Motorola's MOSCAD Ensures Dependable and Efficient Distribution of Natural Gas in Seoul

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Background

Seoul City Gas Corporation (SCG) provides natural gas for the city's residential and commercial consumers. The gas is distributed through a large gas pipe network spread throughout the Seoul city area. Since dependable gas distribution is extremely important to industry and households in Seoul, operation of the gas distribution network requires the highest standards of safety and control.

Natural gas is stored in SCG's large gas tank facility. The gas flows, at a high flow rate, from the tanks through the large diameter main pipe. Medium diameter pipes branch out from the main pipe, and small diameter pipes, connected to the medium pipes, deliver the gas to the customers. In each type of pipe, different gas pressures must be maintained by gas flow regulating valves. Emergency slam shut valves are immediately activated when gas flow must be stopped, due to a leak or other emergency.

SCG's gas distribution control system, managed by Motorola's MOSCAD, controls gas flow, monitors the various pressures in the company's gas pipe network, and sends alarm signals when gas leaks are detected. Motorola's Automatic Vehicle Location (AVL) system enables continuous tracking of the location of service crews to enable efficient and timely dispatch for emergency calls.

System Description

The Motorola system, installed in Seoul, has been operational since January 1998.

The system consists of:

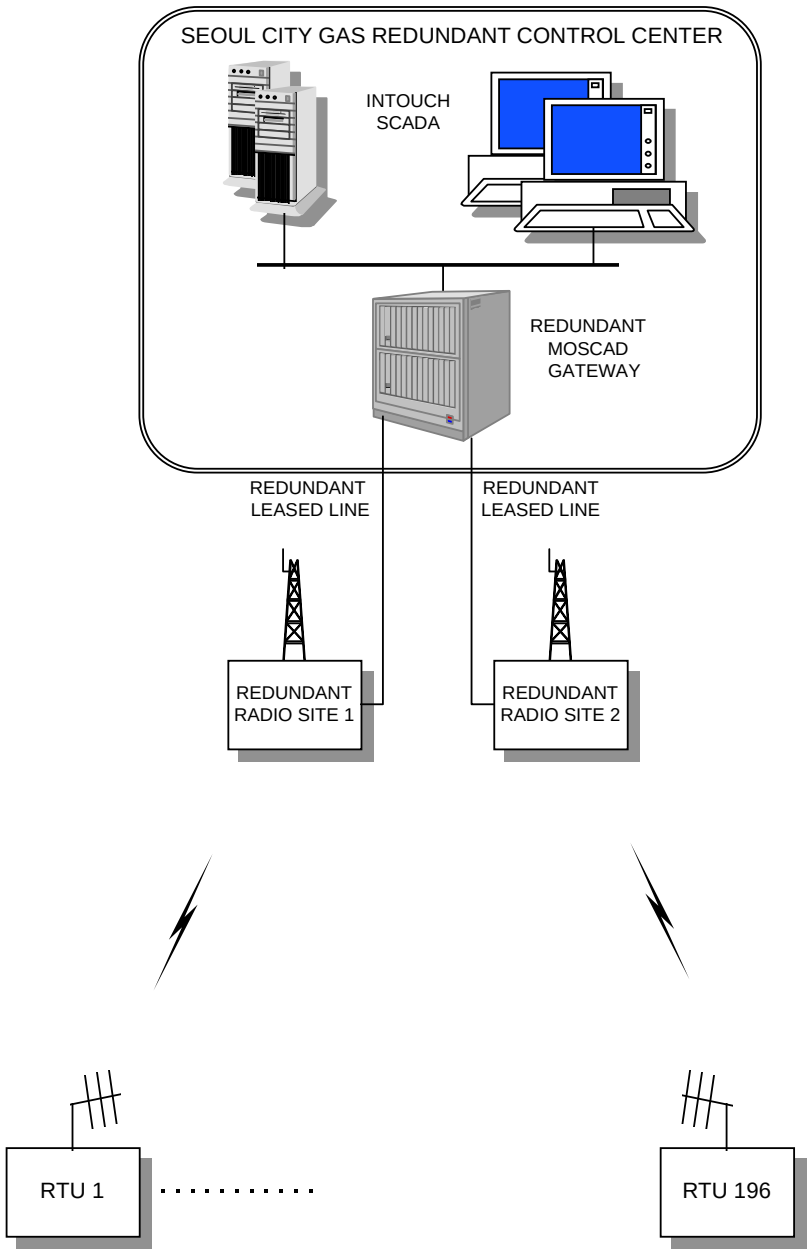
- Close to 300 MOSCAD RTUs
- 44 AVL/GPS MLUs
- Sensors and Valves
- Control Center
- Conventional UHF communication system

A MOSCAD RTU is integrated into each gas network control site. The RTU is powered from the site's mains power and provides 24V DC to the sensors through a DC-to-DC converter. Each RTU is equipped with a back-up battery ensuring continuous RTU operation. A battery test unit, controlled by the MOSCAD, alerts the control center when the battery voltage is too low.

MOSCAD Discrete Inputs are connected to: gas leak detectors, slam-shut valve status indicators, regulating valves status indicators, site door switches, the RTU's tamper switch, and the battery test unit. Analog Inputs (4-20mA) are connected to the gas pressure sensors and regulating valve position indications. Discrete Outputs are connected to the Motor Operated Valve (MOV) controls.

The system has a fully redundant PC-based control center, using Wonderware's InTouch software. The control center interfaces the RTUs via a redundant MOSCAD MCP-T Gateway unit.

The utility's control center is connected via two redundant leased line links to two radio sites, which are equipped with MOSCAD units and radios to ensure reliable RF coverage of the entire Seoul region.



Each SCG service vehicle is equipped with a Motorola radio and MLU (Mobile Logic Unit), containing a GPS (Ground Positioning System) receiver. The MLU reports the location of the vehicle via radio to the company's control center.

System Operation

SCG's control center plays a very important role in maintaining the system's gas distribution network safety, by continuously monitoring the gas pipe network pressures and status. Remote valve-control enables the system dispatcher to regulate the gas flow in the various parts of the network. Gas leaks are immediately detected, enabling activation of immediate disaster prevention procedures.

Communication with all the system's RTUs is tested periodically. The alternate routing characteristics, inherent within the MOSCAD MDLC protocol, utilize the various communication paths to provide redundant communication links.

The MOSCAD, an intelligent RTU, is programmed to immediately report pressure changes, gas leaks and site tampering. The RTU is also programmed to set gas Motor Operated Valves to the desired position requested remotely by the dispatcher.

The AVL part of the system enables the dispatcher in the control center to locate all of SCG's service vehicles, and send the nearest crew to the site requiring immediate service. Knowing the location of each service vehicle helps SCG dispatcher to efficiently manage any emergency maintenance operation; so crucial in preventing disasters.

Benefits

MOSCAD helps SCG operate a more efficient and cost-effective utility, with significant savings in manpower and greater customer satisfaction. The company has better supervision and control capability over its entire wide-area infrastructure, with immediate indication of any failure, and continuous real-time view of the system.

Motorola's MOSCAD – an added dimension to SCADA systems.