiency

Apply only what's needed, where and when it's needed

Reduced Energy Costs

Optimized pump cycles aligned to real crop demand

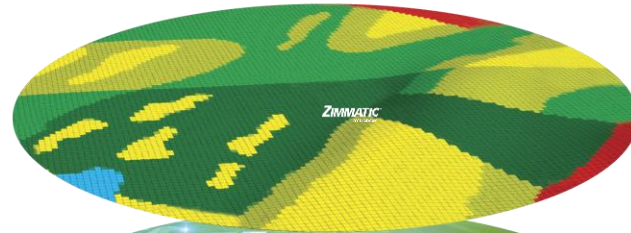
Less Equipment Wear

Fewer unnecessary irrigation runs extend hardware life

Scalability

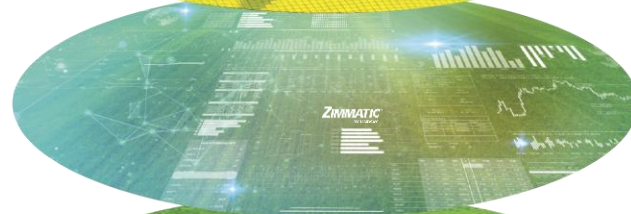
AI recommendations grow from 1 field to 1,000 fields seamlessly

THE SMART IRRIGATION | MACHINE HEALTH & CROP HEALTH



IRRIGATION SCHEDULING & VRI

- Daily optimized recommendations
- Advanced crop modeling, cloud computing
- Hyper-localized weather forecasts



ACTIONABLE GROWER INSIGHTS

- Information to act on
- Increased efficiency & yields
- Higher profitability



CROP HEALTH

- Monitor crop growth stages
- Early detection of disease & pests
- Ultra-high-resolution imagery



MACHINE HEALTH & TELEMETRY

- Predictive analytics
- Remote diagnostics with real-time alerts
- System remote control



CENTER PIVOT MACHINE

- Water Delivery
- Local controls
- Pivots and laterals

MACHINE HEALTH & PREDICTIVE MAINTENANCE

REACTIVE (Old Approach)

Failure discovered during irrigation season

Emergency repairs cause crop stress

Lost yield, cannot recover

High unplanned maintenance costs

PREDICTIVE (AI Approach)

