THE INTERNET OF THINGS
AN EXPLOSION OF CONNECTED POSSIBILITY

2000
1,000,000
Internet of Things

2005
0.5 BILLION
First home devices

2009
IoT INCEPTION

2010
11.2 BILLION

2012
8.7 BILLION

2013
14.4 BILLION

2014
22.9 BILLION

2015
18.2 BILLION

2016
34.8 BILLION

2018
42.1 BILLION

2020
50.1 BILLION

Taking your smart home to the next level will be about 50 billion devices per person on the planet.

YEAR
BILLIONS OF DEVICES
Verizon Enterprise IoT Solutions

- Smart Cities
- Mobile Commerce
- ThingSpace
- Asset tracking and Management
- Smart Monitoring and Management
Smart Monitoring and Management: AgTech

- Remote Monitoring and Control
- Grid Wide Utility Solutions
- Asset Management
- Condition-Based Maintenance
- Irrigation Management Solutions
- Telematics
- IoT Security Credentialing
Agricultural Resources: Three Pillars

- Chemicals
- Water
- Energy
Chemicals

• Overview: two main factors affect chemical usage
  • Government Regulation
    • Federal
    • State
  • Social Positioning
    • Advocacy groups
Government Regulation

• Federal: EPA and USDA
• State: California Department for Pesticide Regulation (CPDR)
Social Positioning

- Local Organizations
- Large Advocacy Groups
  - Pesticide Action Network of NA
    - Panna
  - Beyond Pesticides
    - State-by-state directory of advocacy groups
Chemical Use Recommendations

Use Integrated Pest Management (IPM) practices to develop holistic and flexible IoT solutions

What is IPM?

IPM is a pest management method that focuses on four types of pest controls:

- Biological
- Cultural
- Mechanical/Physical
- Chemical
The IoT Solution Suite

- Data Collection
  - Pest tracking sensors
- Analysis
  - Life cycle tracking, weather/climate models
- Automation
  - Drones, drones, drones!
Water

Regulations:
• State
  • California
    • SB 88
    • Executive Order B-29-15
    • Executive Order V-37-16
  • Oregon
    • 1993 Agricultural Water Quality Management Act
    • Agricultural Water Quality Management Program
  • Washington
    • Best Management Practices (BMPs) – Voluntary Compliance Model
Water

Develop integrated systems that allow for remote monitoring and control of key, low-process productions that help address regulatory compliance issues.

- Data Collection
- Analysis
- Automation and Remote Control
Energy Overview

• Energy is critical to successful crop production
• Technological Advancements:
  • Lead to increased crop production
  • Come at a price of rising production costs and environmental impacts
• To address these needs:
  • Efficiency of current energy inputs must be improved
    • (Machinery, Systems, and Transportation)
  • Focus on shift to alternative sources of energy
  • Regulations
Energy Recommendations

• Hardware/software products focused on increasing the efficiency of current energy inputs
  • Products connected to the system via IoT
  • Follow parameters
  • Report energy usage and diagnostic info
  • System analyzes data in comparison to changing forecasts and production needs
  • Farmers take action or follow preset automations

• Alternative Energy Sources
  • Solar Power
  • Wind Power
  • BioFuels
Energy Recommendations

- Regulations - Incentives
  - Regulations
    - Increased energy efficiency helps farmers maintain government standards
    - Easily adapt to changes
  - Policies
    - Help to set new environmental policies
  - Incentives
    - Verizon has opportunity to help farmers find and utilize incentives based on their needs
Thank You