



APPLICATION SPOTLIGHT

Tilt Scout Wireless Sensor Node Improves Well Drilling Process



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Tilt Scout



Gateway Modbus Stick



Pressure Scout Wireless Sensor Node

APPLICATION:

When drilling wells, maintaining the production schedule is imperative so the rig can move to another drilling location as quickly as possible. Monitoring drilling depth in real-time is a vital aspect of the drilling process so operators can swiftly adjust drilling fluids and speeds to minimize breakdowns. The monitoring process typically involves counting the number of pipes left in the lanyard as the number of used pipes determines drilling depth.

PRODUCT SUPPLIED:

SignalFire Remote Sensing System (SFRSS) comprised of:

- Tilt Scout: integrates an intrinsically safe wireless inclinometer, Sentinel node and an internal battery pack within a NEMA4X enclosure.
- Gateway Modbus Stick: serves as the central data hub of the SFRSS
- A2 Solar Repeater: extend the range or route signal around metal structures
- Pressure Scout: integrates a pressure sensor, wireless Sentinel node and intrinsically-safe internal battery into one package

CHALLENGE:

With information on the number of leftover pipes reported manually, the drilling operator can't correlate data in real-time with other key metrics of the drilling process. In addition, a regional supervisor cannot assess the drilling progress of several rigs simultaneously in real-time.

SOLUTION:

The Tilt Scout helps solve the challenge of measuring drilling depth in real-time. Affixed to the boom truck, this wireless sensor node (that integrates a wireless inclinometer, radio node and battery) counts the number of times the boom moves up and down in loading the drilling rig with pipes for ground placement. Every time the boom travels one up and down cycle, a pipe loads in the rig for ground installation. By multiplying the number of times the boom travels up and down by pipe length, supervisors can determine drilling depth.

The Tilt Scout detects the change in angle (movement) of the boom and transmits data to a Gateway for download into a control system as part of a SignalFire Remote Sensing System. Magnetically installed on the boom, the Tilt Scout eliminates the need to specify independent sensors, power sources, and wires when monitoring the boom truck. No other telemetry system offers an integrated angle sensor node that reduces installation costs and time.

A Pressure Scout works in unison with the Tilt Scout to monitor fluid pressures during drilling. Operating efficiencies correlate drilling depths with fluid pressures during the drilling process.

Similar in configuration to the Tilt Scout, the Pressure Scout integrates a pressure sensor, radio node and intrinsically-safe internal battery into one package. By eliminating the need to specify and purchase a pressure sensor and



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wireless node separately, this integrated sensor node serves as a low-cost alternative to conduit, wired and other pressure sensor solutions.

The Pressure Scout also monitors pressure levels on a slug catcher that collects liquids settled in flow lines, which can overload gas/liquid handling capacity during pigging. The Pressure Scout monitors and reports the differential pressure across the filter so operators know when to empty the slug catcher when it reaches a certain point. If not emptied quickly, a full slug catcher will halt drilling operations.

A mesh network supports radio transmission of readings from the Tilt Scout and Pressure Scout to a Gateway that stores the most recent readings in the network in Modbus format. An interface with a multi I/O module forwards drilling depth and fluid pressure data to a

SCADA system for supervisory management. A solar-powered repeating node provides a robust communication path for the signal to go around major metal structures.

The Tilt Scout ensures accurate measurement of drilling depth in real-time for greater operating efficiencies in the well drilling process. A mesh network supports easy installation of additional Tilt Scouts to different boom trucks, enabling coverage of hundreds of square miles.