Sensor data detects anomaly early

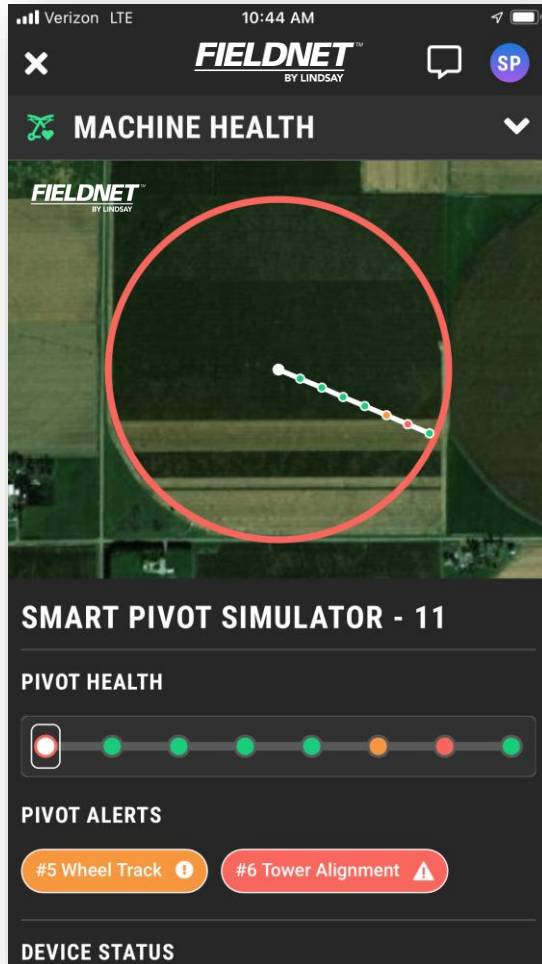
Maintenance scheduled proactively

Zero downtime during critical growth stages

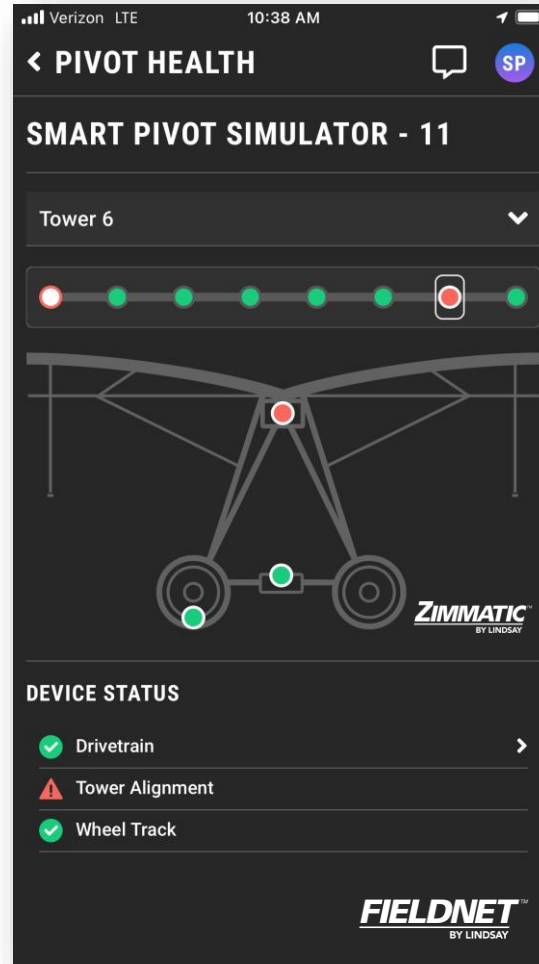
Lower total cost of ownership

Imagine knowing a gearbox is about to fail before it disrupts irrigation. That kind of foresight can save a grower time, money, and peace of mind.

