

ESTD

Engineering Science &
Technology Division

DOE Industrial Wireless Sensor Program

Reliable Ubiquitous Sensing to Improve Efficiency, Reduce Waste and Emissions, and Improve Raw Material Utilization

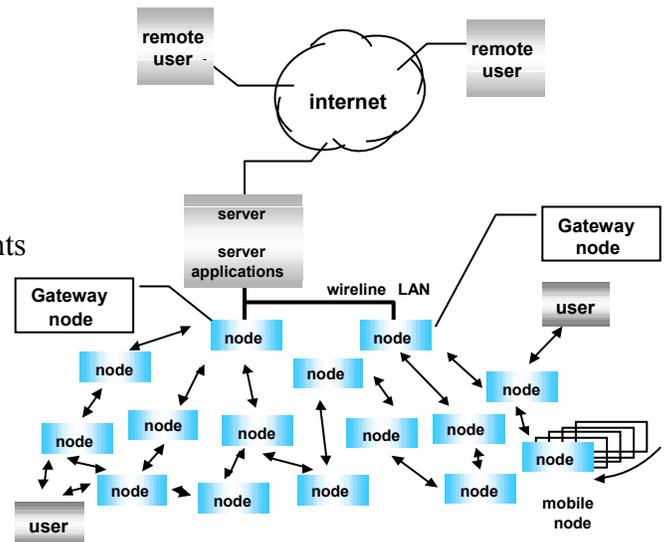
Objective

ORNL is working with the U.S. Department of Energy to develop next-generation untethered, robust, reliable sensor networks (i.e., sensors, communications, signal processing, and power sources) that improve the energy efficiency of industrial processes. Advanced wireless communications techniques are being developed to improve the performance of sensor systems in harsh industrial environments. Wireless sensor technology is being demonstrated in industrial plants and performance merits for energy savings, process efficiencies, and product quality are being validated.

- Goals are energy-efficient operations, improved raw material utilization, and reduced emissions in industrial processes.
- System-level approach is required to maximize energy efficiency and resources.
- Wireless sensor systems can offer rapid technology insertion and minimum retrofit.
- Availability of real-time information from wireless sensor systems can be key to improved efficiency and utilization.

Program Elements

- Technology Development
 - Robust, reliable network communications in harsh environments
 - Integrated microsensors
- Technology Insertion
 - Experiments
 - Demonstrations
- Wireless Testbed
 - Independent third-party evaluations
 - Early technology insertion assessments
- Vertical Integration
 - End-user involvement
 - Product development
- Standards Development
 - Participation in developing open standards (IEEE and ANSI)
 - Implementation of standards into industrial processes
- Outreach
 - Briefs, fact sheets, and case studies
 - Publications and presentations



Successful Demonstrations



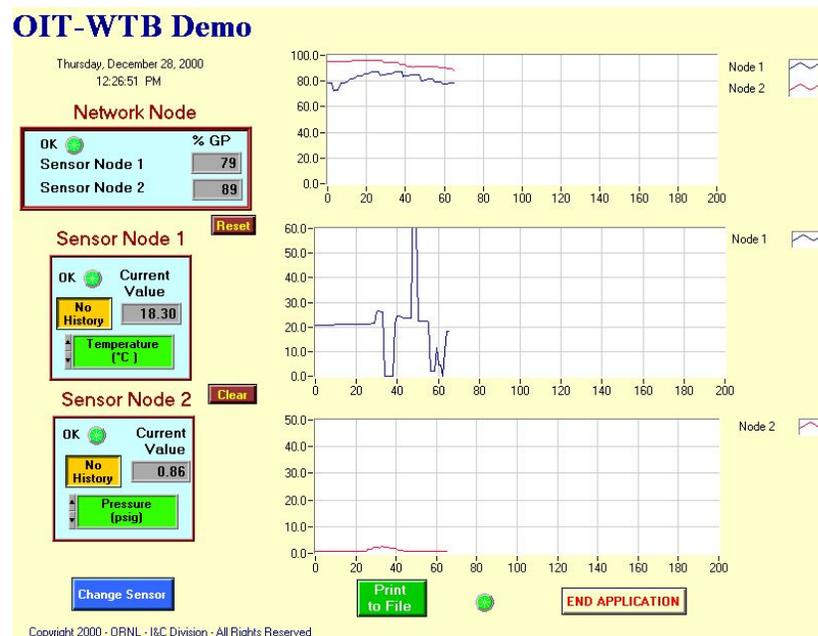
Outside transmitter

Line of Sight
to LUT Cabin



Bi-directional
Transceiver

Timken Steel Mill test demonstrates implementation of bidirectional, direct-sequence spread spectrum wireless communications with repeater technology.



Bowater Paper Plant test shows long distance connectivity and bidirectional capability with acceptable error rates and throughput.

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