Monitoring stations TBS(town-border system) based on wireless sensor networks

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ABSTRACT:
Monitoring the processing of gas transmitters, pressure, flow and temperature as SCADA systems, and now with the cost of communication is done Industrial Automation and Instrumentation design a monitoring system is proposed Industrial Automation and Instrumentation design a monitoring system is proposed. Gas dispatching system based on wireless sensor networks, SCADA systems, unlike the systems that have been used in gas dispatching centers,Configuration and reduce network deployment costs on the one hand and on the other hand, instead of installing thousands of feet of wire just Which are small devices about the size of a dime and put points on the network simply by adding more nodes expanded. The data collected and transferred to control room temperature and pressure measurements by monitoring input and output can be controlled more. In this article we describe an intelligent system for monitoring wireless sensor network is useful for applications in oil, gas company.

KEYWORDS: industrial automation, communication protocols, wireless sensor networks.

1. INTRODUCTION

Sensor networks in the accumulation of a large number of sensor nodes are scattered in the desired location.
Sensor networks in the accumulation of a large number of sensor nodes are scattered in the desired location. Generally, each autonomous collaboration with other nodes to follow the Special Purpose.
Location of each sensor node in the network does not need any previous design and can be dispersed in the environment are completely free.
Nodes are near together, and each node can communicate with another node and provide information to the other nodes,finally, under the condition of central nodes,(pits) will report.
The main difference is in the nature of sensor networks with data-centric and the resources are very limited energy and processing.
According to the proposed methods for transferring data to other networks and that Even networks like sensor networks are largely structural in this network can be used.
Another difference between these networks and their relationship with the environment is the physical phenomena.
Traditional database systems provide communication between humans and however wsn communication with the physical world.
System performance monitoring and remote reading of gas stations and the expansion of the transmission networks and gas distribution,change in gas prices and the need to measure and manage the accurate measurement of gas consumption growth in provincial gas companies .
Needs of provincial gas companies due to the design and interpretation of remote monitoring system.
Design and implementation of monitoring systems for gas stations, data aggregation under the standard protocol,monitored to ensure accuracy of information, using knowledge to implement this system in the country,lead to avoid a using trial and error method.

2. TECHNICAL WORK PREPARATION

performance monitoring System and remote reading of gas stations span the transmission networks and distribution gas,change in gas prices due to subsidies and the need to plan and manage the measurement accuracy of gas consumption needs is the provincial gas companies.

Interest of provincial gas companies adopt different methods of monitoring systems and that the reading distance can be costly to use SCADA systems named.

Designing a wireless network in terms of accuracy and knowledge of design is different from others. This design is trying to achieve the most efficient, cost effective.

The most important step in determining the overall strategy is to design a wireless communication network.

Automation system that will use the network should be established to investigate and objectives of the network. Design, monitoring system has a great cycle, in which a series of external and internal features is presented.Interior features include a set of components to build network models of networks.

The main issues in designing a system that should be considered include: cost, performance, reliability and availability, service or network performance, environmental tolerance, by transfer, capacity development, maintenance and security. [1]

2-1 - to increase the availability of a communication network can be one of the following rules apply:

A) critical processes must be under the network even in case of failure of main canal network can be implemented independently.

B) The network configuration should be simple area network technology because it can be a problem too.

3 - Gas control and intensive monitoring stations TBS

Each control station monitoring and control SCADA system is used. (Figure 1)

SCADA systems for supervisory control and data. Typical SCADA systems for process supervision and control in large networks on a regulatory level (supervisory) are used. System, SCADA, process control and monitoring possibility that the user will have remote locations. [2]

SCADA systems including input and output signal hardware, controllers, networks, telecommunications systems.

Figure 1: Station control system [3]

4- Monitoring and control devices for gas station

The design of instrumentation equipment that is used at each station:

4-1 - Pressure Transducer Pressure Transducer

Output pressure sensor with a radio and a lower limit and upper limit and the limit is too high.

Figure 2: Pressure transducer [4]

Table 1: Profile of the pressure transducer [4]

Operating frequency	Battery life	Operating temperature	Pressure ranges (PSI)
ISM 2.4 GHz	Over 3 years at 1 minute reporting	-40°C to 85°C	۱۰۰ تا ۱۰۰۰۰۰

4-2 - converters Flow Transducer
Flow sensor and the RF output of the gas flow in terms of cubic meters per day are sent.

