DATRAN VI

DATRAN VI is a powerful telemetry and SCADA application offering comprehensive monitoring and control capabilities for use of any operating system and supporting all versions of SQL Server.

Overview

DATRAN VI brings new levels of flexibility to the area of telemetry and SCADA (Supervisory Control and Data Acquisition) software. DATRAN VI is a software-based Telemetry controller not a proprietary hardware solution, so providing a greater flexibility for installations and support.

These systems can now be an integral part of an organisation's information technology strategy, rather than being viewed in isolation. The software can operate in stand-alone mode on a single machine or in client-server mode over any network.

DATRAN VI was developed to provide comprehensive monitoring and control functionality and more effective sharing of SCADA generated data. The Windows environment provides the stability and performance required for demanding applications.

DATRAN VI is an open system that incorporates many of the standards present in today's information technology environment, including OPC UA, SSL, and TCP/IP.

Effective monitoring and control is the primary requirement of a SCADA system, however there is an increasing need for more comprehensive secondary reporting and the presenting of data to non-technical operators in a useable format. DATRAN VI provides users with powerful tools for sharing data across a network or between applications. Information can easily be exchanged with commonly used applications such as Microsoft Access or Excel.

Typical Applications

Wherever monitoring or control of resources or processes is required, DATRAN VI may be applicable. Because of DATRAN VI's powerful integrated telemetry features, these monitored sites are generally remotely located.

Examples of systems implemented include:

- Water & Sewerage Reticulation
- Pump Station Control
- Plant Automation
- Load & Energy Management
- Electricity Substation Control
- Load Management
- Irrigation Monitoring & Control
- Cool Store Monitoring
- Dam & River Monitoring

QTECH DATA SYSTEMS

Design Overview

DATRAN VI was designed with the underlying philosophy that each client application should be a 'black box', providing a standard interface to data stored in the server. All interaction between clients is handled by various subsystems within the server software.

The result of this philosophy is a very flexible, powerful design allowing the efficient development of new client applications to perform specialised functions

In addition, the server and most of the client applications have been implemented as Windows service applications. Service applications start when Windows starts and run in the context of the system, rather than in the context of a logged-on user.

This has two major benefits:

- Service applications will always run, regardless of whether a user is logged in or not. If a machine encounters a serious operating system error, it can automatically reboot and restart the DATRAN VI system.
- Users can be restricted by Windows security from having the ability to start or stop service applications.

Network Integration

Because DATRAN VI acts independently of the underlying network protocol, it can be effectively integrated into many corporate network environments.

DATRAN VI uses Remote Procedure Calls (RPC) for communication between its client applications and the DATRAN Server. This method of inter-process communication can operate locally on a computer or across a network using the capabilities of the Windows operating system.

In a network environment, a client application (such as DATRAN Supervisor or DATRAN Trending) can be located on another PC on the network and use RPC / TCP to communicate with the DATRAN VI Server.

SYSTEM FEATURES

Powerful Real-Time Database

The DATRAN Server is the core of a DATRAN VI system. It is a real-time hierarchical database for storing and retrieving information. It runs as a Windows service application and provides a repository in memory for information to be shared between client applications.

The DATRAN Server contains the real-time information received from the remote telemetry units as well as system configuration details. The design philosophy permits better communication between client applications and permits a large volume of structured information to be stored without the database becoming cumbersome.

DATRAN service applications (e.g. **Alarm Service**) register interest in certain data inside the real-time database and when these points change, the server notifies the service application of the change so that it can act accordingly.

The DATRAN Server includes two primary service applications. The **Derived Value Generator** performs calculations on data cells within the server database using scripting and formulas. These calculations enable the incoming data to be converted into a more useable form for the system.

The **Server Manager** ensures all data in the server is saved to file or multiple files at designated intervals. The **Server Manager** performs periodic maintenance and monitoring of system critical DATRAN service applications and can also shut down errant applications that do not respond to communications.

