HUGHES SCADA Solutions

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1.0 HUGHES and SCADA Systems

Hughes has a well-established history in supplying highly reliable network solutions in support of Supervisory Control and Data Acquisition (SCADA) applications. Our longstanding support of industry leaders such as BP Pipeline, Shell Pipeline, Marathon Pipeline, and Teppco, have garnered us a solid understanding of the dynamics that are unique to the SCADA industry. As such, we are acutely aware of the particular needs of the industry and the importance of providing a highly reliable, flexible and robust architecture in a cost-effective manner.

Satellite communications and its ability to provide high quality connectivity anywhere on the earth is a natural means for enabling SCADA applications. This is particularly valuable for such SCADA applications as oil and gas pipeline monitoring and power line monitoring. Very typically pipelines and power transmission lines will be run very long distances in very rural and remote areas – places where satellite is the most cost effective and viable mechanism to provide connectivity. In addition to supporting connectivity for SCADA applications in the pipeline and transmission line sectors Hughes has also successfully deployed solutions in non-energy sectors such as cellular tower monitoring.

Not all satellite terminals are the same and Hughes has developed a comprehensive set of features tailored to the SCADA industry that make Hughes the number one choice for SCADA solutions.

This white paper outlines the unique requirements of SCADA applications and articulates the key advantages of Hughes in providing connectivity solutions to remote SCADA locations.

2.0 Challenges of SCADA Implementations

Through our many years and 10,000s of remote SCADA installations we have developed a very clear understanding of the unique challenges posed by typical SCADA applications.

2.1 Industry Drivers

The oil and gas pipeline and power line industries share some of the same drivers with regards to SCADA applications and connectivity.

The principle application in these industries is the measurement and control of product as it is delivered. Beyond this high level view there are a number of key drivers that we see in many SCADA applications and these are enumerated below.

Very High Availability

No matter where a pipeline or transmission line runs it is vital that all SCADA points can be monitored and commanded at any time of the day. This requirement is driven by both economic needs as well as security and environmental demands. It is simply unacceptable to lose connectivity.

High Traffic QOS Requirements

Seconds are vital in making a decision regarding the control of a pipeline or transmission line. The communications solution must be able to both quickly (and consistently) provide accurate real time monitoring but in the event of an anomaly the operator must be able to effectively send commands quickly and with certainty. Low latency and consistent (predictable) response times are important elements in a successful solution.

Harsh Locations

The very nature of pipelines and transmission lines is that they run through very remote and harsh geographic areas. Often there is no shelter and AC power is not always present or reliable. The right solution must be able to adapt to these conditions.

Unique Maintenance Limitations

Due to the fact the remote locations are in isolated areas it can be difficult and time consuming to get a technician to the remote SCADA site. The communications solution must be robust and the service provider must provide a service which enables zero down time even for maintenance windows.

3.0 Hughes SCADA Solution

Through our many years of experience, Hughes has enhanced and optimized our satellite broadband products and services to directly address the key requirements found in many SCADA applications. These features have been fully incorporated and integrated into both our HN and HX satellite broadband systems.

The HN and HX Systems share a common technology base including such key features as the ones outlined below.

Both the HN and HX Systems provide cost effective satellite based connectivity from a central location to multiple remote locations. These systems are IP based and provide broadband IP connectivity to remote locations. Full information on these solutions can be found at WWW.HUGHES.COM.

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3.1 Hughes Satellite Broadband Products Utilize the IPoS (IP over Satellite) Standard for High QoS Traffic Support

Hughes satellite broadband products utilize the IPoS (IP over Satellite) standard for satellite transmission – a standard which has been adapted by ETSI and the TIA. Key to this standard, and the implementation by Hughes, is the ability to provide differentiated and prioritized services to individual remote terminals. This allows Hughes to structure service offerings whereby we can provide a guaranteed SLA in terms of response time as well as bandwidth offered.

3.2 DC Power

Both the HN and HX remote satellite routers are configurable with a DC power supply. This enables cost effective connectivity to solar powered sites or sites where power is driven off a DC based UPS system.

3.3 High Availability

Integral to the IPoS standard used by Hughes is the capability to continuously and dynamically adjust the downstream and upstream link parameters to each remote site individually. This capability, enabled by our "DVB-S2/ACM" and "AIS" features, means that the Hughes system will provide the very highest link availability possible.

3.4 Hub Diversity

No system can provide 100% availability just for the simple fact that maintenance windows must be planned for and accommodated. The Hughes HN and HX systems both support a feature called "Hub Diversity" which allows the remote terminal to automatically select a backup hub in the event of any kind of link interruption. This feature ensures continuous connectivity to all remote sites.
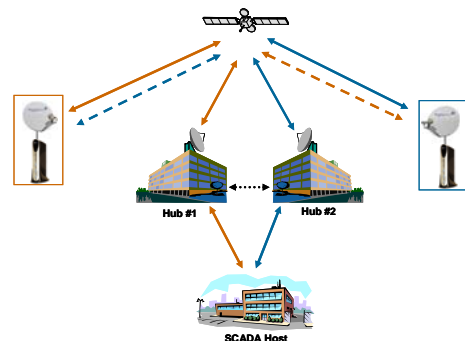
Diagram of Hub Diversity

3.5 Outdoor Enclosure

Not every remote SCADA location is located in an environmentally controlled facility. For this reason Hughes has developed an outdoor enclosure which houses the satellite broadband router. This enclosure enables the Hughes satellite broadband router to be deployed in environments as harsh as -30 to +55 degrees C.

3.6 Integrated Serial Support

The Hughes broadband solutions include the capability for integrated serial support which allows a remote terminal to directly connect to a SCADA terminal using the serial interface. This feature is available on the HN7700S, HX50 and HX100 remote satellite broadband routers.

3.7 Integrated Voice Support

When a technician visits a remote SCADA facility the ability to make voice call is essential and Hughes is able to provide this feature. The HN7740S satellite broadband router includes 2 FXS (analog telephone) connectors which use VoIP technology to enable toll quality voice connections for a technician visiting the remote site.

3.8 More Information Available

These are just some of the features which make the Hughes solution right for SCADA applications. Visit Hughes.Com or consult your local Hughes representative for a more detailed briefing on Hughes solutions for SCADA applications.

4.0 Extensive Installed Customer Base

The list of "blue chip" corporations who are using Hughes solutions to connect to remote SCADA locations speaks well of our capabilities to provide the highest quality SCADA solutions. Our list of clients includes;

- BP Pipeline – Oil and gas pipeline
- Buckeye Pipeline – Oil and gas pipeline
- Colonial Pipeline – Oil and gas pipeline
- Duke Energy – Electrical power monitoring
- Equilon Pipeline – Oil and gas pipeline
- Global Atmospherics – Lighting detection
- Marathon Pipeline – Oil and gas pipeline
- Nabors/Epoch Well Services – Drilling and well-head monitoring
- Sunoco Pipeline – Oil and gas pipeline
- Teppco Pipeline – Oil and gas pipeline
- Valero Pipeline – Oil and gas pipeline

Our experience has taken us some of the most remote and harshest environments in the world as evidenced in the photos below.

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Hughes Satellite Broadband at a power substation

Hughes Satellite Broadband at a transmission line

Hughes Satellite Broadband at a remote and cold pipeline location