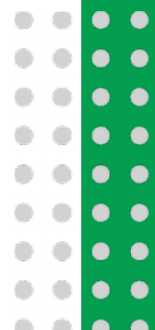




**ANIMAL
IDENTIFICATION:
NEW DEVELOPMENTS &
FUTURE POSSIBILITIES**



Overview



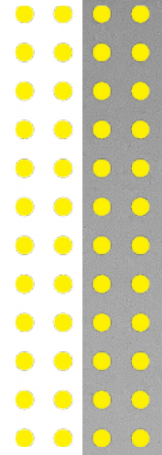
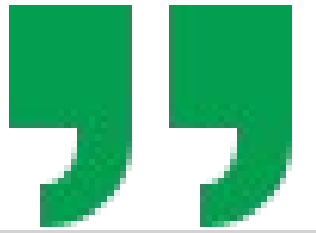
 **About Us**

 **Innovation & Change**

 **Multi-modal Biometric Monitoring**

 **Digital Transformation**

 **Value of Wireless Bovine Systems**



About Us

Wonderkow delivers modern automation tools customized for agricultural business. This includes advanced electronics, sensors, wireless communications, and software from the sensor device on the farm to the cloud.

Chris Anderson – chris@f3wireless.com

Michael McHugh

Chief Executive Officer
mike@wonderkow.com



How we've always done it

Most current monitoring systems are built on accelerometers harvesting simple motion and delivering that data through a short range local radio. Data gathered includes signs of readiness for breeding and jaw movement for eating.

No direct measurement of biometrics.

Biometric Monitoring is Ready for Development



Past Challenges

Available sensing technology
Power constraints



Hardware Costs

Cellular hardware costs have come down and 5G networks have rural 5G funding.



Evolved Tech

Silicon photonics have evolved with years of trial and validation.



Scaleability

High scalability of the cloud and artificial intelligence.

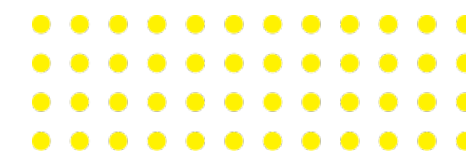
Innovation & Change

New sensors:

- * Core body temperature
- * Hydration
- * Pulse
- * Blood pressure
- * Blood oxygen level
- * New ones coming all the time

New Methods:

- * Cellular networks, public and private
- * Local radio networks
- * Cloud processing and availability of data



Biomarker Example Detail

Biomarker	Accuracy	Range	Sample Intervals
Heart Rate	3 BPM	20-250	Every 5 seconds
Heart Rate Variability	+/- 5%	0-300 ms	Adjustable in non motion
Respiration	3 BPM	3-70 BPM	Adjustable
SpO2	5%	70-100%	Adjustable
Core Body Temperature	0.5c	35-40c	Adjustable
Hydration	TBD	10 point Scale	Adjustable