Scripting Engine

The Derived Value Generator (DVG), is the core of the DATRAN VI scripting functionality. The Scripting engine allows complex manipulation of data for both monitoring and control functionality. The language used is a pseudo high level C style structure. Advanced users can implement complex and flexible solutions with this tool set.

Ease of Configuration

DATRAN Browser is a user application for developing and configuring the DATRAN VI system.

Within DATRAN Browser, characteristics for objects such as groups, operators, comms (RTUs) and communications channels are established. The application presents the user with a tree like structure of the above objects, selecting an object will invoke a graphical screen with configuration parameters that can be edited.

Using formulas and scripting, it is possible to create templates that encapsulate the characteristics of specific resources (e.g. a pump station) and simply copy them (with only limited modification) when a new pump station is added to the system.

Diagnostics

The Diagnostic Console presents users with a view of events/transactions happening within the system. It is possible to view all communications with the RTU's, the alarm system and transactions to the historical database from the Diagnostic Console.

Configuration errors quickly become evident in Diagnostic Console making it a powerful troubleshooting tool that assists the initial system configuration and faults that may occur in the future. System events may also be logged to disk for administration purposes.

Historical Data and Reporting

DATRAN VI has native features that allow comprehensive data logging and reporting capabilities. Data can be logged to any ADO ODBC compliant database and specific database products such as Microsoft SQL Server at set time intervals or when specific events occur (such as when a value changes by a certain amount). The ability to determine when data is logged to the database ensures that the retrievable information is relevant and timely. The historical data can be queried, manipulated and then displayed from within DATRAN VI directly.

With data stored in standard databases like MS SQL Server, extensive and flexible reporting can be developed using familiar desktop applications such as Crystal Reports or the DATRAN VI Reporting engine for the front end. This enables SCADA data to be available to users of the computer network, not just operators.

User & Graphical Interface

DATRAN Supervisor provides the user interface application for display and control of I/O and management of alarms. The interface is user configurable.

DATRANVue is DATRAN's own SCADA HMI that enables the development of operator GUI. It comes with a full set of symbol templates and drawing capability, with items such as text boxes, buttons, bit maps or simple animation to be incorporated into a user interface. The embedded controls interact directly with the DATRAN VI Server database to retrieve the required information.

If desired Graphical User Interface applications (GUI's or MMI's) like Intellution's FIX for Windows, Wonderware's InTouch, Archestra or CiTechnologies CiTect may be used instead. DATRAN VI can interface with these and other applications using the DATRAN VI DDE, OPC-UA and SuiteLink's modules.

Alarm Handling

Sophisticated alarm generation and management is an integral function of the system. The **Alarm Service** allows different classes of alarms to be created that specify a sequence of actions and escalation's to be undertaken when an alarm event takes place.

The **DATRAN Supervisor** client is the user interface for the display and management of alarms. The interface is user configurable for different types of alarms and will show the current status of alarms (e.g. whether alarm has been acknowledged or not).

XML SMS Interface

The XML SMS Interface integrates tightly with the Alarm Service module providing a comprehensive means of annunciating alarms. It connects to the cellular providers via either secure XML interface or as the SMS Direct implementation via a cellular modem.

It provides the user with the ability to communicate with the system from their cellular phone, demanding system data or provide the ability to perform control.

Communications Telemetry and Datran VI

Communication from the remote sites to the DATRAN VI Base Station (Telemetry Server) can be done via several transport systems:

