SIGNALFIRE
WIRELESS TELEMETRY

APPLICATION SPOTLIGHT

Plant Reliability Program uses 900 MHz over 2.4 GHz for pH Level and Probe Monitoring

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Sentinel Nodes

Gateway Modbus Stick

A2 with Solar panel

APPLICATION:

An existing telemetry system operating on a 2.4 GHz wireless spectrum failed to maintain long-range communications with ten pH and conductivity sensors installed at intermittent points along drainage ditches in a chemical plant. The chemical plant needed a more reliable wireless sensing system that could connect distantly-located sensors with radio nodes to its network to monitor both pH levels and probe health.

PRODUCT SUPPLIED:

SignalFire Remote Sensing System:

- Sentinel Nodes: power and extract data from sensors for transmission to a Gateway
- Two solar-powered A2-HART serve as measurement points and repeaters
- Gateway: formats and stores data from different radio nodes within a network for receipt by a central data center or Internet
- Mesh network system: provides a more reliable data transmission of 10 Kbits/sec over longer ranges

CHALLENGE:

The original 2.4 GHz telemetry system could only maintain a maximum of 200 feet of communications between each node. The farthest node from the Gateway was 2000 feet and required a signal path traversing through various plant infrastructures and obstructions. The 2.4 GHz network would require 20 additional radio nodes acting as repeaters to ensure reliable data communications with all data points. Adding more repeaters, however, would result in unanticipated project expenses without guaranteeing a successful resolution to the communication issues.

SOLUTION:

A SignalFire Remote Sensing System (SRSS) operating on a 900 MHz system supports a more reliable data transmission of 10 Kbits/sec. over longer ranges in more challenging environments. In addition, the SignalFire telemetry system implements a unique two-way mesh technology that provides the power and stability needed for reliable data transfer over long node-to-node distances. A Frequency Hopping Spread Spectrum (FHSS) enables signals to “hop” over narrowband interference. This data transfer technique preserves high data rates as data jumps from one sensor to another until connecting with a radio node.

The configuration of the wireless sensing system requires just 10 nodes for 10 measurement points to maintain strong communications with distantly-located sensors often blocked by large tanks and other structures. The network was configured, installed and fully operational in just two days. The mesh network permits nodes to self-configure into a web-like structure without installation requirements.

Robust Gateways can accommodate hundreds of transceiver inputs from field sensors, enabling the network to cover large areas. The Gateway interfaces with an Ethernet module to enable the

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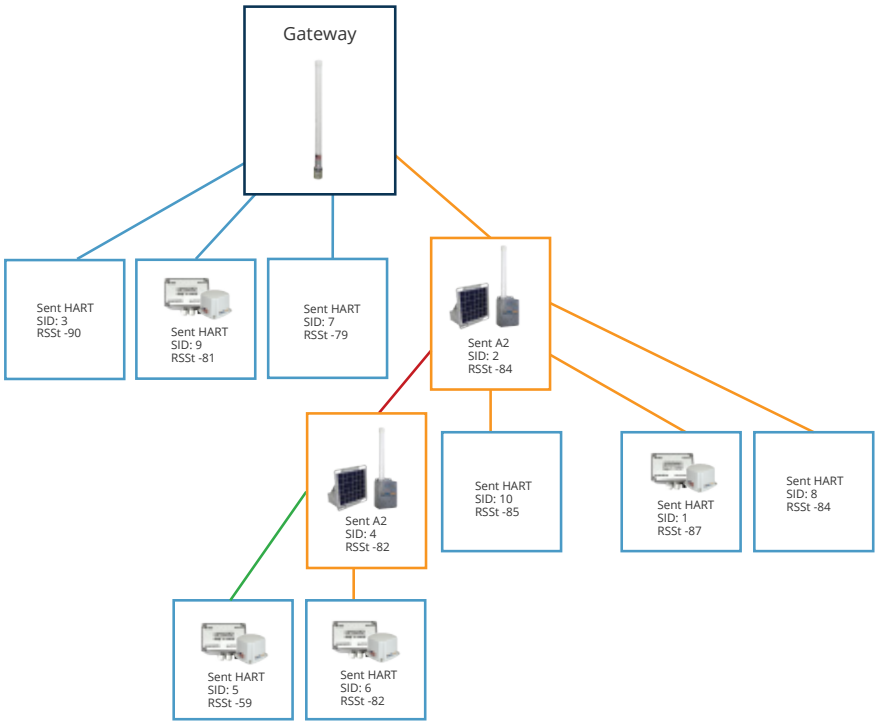
chemical plant to access measurement data by two methods. The data is transmitted to both a local plant DCS network and to the Internet via a cellular modem that connects to a cloud-service provider for in-depth analytics.

"Devices are all working well and reliably," notes the customer project engineer. "We are very impressed with the ease-of-use, range of devices, and software. This is a definite win for us and will be a go-to moving forward. Thanks for all your help!"

The SignalFire product offers longer transmission distances between nodes with easy implementation features - all at a surprising price point. A 900 Hart network with full wireless configurability utilizing manufacturer DTM files is just one of its many features.



This screen shows a visual representation of all the nodes in the field, which nodes are using others as repeaters as well as the signal strength.

Modbus Slaves Reporting
Double-click a Row to View Registers

Auto Refresh | Refresh List

Slave ID	Node Type	Node Name	RSSI (dBm)	Register Quantity	Checkin Interval	TTL (min): Current/Max	Mainboard Firmware	Radio Firmware	Configure
1	Sent HART	N3_M1	-87	19	15 min	73/77	0.59	2.50 (sleeping)	☐
2	A2 HART	N3_M2	-84	25	10 min	48/52	0.84	2.50	☐
3	Sent HART	N3_M3	-90	19	15 min	65/77	0.59	2.50 (sleeping)	☐
4	A2 HART	N3_M4	-82	25	10 min	48/52	0.84	2.50	☐
5	Sent HART	N3_M5	-59	19	15 min	70/77	0.59	2.50 (sleeping)	☐
6	Sent HART	N3_M6	-82	19	15 min	70/77	0.59	2.50 (sleeping)	☐
7	Sent HART	N3_M7	-79	19	15 min	75/77	0.59	2.50 (sleeping)	☐
8	Sent HART	N3_M8	-84	19	15 min	68/77	0.59	2.50 (sleeping)	☐
9	Sent HART	N3_M9	-81	19	15 min	76/77	0.59	2.50 (sleeping)	☐
10	Sent HART	N3_M10	-86	19	15 min	63/77	0.59	2.50 (sleeping)	☐

Screen shows that the nodes are checking into the SignalFire toolkit software (PC application for configuring and diagnosing SignalFire equipment). With input from this screen, users can verify which instruments are checking into the Gateway, signal strength and other important information.