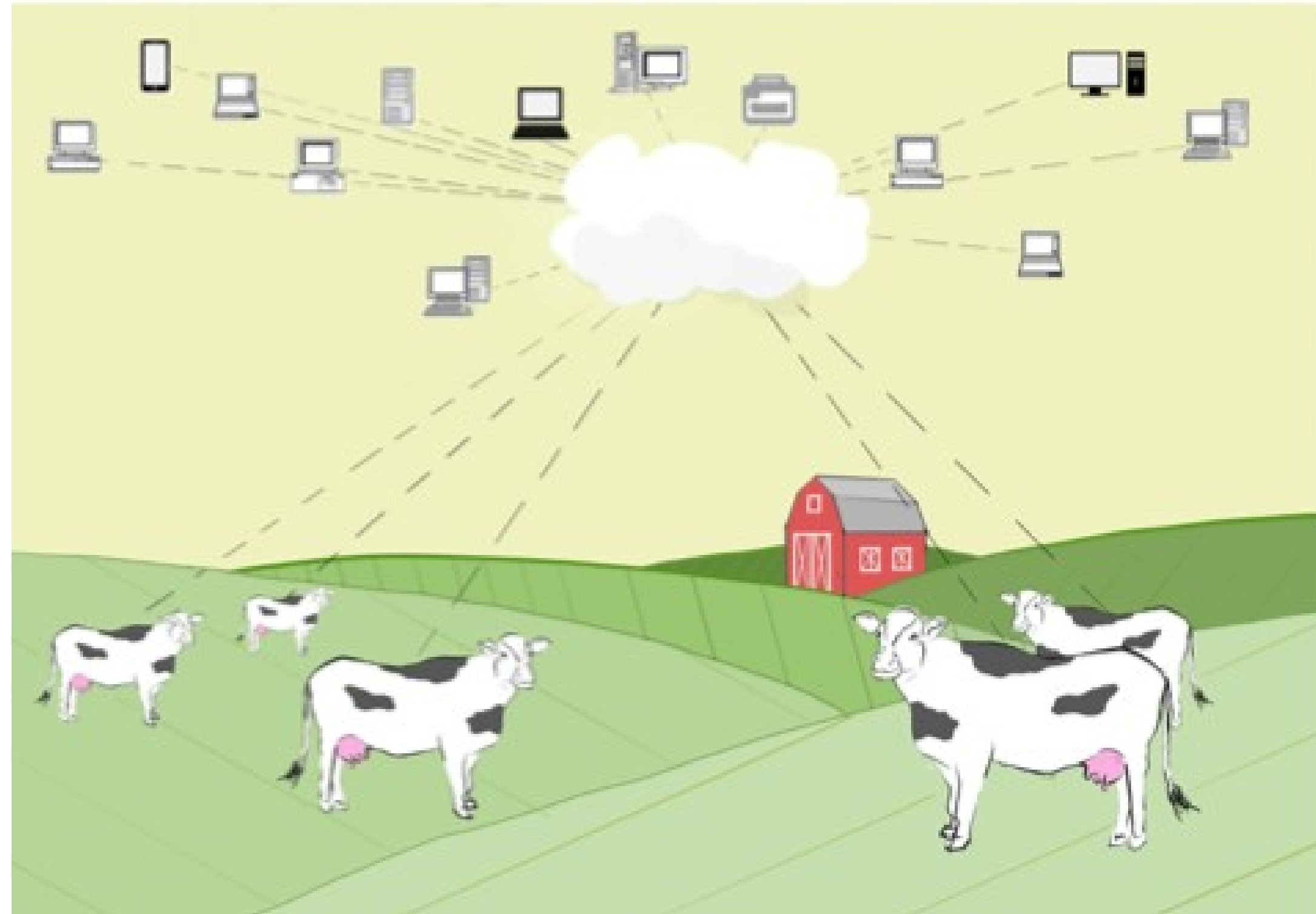


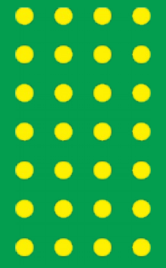
Direct Cellular Uploads

**Real Time
Records**

**Herd Data
Mining**

**Location
GPS**





Critical Use Example for Beef Cattle



- Biometric sensing allows for early detection of sick or struggling individuals via temp, heart rate, respiration, or activity monitoring
- Find the animal you need, when you need them even in a concentrated feed lot
- Traceable, individualized animal welfare monitoring
- Know what animals have what health conditions and treat them individually or in relevant groups

Feed Lot Application

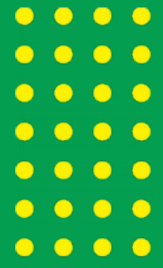
Benefits



Increased fertility rates
Saves money and time.

Better general health
Monitoring vital signs saves money and time vs. manual checks.

Reduced deaths
Reducing stress by monitoring vitals means less heat stress and death.



Data Fusion

Combining information from multiple systems allows for a holistic understanding of each animal's health, and thus herd health, allowing for effective business decisions based on current data.

Milk

- DHI raw milk component data
- Milk volume production and trends
- Trends in Progesterone by cow
- Trends in Protein by cow and herd

Feed

- Feed analysis data from Nutritionists

Other

- Economic factors of agriculture variables
- Environmental trends
- Regional trends on feed and environment etc.



**THANK
YOU!**



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