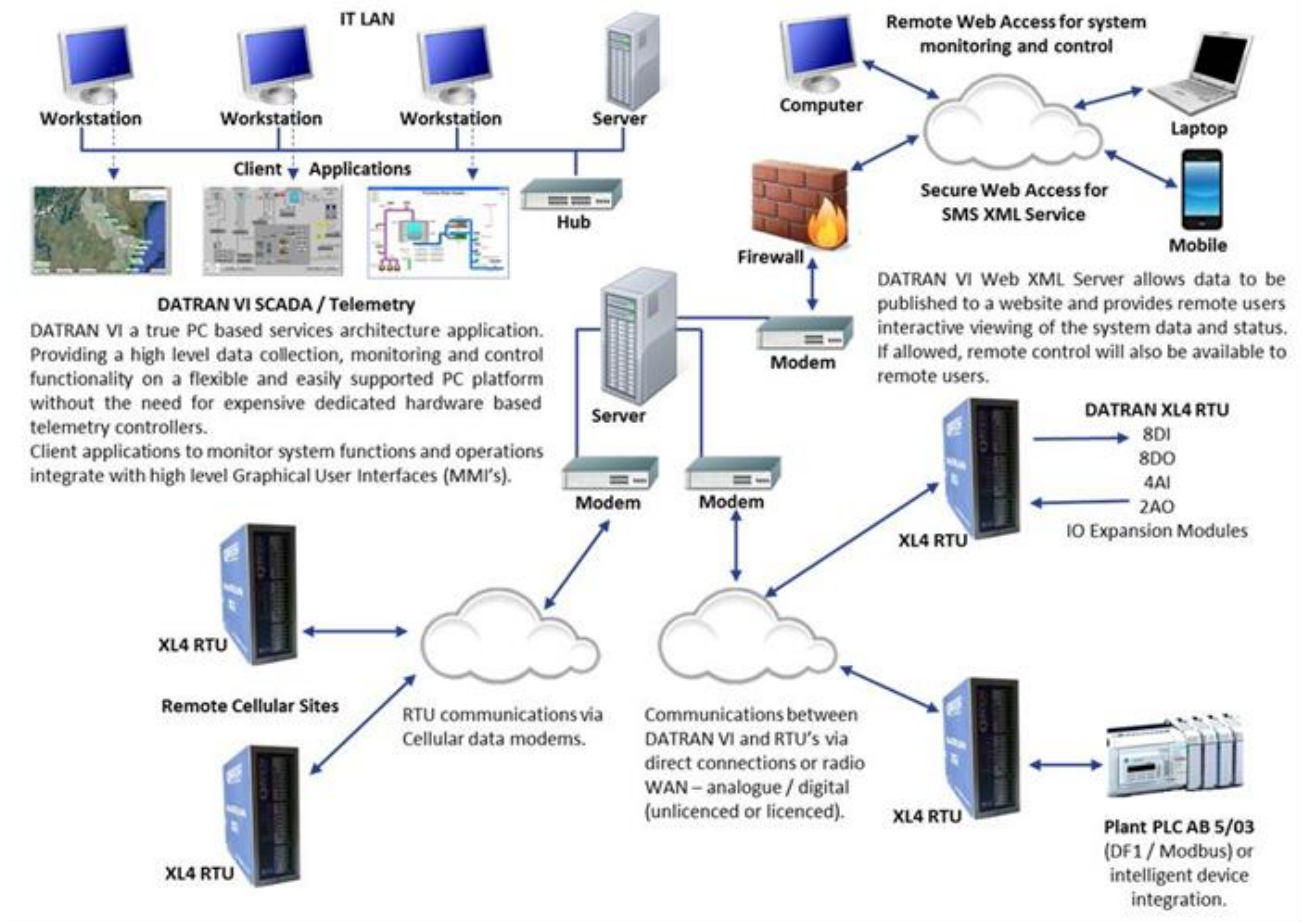
- Radio Telephone
- Data Radio
- Direct or leased lines
- Cellular network
- Digital Microwave Radio (DMR)
- Ethernet

DATRAN VI supports a number of communication protocols, that allows it to integrate many other devices. These protocols are supported by installation of the required DATRAN communications service when required.

- DATRAN RTU Communications Protocol (Serial and TCP/IP)
- DNP3 Communications Protocol (Serial and TCP/IP)
- ModBus Communications Protocol (Serial and TCP/IP)
- Allen Bradley DF1 Communication Protocol (Serial)

Both DNP3 and Modbus are industry standard and third-party device communications protocols.

