



IoT Solutions for Profitable Agribusinesses

APPLICATIONS

1. Crop Management
2. Precision Agriculture
3. Greenhouse Automation
4. Livestock Monitoring
5. Water Resources Management
6. Autonomous Farm Machinery
7. Fertilizer Management
8. Smart Pest Control
9. Weather Sensors and Weather Forecasting
10. Predictive Analytics for Smart Farming

CHALLENGES

- Collecting a variety of data in the agriculture industry requires a wide range of IoT sensors, as well as types of applied techniques. Such data includes meteorology (temperature, humidity, air pressure, rainfall, wind speed, wind direction, dew point temperature, relative humidity, solar radiation), soil conditions (moisture, pH deviation, matter deficit, saline-sodic level, nutrients levels), plants (leaf wetness, chlorophyll), animals (heart rate, body temperature, breath emissions, sounds), GPS position, greenhouse gasses, etc.
- Field cabling over big field surfaces may incur high costs and is just not possible in some cases, like monitoring livestock.
- Different types of topographic and natural boundaries demand wide coverage and deep penetration features for wireless technology.
- Sensors need to be battery-powered and future-proof, with an autonomous operation lifecycle of several years.
- A quick configuration and batch type configuration of parameters should be spread among the sensor network in order to easily adapt to each type of application.
- Sensor outputs should be effortlessly fed into different cloud data visualization and analytics vendors.
- Full duplex, real-time communication should be implemented in order to apply control signals to on-field devices and machinery.
- As the size of agricultural needs varies over time, the sensor network should adapt accordingly and allow flexible models for scaling.
- The deployed network should be secured because the data gathered is important.
- The virtual orchestration of the fleet of IoT devices should grant a straightforward workflow, including the performance of FUOTA (Firmware Update Over the Air) operations, real-time alarm monitoring, and remote troubleshooting.

Sensor Hub

Sensor Hub RAK2560 is a modular sensor ecosystem consisting of the Sensor Hub Smart Datalogger and multiple pre-configured sensor probes. It also supports additional use of third-party sensors.

Use Case:

The Sensor Hub is a suitable and versatile solution platform for various IoT applications where environmental monitoring is needed - weather monitoring, soil monitoring, and water monitoring.

Benefits for End User:

- Ready-to-use
- Easy to configure with a smartphone
- Pre-selected sensors

Benefits for System Integrator:

- Work with pre-attached or user-selected sensors
- Customizable software
- LoRaWAN[®] and NB-IoT





WisGate Edge

WisGate Edge gateway supports up to 16 LoRa[®] channels for gathering data from thousands of end nodes. It forwards the data to the cloud analytics and visualization software via multi-backhaul options, including Ethernet, Wi-Fi, and cellular connectivity.

Use Case:

With industrial-grade components, WisGate Edge gateway achieves a high standard of reliability and is ideal for IoT commercial outdoor deployment. And with the RAK Battery Plus, it's perfect for deployments on and off grid.

Benefits for End User:

- Easy configuration and setup
- Pre-added to WisDM* for quick deployment

Benefits for System Integrator:

- 4 working modes: PF (Packet Forwarder), BS (Basics Station), Built-in Network Server, MQTT bridge
- Built-in support MQTT and HTTP integration for data sending
- Extensions provide additional features
- Central monitoring and maintenance with WisDM*

WisGate Edge Full Duplex

This full duplex LoRaWAN[®] gateway supports the simultaneous transmission and receiving of data, lengthening the downlink window to enable gateways to send more data to end devices and remove the latency experienced with half duplex gateways.

Use Case:

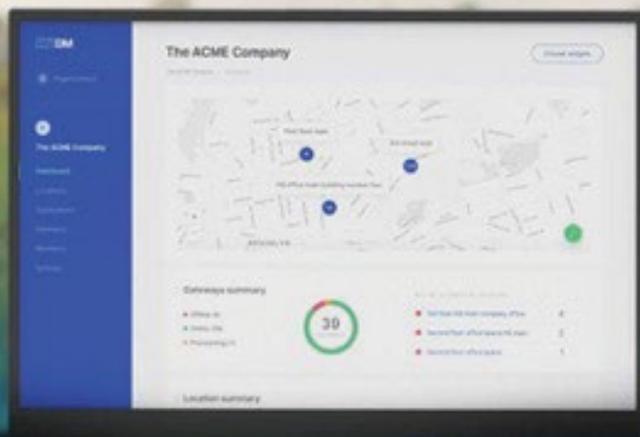
The edge gateway improves LoRaWAN[®] protocol message response time for applications, which require fast acknowledgment from the gateway. It also enables Firmware Update Over-The-Air (FUOTA) while processing uplink traffic, and reduces the time and cost of operational management of end devices.

Benefits for End User:

- Easy configuration and setup
- Pre-added to WisDM*

Benefits for System Integrator:

- Update end devices firmware over the air
- Control and set up end devices with mass downlinks (multicast) without losing data





Battery Plus

Battery Plus is RAK's latest battery system that incorporates a solar charging system and status monitoring. It is specially developed for the WisGate Edge Pro gateways.

Use Case:

It allows reliable outdoor gateway deployment in remote off-grid scenarios where power supply is unreliable or inaccessible. Not only will your gateway be powered 24/7 with a solar panel option, you will also get all the battery data and status in the WisGateOS⁺ Web UI locally, and in WisDM* remotely.

Benefits for End User:

- Easy installation with kit provided

Benefits for System Integrator:

- Off-grid deployment
- Monitor state of the battery and solar charge in the WisGateOS⁺, WebUI and WisDM*

* A simplified, cloud-based, IoT fleet management platform provided by RAKwireless.

⁺ Operation System designed for all WisGate Edge gateways.

WHY CHOOSE RAK'S SMART AGRICULTURE SOLUTIONS?

- Simple, real-time, and centralized control of operations.
- Low-cost and low-maintenance.
- Continuously innovating in the types of compatible sensors list.
- Easy control of different kinds of actuators.
- Substantial reductions in resource consumption.
- Delivers fast ROI by lowering labor costs.
- High effectiveness in the monitoring cost per sensor.
- Easy scalability at hardware and software levels.
- Improves agriculture production.
- RAK has an established reputation as a leading end-to-end solution provider for the LPWA market.
- RAK's portfolio offers a simple and secure IoT application development platform.
- RAK is run by agile, scalable teams located worldwide.
- RAK provides utmost care for customer support and product documentation.
- RAK is proud to be a community-driven company – without our users we are nothing.



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