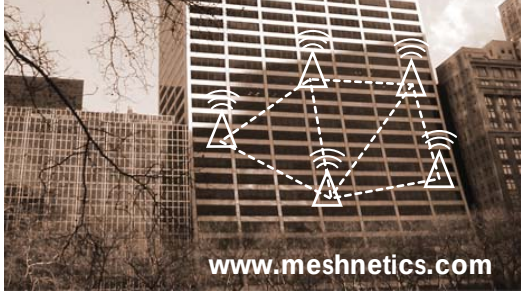
CASE STUDY



MeshNetics®

ZigBee™ Solution for Building Insurance

What Value Can Wireless Sensor Network (WSN) Technology Offer The Building Insurance Industry?

Insurance Industry Today

Most insurance companies today face an uncertain future: Growing losses, exposed equities, and weakened reserves. Industry visionaries are seeking new solutions and technologies that will secure a competitive edge. WSN is at the forefront of these groundbreaking solutions, and those who adopt this emerging technology are building a solid foundation for future success. The ultimate value of WSN implementation is the data collected from sensors. Possession of real time data offers insurance companies significant advantages:

- Minimized Risk
- Reduced Operations Costs
- More Accurate Pricing
- Claims Settlement Process Efficiency
- Loss Prevention
- Enhanced Customer Service
- Value-added Products and Services
- Information Brokerage

Antiquated Claim Assessment Process

Currently claim assessment may take anywhere from six months to five years. At least two professional engineers are required. These engineers must go out in the field and take measurements, collect data, and generate reports manually.

Case in Point: Wireless Sensor Networks (WSNs) Deployed to Monitor Building Subsidence*

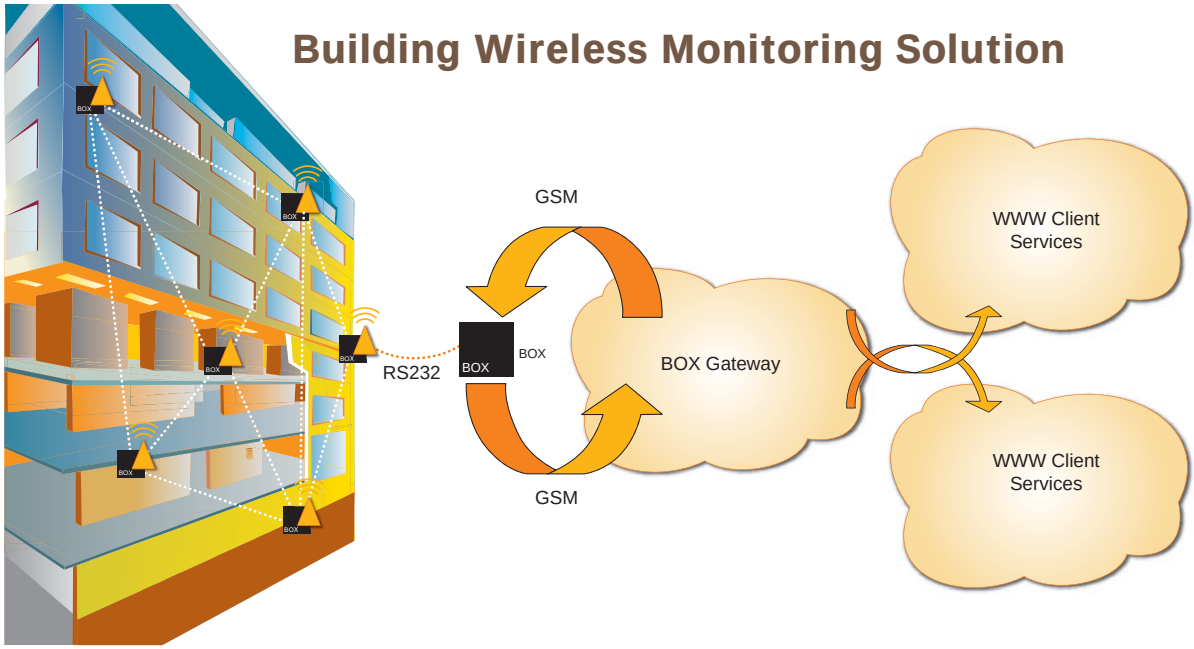
Opportunity: As the world's largest independent provider of claims management solutions to insurance companies, **Crawford & Company** wanted to reinforce its market-leading position by implementing a new technology. WSN was the clear choice. The next step was to find a partner who had the required WSN expertise. **BOX telematics**, one of the UK's most experienced and respected telemetry and telematics providers, was chosen to coordinate Crawford & Company's WSN implementation. BOX provides proven end-to-end "wire-free" telemetry and telematics solutions for many customers in various sectors. In order to ensure long-term interoperability, the decision was made to develop a standards-based solution.

