Revolutionizing farming: How FarmHQ helps growers around the world lower costs, protect their crops, and irrigate more efficiently with Monitor One

Case study **FarmHQ**

Introduction

FarmHQ, a leading agricultural technology company,

has revolutionized ag irrigation systems in the farming sector by integrating Particle's Monitor One. This case study explores how FarmHQ leverages Monitor One to monitor and control farm irrigation equipment, resulting in significant water savings, cost savings, and operational efficiencies for farmers across various regions.

The company: FarmHQ

FarmHQ is an irrigation technology firm specializing in creating innovative solutions for farmers. Its primary focus is improving irrigation efficiency and reducing associated costs and environmental impact.

Objectives

- To enhance irrigation efficiency and reduce water and energy waste.
- To minimize labor requirements and operational costs in irrigation management.
- o prevent crop damage due to errors in irrigation equipment.

↓1.2M

Gallons saved

FarmHQ pump automatic shutdown feature saved 1,285,112 gallons

↑16%

More acreage

FarmHQ helped hose reels cover 16 more acreage

↓7

Less trips

FarmHQ users saved an average of 7 trips to the field per day.

FarmHQ

Implementation

FarmHQ implemented Particle's Monitor One devices in their remote monitoring and control retrofit solution for farm irrigation equipment, including ag irrigation pumps, water reel irrigation or hose reel irrigation systems, center pivot irrigation systems, linear irrigation systems, irrigation flow meters, and irrigation sprinkler valves . The FarmHQ devices measure critical parameters like flow rate, pump pressure, and location, providing farmers with real-time data and control.

Particle's Monitor One is an IoT gateway that enables equipment monitoring with integrated cellular connectivity, cloud-based management software, and developer tools.

Monitor One provided FarmHQ with a rapid design strategy, which comes with several built-in capabilities, including:

- CAT-M1 LTE cellular radio with built-in antenna, as well as an external-facing cellular antenna (if needed)
- GNSS receiver mounted with plastics to the PCBA for a self-contained unit
- High-capacity LiPo battery with thermistor for monitoring the battery temperature at the battery for charging safety
- Built-in power management circuit to seamlessly switch between battery power and externally supplied power
- Fuel gauge capable of monitoring the state of charge of the internal LiPo battery
- Status LEDs at the top cover of the enclosure so farmers can easily debug and control the device
- Built-in ESP32 for Wi-Fi Locate

In addition to the above, the monitor gave them a custom-built expansion card to add more functionalities, such as controlling a high-voltage relay, an analog sensor interface, and a CAN bus interface.

Key features utilized by growers:

- Set speed, pressure, flow rate points
- Flow rate monitoring: Ensures optimal water usage, preventing under and over-irrigation.
- Pump pressure tracking: Helps maintain the correct pressure, essential for effectively functioning irrigation systems.
- Location tracking: Enables precise positioning of sprinklers for even water distribution.

Return on investment:

- ROI: FarmHQ devices have provided a staggering 400% to 1,500% annual return on investment.
- Cost savings: Each system saves up to $15,000 per season by preventing damage to high-value crops.
- Energy efficiency: Decreased energy costs amounted to up to $650 annually.
- Labor reduction: Eliminated up to 75 hours of labor per season by saving up to 7 field trips daily.

Environmental and operational benefits from FarmHQ in 2023:

- Water conservation: saved an average of **1,285,112 gallons** of water and protected crops from flooding
- Increased efficiency: covered **16% more acreage** over the season
- Expanded reach: **managed 40,154 acres**, a significant increase from previous years

Global reach:

- Expansion: Devices are operational across 31 states and provinces in the U.S., Canada, Mexico, and Australia.

Future outlook

FarmHQ has integrated Particle's Monitor One into their remote irrigation monitoring and irrigation controller solution, representing a significant advancement in agricultural technology and contributing positively to environmental sustainability while providing substantial financial and operational benefits.

With the success of this integration, FarmHQ is poised to expand its technological applications in agriculture, potentially exploring new areas such as automated soil health monitoring and climate-adaptive irrigation systems. The ongoing evolution in Particle's edge-to-cloud offering will undoubtedly open more opportunities for FarmHQ to innovate its precision farming technology and transform ag irrigation systems.

Particle is the leading edge-to-cloud infrastructure for the Internet of Things, helping thousands of companies power world-class connected machines, sensors, and devices. Particle provides everything you need to build an IoT product in one tightly-integrated platform, so you can focus your time and energy on what matters: your product, application, data, and customers. Hundreds of manufacturers, thousands of startups, and 260,000 developers use Particle to power their IoT products; to learn more, visit particle.io.

PARTICLE