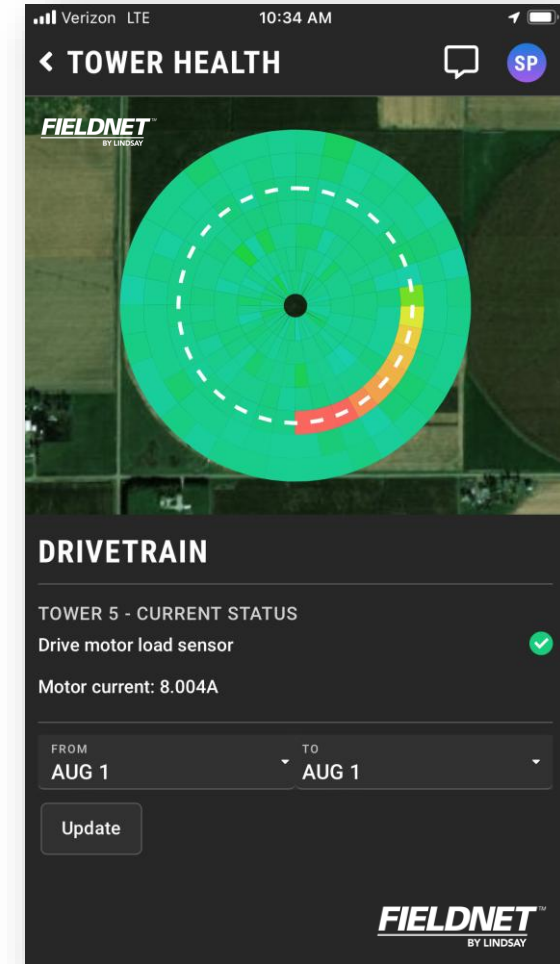
OUR DEVELOPMENT - FROM AN INFORMATIONAL VIEW TO THE MACHINE LEARNING



Tower Identification

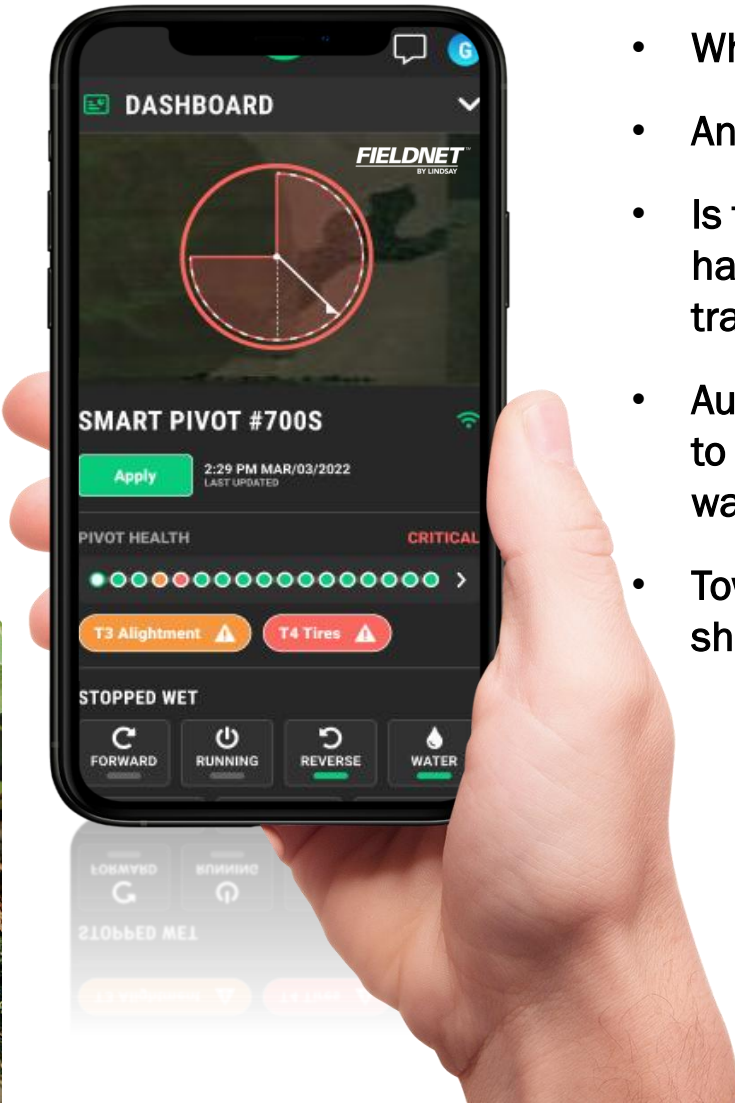


Detailed Tower Information



Analytical information





TRACKING ISSUES & SUCCESS = MACHINE LEARNING PERFORMANCE



- Which tower shutdown?
- Any flat or low tires?
- Is the center drive motor working too hard? – if so, is the issue with a wheel track or a component?
- Automatic wheel slippage compensation to always apply the correct amount of water
- Tower fault avoidance to minimize shutdowns and downtime

INDUSTRY PARTNERSHIPS & ECOSYSTEM INNOVATION

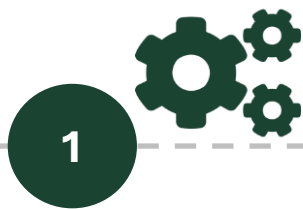
AI's effectiveness depends heavily on data quality and integration. The industry is seeing a growing number of partnerships between:

-  **Hardware manufacturers**
-  **Software & AI platform providers**
-  **Remote sensing & imagery specialists**
-  **Agonomic knowledge providers**

Goal: Combine crop health + soil + weather + equipment data into ONE decision-making ecosystem

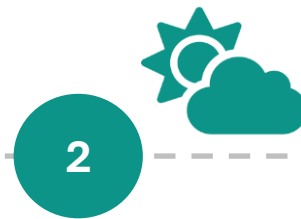
THE ROAD AHEAD - WHERE IS AI TAKING IRRIGATED AGRICULTURE?

We are still early in the journey. But we are moving toward a world where irrigation is no longer reactive, but predictive and adaptive. That is the shift AI is driving.



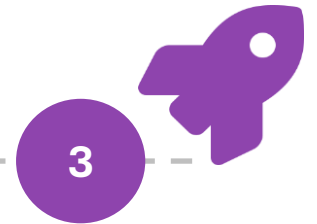
Machine Health Analytics

Preempt irrigation system failures before they happen, keeping systems running during critical crop stages.



Hyperlocal Weather Modeling

Field-specific forecasting, enabling precise, real-time schedule adjustments.



Fully Autonomous Irrigation

Systems that sense, decide, and act in real time, from reactive to predictive and adaptive.

CHALLENGES OF AI IN AGRICULTURE

- **Large upfront costs** - While AI solutions can be cost-effective in the medium-to-long-term, there's no escaping the fact that the initial investment can be very expensive.
- **Reluctance to embrace new technologies and processes** - Unfamiliarity often makes people hesitant to adopt new technologies creating difficulties farmers to fully embrace AI, even when it offers undeniable benefits.
- **Proper cost understanding** – In many cases water savings for example is not the main driver in different regions, and it is not added to the overall analysis.
- **Lack of practical experience with new technologies** - Aspects of the agricultural industry differ in their technological advancement around the world. Some regions could leverage all the benefits AI, though there are some hurdles in countries where next-gen agricultural technology is uncommon.
- **A lengthy technology adoption process** - In addition to a lack of understanding and experience, the agricultural sector generally lacks the infrastructure needed for AI to work.
- **Technological limitations** - As AI is still developing, the technology will have constraints. Accurate models depend on diverse, high-quality data, which can be scarce in agriculture.
- **Privacy and security issues**- There is still a general lack of regulations relating to the use of AI across all industries. Particularly, implementing AI in precision agriculture and smart farming raises various legal questions. For example, security threats like cyberattacks and data leaks may cause farmers serious problems.

FINAL THOUGHT

AI Won't Replace the Grower. It Will Amplify Their Ability.

As pressure mounts to produce more with fewer resources, AI will be central to creating irrigation strategies that are smarter, leaner, and more resilient.

From precision water delivery to predictive maintenance, it is transforming irrigation, one field, one decision at a time.



THANK YOU!

Bruno Perroni - Bruno.perroni@lindsay.com

QUESTIONS

Q & A

ANSWERS