DATRAN VI - Design and System Overview



Why Windows?

Windows is the chosen platform because of their demonstrated inherent stability and robustness over many years of use. These Windows platforms allow the DATRAN VI modules to run as independent services, meaning instability in any one module or application doesn't result in total system failure.

The comprehensive user and security structures within these Windows platforms allow access to the various sub systems of DATRAN VI to be tightly controlled.

The superior scalability of these Windows platforms allow the use of powerful CPU's to be used for the telemetry server to increase performance, they permit DATRAN VI to be effectively integrated with other advanced technologies.

Power Management

Power Management is an application developed for the specialised function of electricity load management. The product draws on QTech's considerable experience with load management applications. **Power Management** has been designed to provide local supply authorities and high usage corporate clients, with

the flexibility required to effectively manage “energy usage” and “system load” in today’s wholesale electricity market.

The application integrates tightly with DATRAN VI enabling both load management and SCADA functionality to be provided to our clients.

More information on Power Management is available from QTech upon request.

The Complete Solution

QTech is able to provide all the hardware and software required for a complete SCADA solution as we have developed a range of sophisticated RTU’s (Remote Terminal Units) that enable us to match system complexity and functionality to our customer’s needs. These units interface to instruments at the site (temperature gauges, flow meters etc.) and communicate data back to the base station.

The RTU’s provide data collection and control capabilities at remote sites. Local control functionality at the RTU can be provided with control programs called Down-Loadable Programs (DLP’s) that are downloaded from the Base Station. Control functionality can be changed by simply sending a new DLP.

The DATRAN XL4 Plus is a new state of the art Telemetry RTU and is a self-contained DIN Rail mounted RTU. The base module provides 8 digital inputs, 8 digital outputs 4 analog inputs and 2 analog outputs. As your I/O (Input/Output) requirements grow expansion modules can be added to increase the range of analog or digital inputs and outputs. The following expansion I/O modules are available:

The Q26 provides an additional 16 Digital Inputs and 8 Digital Outputs. The Q23 provides an additional 8 Digital Inputs, 8 Digital Outputs, and 6 Analogue Inputs - 2 of which may be also configured as Analogue Outputs. The housing of both units uses the same DIN rail mounting system as all other DATRAN RTUs, making it easy to add to your system. Communication to the RTU is via the RS485 Intelligent Peripheral Bus (IPB) and adding the module to an RTU is achieved using QTech’s free “Workbench” software. The RS485 connection allows communication via radio, cable, or fibre optic.