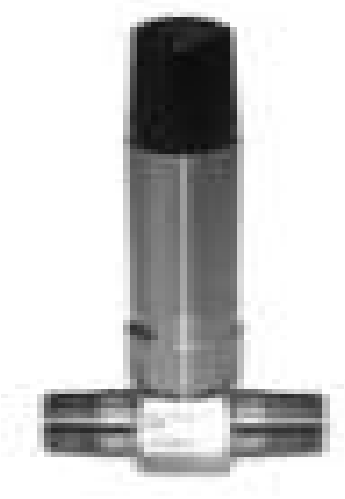

Figure 3: Flow Converter [1]

4-3 - Heat Exchanger TempretureTransducer
RF output temperature sensor, the temperature of the gas is sent. In these types of oscillators, independent of temperature sensors used to measure temperature, so a simple count is sufficient. The sensors are cheap and available today. -55 C to +125 C temperature measured from -10 C to +85 C temperature is +0.5 C sensor sensitivity and sensor response is almost linear in this range. And Thermometer resolution is user-selectable from 9 to 12 bits. The response time is calculated from temperature sensors and convert it into 12-bit digital word, the maximum is 750 microseconds. How to connect a sensor that works in Passive mode and does not require a separate power supply. This training can be used to reduce sensor power supply is given through the same line. [3]

5 - Introduction to Wireless Sensor Networks
The network consists of a large number of nodes (node) into a small number of sensor nodes there. Strongly interact with the physical environment by sensor networks and sensor data from the environment and react to operate. Each node works independently, without human intervention, typically in terms of physical size, the Nano is. (Figure 4)

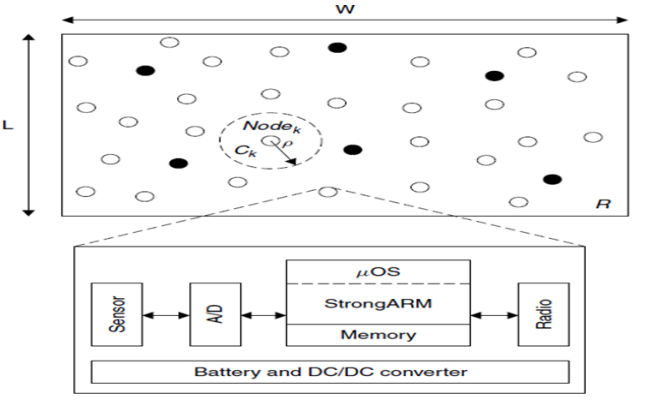

Figure 4: Architecture of wireless sensor network [5]

5- Building node
Each node contains a single sensor / disablement, the data processing unit, the transmitter / receiver is wireless and power supply done on the transmitter sends. Processing unit management, coordination and collaboration with other nodes in the network managers do. Transmitter and receiver units are connected to the network node. The sensor unit consists of a series of sensors and analog to digital converter and a digital to analog data from processor delivers. Operate and operate the unit includes a digital to analog converter, the commands used to operate the digital processor delivers. Energy supply unit, power supply all the parts that are often limited battery energy. One of the major problems is the limitation of energy source in sensor network design are all affected.
GPS used to identify physical location of nodes. Routing techniques and sensing tasks require accurate location information. One of the main benefits of managing communications between nodes in sensor networks are moving. (Figure 5)

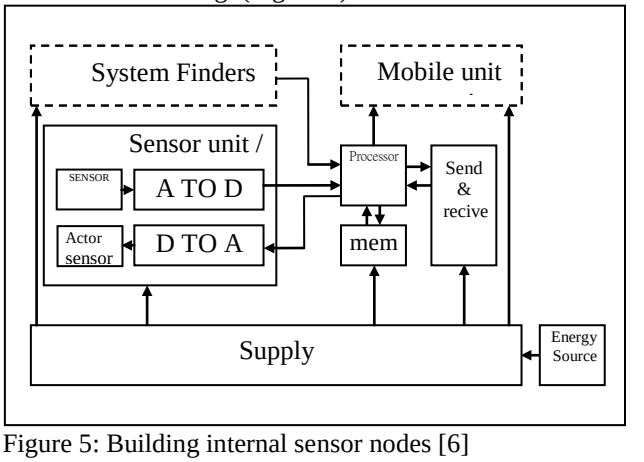

Figure 5: Building internal sensor nodes [6]

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