* - Subsidence is essentially a downward movement of the ground supporting a building. It is especially dangerous when the movement is uneven, from one part of the building to another. Subsidence can be caused by certain soils, such as clays; vegetation; leaking drains; and various types of ground movement, i.e. heaves, landslips, etc. If left unchecked, subsidence may result in structural damage, when cracks appear on the building's walls, particularly around doors and windows. Subsidence presents a serious problem for building owners. Every year, total subsidence damage is measured in hundreds of millions of dollars. Manual inspection is time-consuming and costly; usually requiring two engineers to go on-site to inspect the building. Due to the high cost of manual labor, inspector visits are done on a weekly basis at best, which does not amount to efficient monitoring. Automated building subsidence monitoring solves this problem by enabling timely action that helps prevent serious damage.

Challenge: To deliver a working building subsidence monitoring solution, fully certified and tested for use in the UK and European theatre, the following requirements must be met:

- The tilt sensor nodes must form a self-organizing, self-healing ZigBee network;
- Data collection must be performed via GPRS gateway;
- The sensor network must meet rigid power consumption requirements; Max. power consumption per year is 2500 mA/h for each node, assuming that test mode is not longer than 30 minutes a year;
- The battery must be fitted to ensure that a technician can remove and fit new batteries without interfering with other system components;
- Battery Life must exceed 12 months; Battery Type: AA type, 1,5 V. Battery capacity must be not less than 300mAh;
- Scalability (50+ nodes).

The BOX telematics system will be collecting, logging and uploading data to the Box Gateway (WWW) on a daily basis. Data will be gathered and transmitted by the SlaveBOX wireless nodes at pre-determined intervals via the Zigbee standard protocol.



Solution: BOX telematics partnered with **MeshNetics**, the wireless sensor technology provider & 802.15.4/ZigBee expert, and jointly developed a wireless sensor solution that allowed remote building measurement. Customized MeshNetics MeshBean sensor boards, running eZeeNet networking stack firmware, were used as the hardware platform. The hardware set included the following:

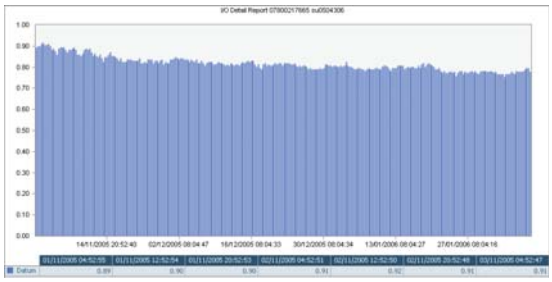
- Single Sided PCB (a customized MeshBean platform). The PCB was single sided for easy mount options into suitable enclosure;
- Protective Enclosure. The unit was housed in a suitable IP65 enclosure that met required standards and also featured convenient access for battery exchanges. The unit included a solid wall mounting bracket to ensure that the node would not move during its operational phase;

MeshBean Board with Tilt Sensor

- RS232 Interface sensors. The RS232 interface communicated with the sensor on wake up periods;
- RS232 Interface for BOX. The RS232 interface communicated with the BOX Unit;

BOX GSM Logger and Root Node

A convenient web portal was set up to provide an easy access to the real time data.