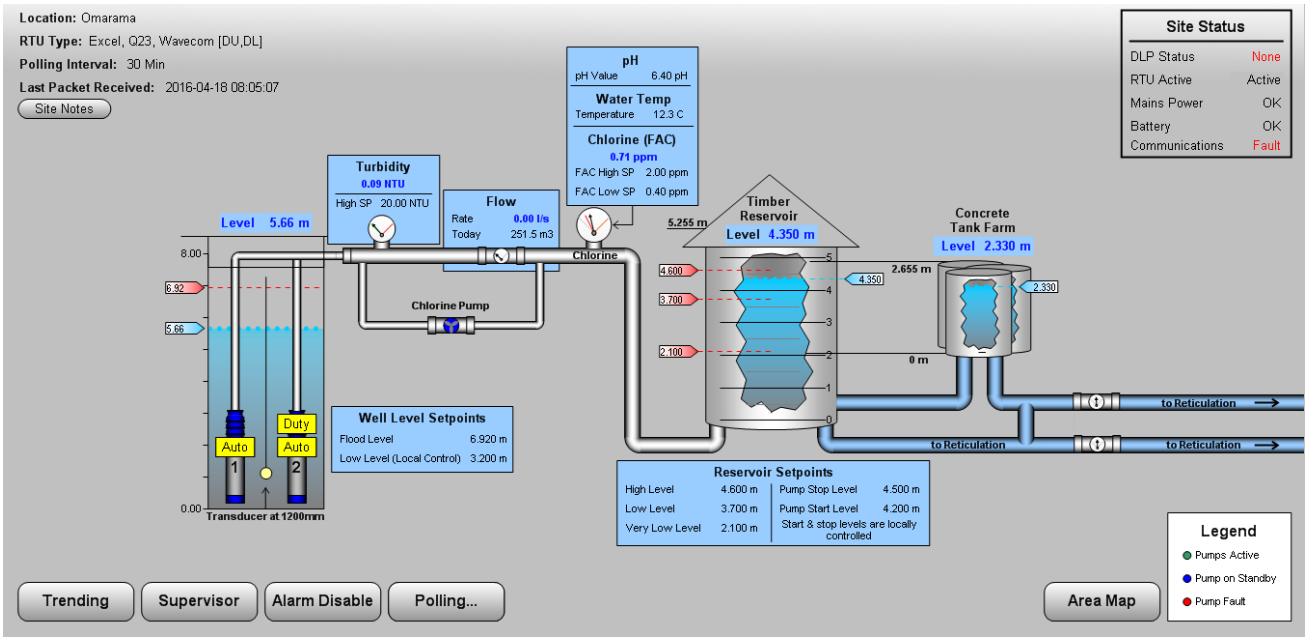
Data Logging functionality is a standard feature. Cellular technology options are available providing SMS Push and Pull functionality in the above RTU’s.

As well as developing our own components, QTech can integrate third party RTU’s and PLC’s from leading technology suppliers into our solutions

What is SCADA?

Supervisory Control and Data Acquisition and Telemetry (SCADA) systems form an integral part of many organisation's operations. The systems are used to control and/or monitor physical resources or processes critical to an organisation's effectiveness. They are invaluable tools in providing unattended local control and monitoring functions.

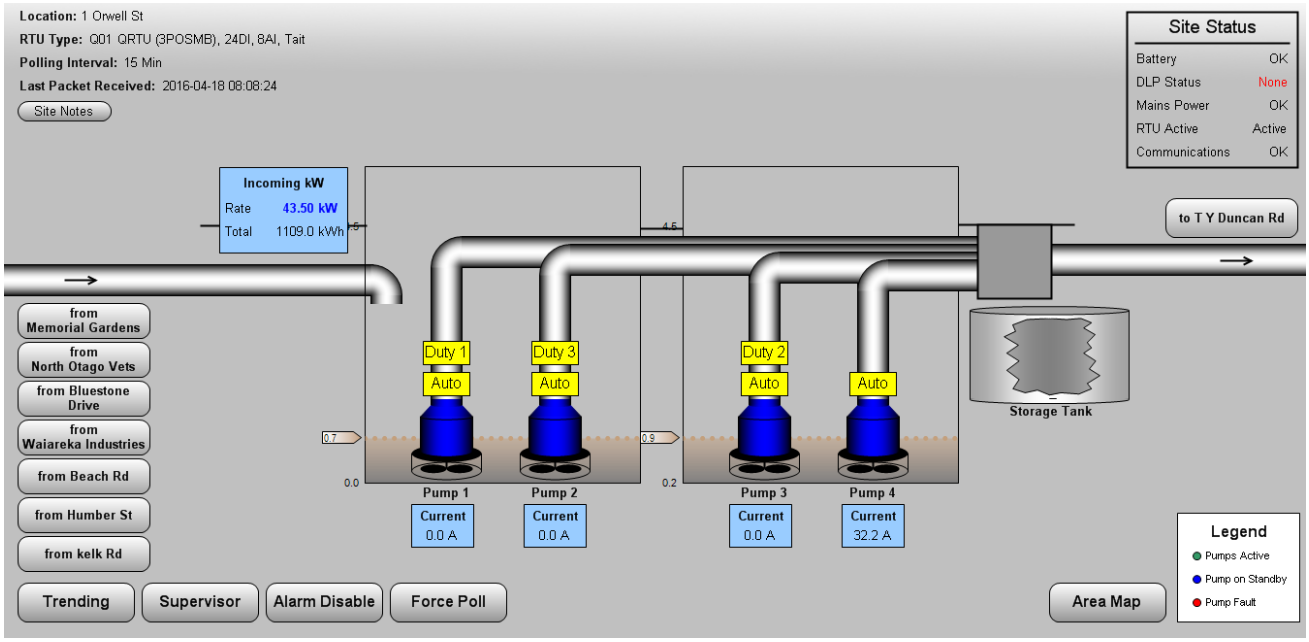
These resources can reside in a typical factory or plant environment or in remote locations. Where the monitored stations are remote, telemetry communication (via radio, land line, cellular link) is used to transport data back to the base station. Telemetry communication is used where direct serial communications with devices is not practicable.



