Remote Monitoring of Critical Plant Metrics using the RLS™-NEMA
Oberon’s Remote LAN Service (RLS™) system is being used to provide remote monitoring of critical power plant infrastructure components. The ability of the RLS™ to aggregate data reports from numerous 802.11b (Wi-Fi™) enabled sensor devices, and report metrics via the regional cellular carriers infrastructure, saved the project thousands of dollars in data cabling infrastructure design and installation costs, and weeks of installation time.

As part of a pilot project, numerous 802.11b enabled sensing devices are to be installed around a power plant. These sensors may be used to sense a variety of physical parameters including temperature and vibration. The objective is to be able to detect and predict failure mechanisms before they cause real damage. It is anticipated that by improving monitoring methods, cost savings will be realized by avoiding costly equipment malfunctions, and performing maintenance preemptively only when required, rather than routinely.

However, running data cable to a large number of sites within the plant is not only prohibitively expensive but is difficult and undesirable due to (in some cases) the extremes in temperature and environmental exposure.

In the power plant application, sensors and their transducers are placed in close proximity to the equipment they are monitoring. In many cases, these positions are far from a network drop, and it’s undesirable and perhaps infeasible to run additional data cable. In most cases it’s undesirable to burden the existing data network with additional sensors and protocols. The RLS™ is placed where it can be “seen” by many of the 802.11b enabled sensor devices. The 802.11b devices can transmit and post sensor data to the RLS™ wherein the data will be passed to the Internet and appropriately connected terminals. The sensor network is independent of the existing LAN. The advantage of the RLS™ is that a multiplicity of 802.11b enabled client devices share a single cellular data account.

Likewise, sensor metrics may be monitored remotely by accessing the RLS™ through the cellular carriers data infrastructure from anywhere on the Internet. In either case, the only requirement is that the 802.11b enabled client device can associate to the RLS™, and that the RLS™ receives adequate RF signal from the carrier’s data infrastructure. In either case, RLS™ has connectors so that external antennas can be mounted for optimum coverage.

The cellular carrier’s data network is an “always on” packet data network, so access to any device on the RLS™ network is instantaneous. Since it may be desirable to monitor power plant sensors at any time, it’s necessary to maintain the connection. The RLS™ provides this using a Dynamic Domain Name Server (DDNS). The DDNS creates a persistent connection, even if the cellular carrier changes the RLS’s™ dynamically assigned IP address. In this application, it is also desirable to access the web server on the individual sensors from the WAN. The RLS™ is designed to support port forwarding so that an HTTP connection from the WAN to connected clients can be opened.
About the RLS™

The RLS™ is comprised of an extended temperature range IEEE 802.11b access point, cellular data modem, and router integrated in a water proof NEMA 4 type enclosure. (The RLS-mobile version, designed for vehicle mounting, can be powered from a +12Vdc vehicle battery). The RLS™ provides seamless connectivity between Wi-Fi client devices and the Internet through the cellular carriers’ data infrastructure. The RLS™ connection manager can be configured to provide an always on data connection, or connect and disconnect from the Internet on regular intervals.

When connecting to the cellular carriers infrastructure, the RLS™ acts as a DHCP client, receiving an IP address from the carrier. 802.11b Wi-fi client devices, embedded in either mobile or handheld computing products or sensors, and configured with the RLS SSID, associate and authenticate to the RLS™ access point. The RLS™ acts as a DHCP server in respect to these client devices, providing each of them with an IP address. Network Address Translation (NAT) permits seamless connectivity from a multiplicity of 802.11 client devices to the Internet.

The RLS™ provides for 128 bit Wired Equivalency Encryption and is able to cloak or hide the SSID in beacon packets so that only those client devices which are configured with the RLS SSID can “see” the RLS™ (if desired). MAC address filtering adds another dimension of security.

The RLS™ uses a high power radio card (>200 mW) with high receive sensitivity to improve coverage. Typical line of sight coverage is >200 meters. The RLS™ provides 2 wireless LAN antenna connectors for receive diversity. Antennas can be mounted externally to achieve maximum radio coverage and reception in the area desired.

Cellular/PCS WAN coverage is provided by national carriers (Cingular, Sprint, T-mobile, and Verizon wireless). The embedded modem may be either a dual band (Cellular and PCS) CDMA modem for operation within a 1X-RTT network, or a dual band GSM modem for operation within a GPRS network. An external antenna connector permits the cellular/PCS antenna to be mounted externally for optimum cellular reception. Contact your Oberon representative for information on wireless data service activation through a national carrier.

About Oberon, Inc.

Oberon designs and manufactures mobile and outdoor wireless LAN and WAN products for commercial and industrial applications. The Oberon website is www.oberonwireless.com.