The Eyes and Ears of Flood Control

The client, an internal drainage board, own and manage sixteen pumping stations and several sluice gates in the local area. These are designed to ensure the safe transfer and discharge of excess rainwater from the valuable agricultural and urban land areas into the Wash.

The old scanning radio telemetry system had reached the end of its life and the client needed to replace it with a system that provided advanced features and higher performance than what could be achieved with the traditional low-band system to enable efficient central management of their widely distributed assets.

Actemium Automation Ltd developed a novel and highly sophisticated telemetry system for the client, Actemium Automation selected Wonderware InTouch for the control room SCADA and Wonderware Historian for its comprehensive data logging.

The client, which operates through The Land Drainage Act, wanted additional capabilities that were beyond those of traditional telemetry systems, and more akin to a distributed control system. These requirements included the option of central pump control from their offices, remote video surveillance for security and safety, and 'drive-by' interrogation for use in inclement weather. Consideration was also given to the requirement for a 'store-and-forward' feature that provides continuity of data logging across communications drop-outs.

Communications

It was clear from the outset that providing reliable communications links and sufficient bandwidth to carry the anticipated traffic was going to be a significant challenge. After investigating alternative approaches, including carrying out a survey for point-to-point microwave links, Actemium Automation proposed a network of VPN tunnels over the Internet. Extensive discussions with the

client, network providers including BT, Vodafone and T-mobile and with the Internet Service Providers (ISPs) established both the feasibility and the cost model. Following a survey at each of the 17 remote locations, it was found practical to use land lines at the majority of the remote sites. Sarian routers were used to provide the ADSL capability with automatic fall-back to either the T-Mobile or Vodafone GSM networks.

At locations where the provision of telephone cabling proved to be prohibitively expensive, or the distance from the local exchange was too great for ADSL, communications rely entirely on the mobile networks. Key features of this approach include the ability to initiate the VPN tunnels from the remote locations, thereby eliminating the need for dedicated and expensive private APN's, and the capability to limit data traffic to less than the 3GB monthly contract limit and avoid excess charges from the network carriers.

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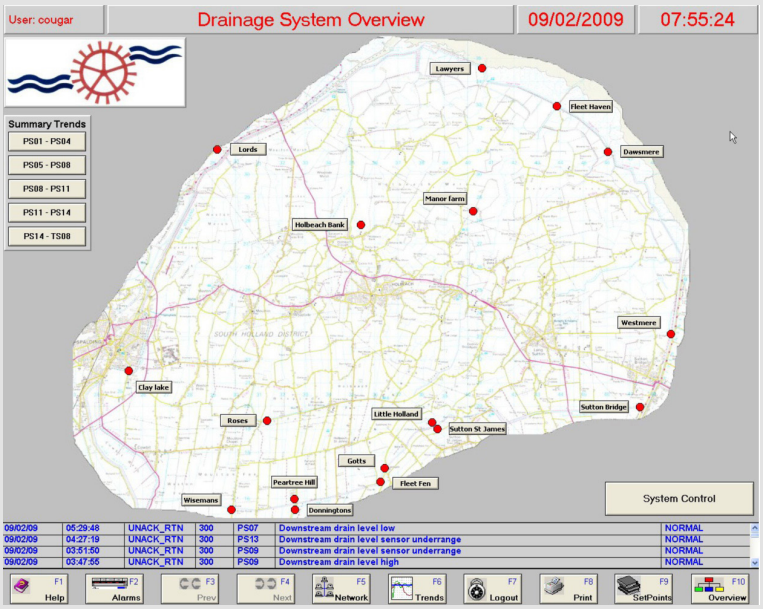

"Central to our telemetry system, Actemium Automation's technology allows us to prioritise situations and deal with potential issues before they arise, while giving us the foresight to allocate manpower accordingly and guarantee that our engineers are in the right place at the right time."

-District Engineer

The Technology

Actemium Automation selected the Beckhoff CX1000 series devices as the principle remote control unit. This Windows CE based 'soft' PLC proves to be the ideal platform to provide the eclectic mix of capabilities required for this unique project. The IEC-61131 programming environment with a suite of special-to-purpose library modules including a Modbus serial protocol, a built-in FTP server and NTP client were all essential features. Each remote site is also equipped with an industrial Wi-Fi access point that allows the field engineers, equipped with suitable laptops, to interrogate the network without having to leave their vehicles. This feature provides a rapid and safe means to monitor operation of the pump stations in inclement conditions— just when the flood control system is most critical!

Remotely controlled PTZ IP cameras are fitted in some locations, and the images from these are integrated into the SCADA application. This allows the operators to monitor personnel and vehicle movements to the distant site and to ensure that it is safe to remotely start a pumping operation.

Visualisation and Archive Trends

At the base station, real-time data is presented using a SCADA application based on Wonderware's InTouch® whilst continuous data logging to a dedicated SQL server platform is managed by Wonderware Historian®. The latter has undergone an enhancement with Actemium Automation developing proprietary extensions written in C# .NET, to implement the store-and-forward requirements of the project. Wonderware Historian is the real time data repository which allows the client to view past events in detail – rainfall location and the state of all pumping and sluices at that time – so that they can use past experience to implement actions for particular circumstances. This also includes comprehensive equipment condition monitoring and power supply status; ensuring that all of the assets within the system are available – or appropriate maintenance actions have been taken.