Both hardware and software are integrated to provide a SCADA solution, with various hardware instruments and modules providing and transporting the data to the application residing on a control workstation. Hardware which can be in the form of a RTU (Remote Terminal Unit) or an installed PLC (such as Allen Bradley), interfaces to sensors or instruments located at critical sites for data collection. With telemetry some form of communications device such as a modem or radio is also required to transmit this data back to the base station.

The SCADA software which can reside on a single PC workstation, handles all the communications with remote or local devices and provides the operator with an interface that depicts "real world" events (e.g. pump station operation). This interface can be graphics based (GUI), or in a textual form.

Providing a central point of control for critical resources, SCADA systems permit efficient management of operations. From this central base station, it is possible to get a comprehensive overview of the events and processes occurring in the "real world".



The critical element in SCADA solutions is the ability to provide timely and accurate data back to a central point for either monitoring or control purposes. The provision of this data permits operators to make informed and prudent decisions about the resources they are overseeing.

SCADA systems usually have facilities for data logging or alarm handling incorporated into them. It is often important to know when processes are out of their typical operational ranges and have the ability to record these events. The ability to log data and provide reporting functions are also key requirements of most SCADA systems.

DATRAN VI FEATURES

Stability:	With many of the DATRAN VI client applications running as Windows Services system stability is enhanced.
Performance:	The 32-bit architecture of the system has been optimised for performance on either standalone machines or across networks.
Unlimited Expansion:	DATRAN VI has almost unlimited capacity to expand as your monitoring or control requirements increase.
Scalability:	As the processing requirements of your system increase, load can be shared across multiple processors or multiple machines on the network.
Open Design:	Standards such as DDE, OPC, OLE Automation and ADO-ODBC are incorporated into the DATRAN VI system, allowing the sharing of data and communications with a wide range of industry standard applications.
SMS & Alarm Handling:	Features within DATRAN VI are flexible and powerful. Various alarm classes can be created within the system with several options for the handling and escalation of these alarms. DATRAN VI supports an extensive range of paging devices.
Windows:	DATRAN VI can harness all the inherent advantages of Windows. The performance, robustness and security of the operating system now characterise the DATRAN VI system.
Database Connectivity:	Achieved through the Database Connectivity module. It enables data to be sent and retrieved directly from the Microsoft SQL Server database engine. Other ADO-ODBC (Open Database Connectivity) compliant applications can then query the databases for data.
Telemetry:	A wide range of systems can be used for communication between the RTU's (Remote Terminal Units) and the central Base Station.
PLC and RTU Integration:	DATRAN VI can be integrated with a number of leading third party RTU and PLC devices using Modbus or DFI communications protocols.
Communication Protocols:	DNP3, Modbus, Proprietary QComms

System requirements for DATRAN VI Telemetry Server

4 Gb RAM, 20Gb Hard Disk Space, any Windows Operating System

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