Web Report Sample

Successful Implementation: The Box telematics/MeshNetics collaboration yielded a cost-effective, robust wireless sensor network, providing critical data flow that enables continued structural integrity assessment of buildings in real-time. This allows proactive, preventive action before any serious damage occurs.

The wireless SlaveBOX nodes with measurement sensors are placed in and around buildings. They form an ad-hoc mesh network, using MeshNetics eZeeNet Stack software, that supports ZigBee network, and transmit data through the GPRS gateway to the monitoring company's server. The data is then stored in a database and reports are generated. The whole process is completely automated.

Achieved Benefits:

Fast Time-To-Market: Crawford & Company received the working WSN solution in less than four months. BOX telematics expedited development by tapping into MeshNetics' expertise in ZigBee network software and hardware design. Thanks to the inherent flexibility of the MeshBean hardware platform, MeshNetics was able to quickly customize it for this project. The system has been already deployed at over 10 sites.

Improved Accuracy & Safety: Now data is collected on a regular basis, flowing in real time into monitoring companies' PCs. This continuous information flow enables enhanced building condition assessment and early preventive actions.

Cost Savings: The prohibitive cost of labor when the engineers visited sites, along with the manual data logging, was largely eliminated. The real-time wireless building solution also eliminated the need to run costly wires in the building—an expense that may exceed $100 per foot.

Improved Operation Efficiency: Claim Investigation time reduced from 6-12 months to only 2 months!

Created Value:

- Real-time data
- Ability to manage multiple locations
- Simplified deployment and upgrade
- Ability to support customer needs
- Preventive maintenance

"Wireless m2m technology is the future of remote measurement," said Mark Woolridge, Sales Director of BOX telematics. "Delivering the latest m2m hardware and BOX Gateway web based solutions; its continual investigation and delivery of ground breaking 'wire free' connectivity BOX telematics stay at the forefront of technology by working with MeshNetics and its WSN technology. Remote building measurement delivers high value data via the BOX gateway enabling quick and accurate data decisions without the need for on site engineering evaluation."

About Crawford & Company: Based in Atlanta, Georgia, Crawford & Company (www.crawfordandcompany.com) is the world's largest independent provider of claims management solutions to insurance companies and self-insured entities, with a global network of more than 700 offices in 63 countries. Major service lines include property and casualty claims management, integrated claims and medical management for workers' compensation, legal settlement administration, including class action and warranty inspections, and risk management information services. The Company's shares are traded on the NYSE under the symbols CRDA and CRDB.

About BOX telematics: System integrator and telematics devices designer/manufacturer, BOX telematics (www.boxtelematics.com), have been designing, producing and integrating their wide range of "wire-free" technology since 1998, for both the static m2m (machine to machine) and mobile telematics markets. BOX has since grown into one of the UK's most experienced and respected telemetry and telematics providers. BOX provides proven end-to-end "wire-free" telemetry and telematics solutions for many customers who trade in dynamic operating sectors such as licensed trade, service & logistics, security, industrial, asset and vehicle tracking and outdoor media.

About MeshNetics: MeshNetics is a leading technology provider enabling wireless sensor data integration with customers' enterprise applications. MeshNetics has a unique expertise in hardware, firmware and software. Their product portfolio includes IEEE802.15.4/ZigBee™ OEM module; ZigBee Developer Kit; networking stack firmware; SensiLink gateway server software; and customization services. MeshNetics helps its partners and customers to accelerate time-to-market by providing the tools for development of complete M2M solutions for industrial automation, building automation and utility monitoring and control. MeshNetics bases its long-term strategy on open standards, and is a member of the ZigBee Alliance and OPC Foundation. For more information, please visit www.meshnetics.com.

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