Stuart Gaunt, a Principle Project Engineer at Actemium Automation said, "This has been an exciting project to work on and I have learned a great deal during its implementation. We have confronted and overcome many new challenges and are delighted with the outcome— which has been a success for both the client and for Actemium Automation"

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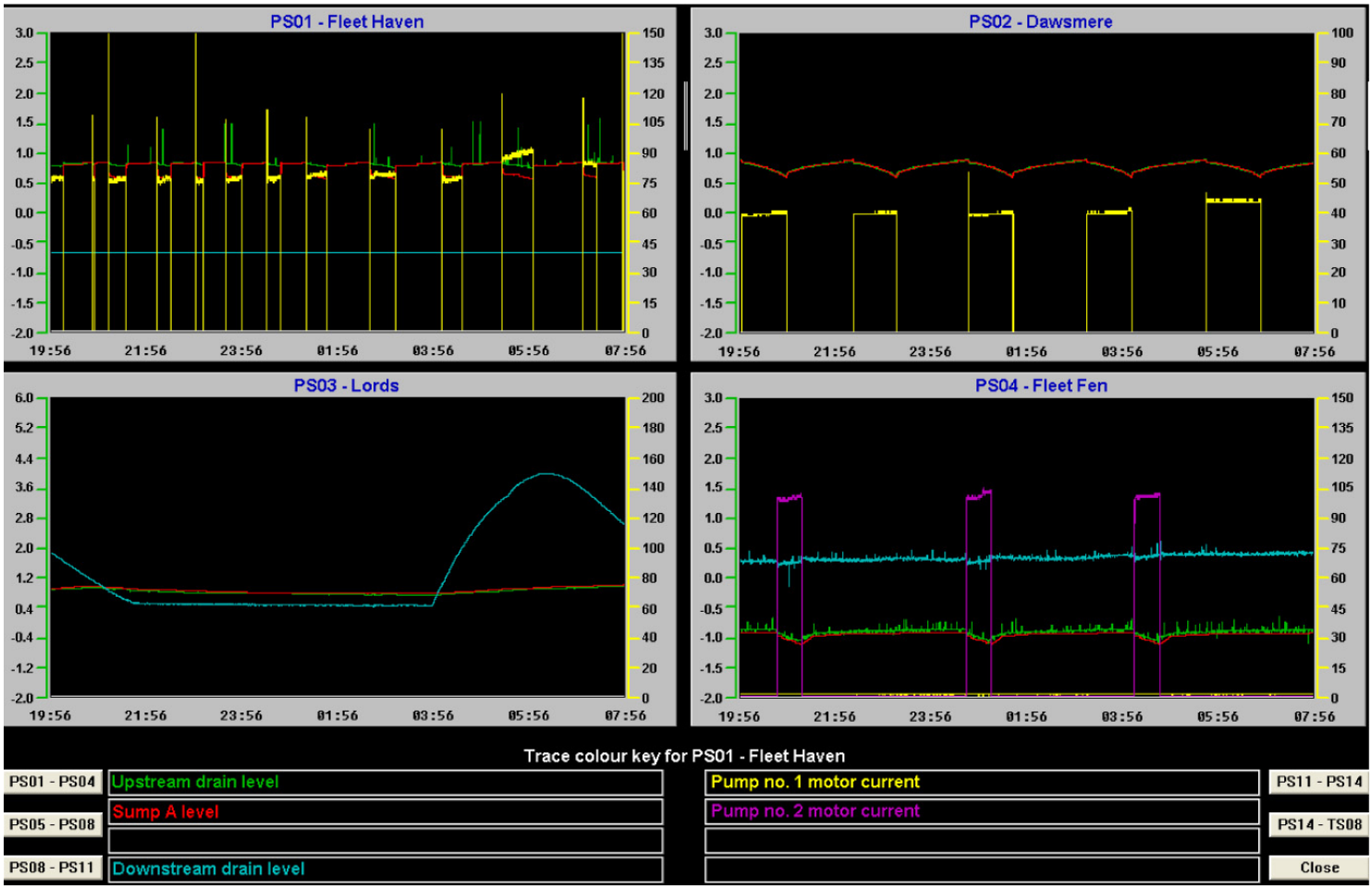

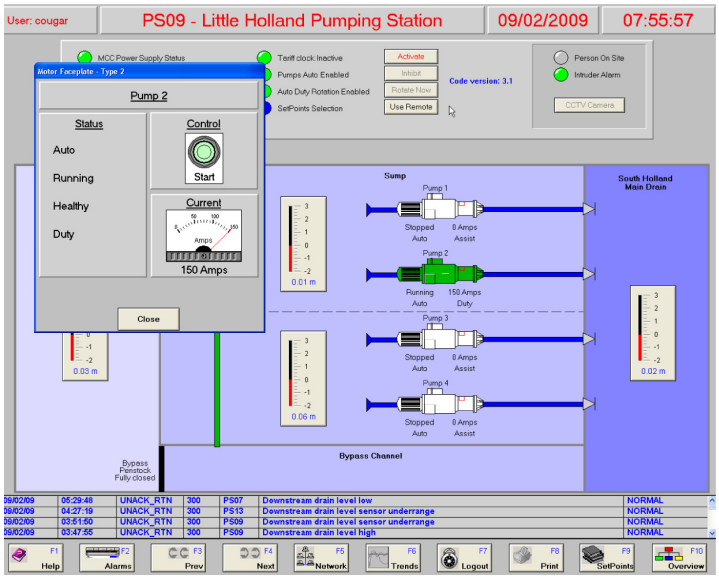

Client Comments

"The telemetry network is literally our eyes and ears across the district – with more than 95,000 acres of land, including large residential and industrial areas, the local community depends on us to manage water-levels effectively to prevent permanent flooding and water-logging," said the district engineer. "Central to our telemetry system, Actemium's technology allows us to prioritise situations and deal with potential issues before they arise, while giving us the foresight to allocate manpower accordingly and guarantee that our engineers are in the right place at the right time." The system has stood the test of the abnormal weather conditions of recent times and has proved to be effective in the protection of all stakeholders that are dependent upon the important service provided by ourselves.