

# CASE STUDY

## ASTON VILLA'S STADIUM RUNS RELIABLY AND ENERGY EFFICIENTLY WITH TREND BMS

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Villa Park – the home of Aston Villa Football Club – has one of the most advanced building management systems in any UK sports stadium. The Trend Controls system enables the stadium manager to access the status of all monitored points from any PC terminal in the building, wirelessly from his personal digital assistant (PDA) or elsewhere via the internet.

The system also sends a text message to his mobile phone in the event of critical alarms, such as due to a boiler, gas valve or ventilation fan failure. The system includes The Holte – the Club's own pub sited adjacent to Villa Park – and the Club's training ground, 10 miles away, near Tamworth, both through Ethernet links.

The Trend building management system (BMS) was designed and installed by Direct Control Systems Ltd and presently has 24 Trend outstations on the stadium site. The training ground has six Trend outstations controlling under pitch heating as well as room environments, the hot water system, a swimming pool and hydro spas.

Standalone HVAC control systems at Villa Park are being upgraded and added to the Trend BMS when practically possible. It will also increase considerably when the new North Stand is expanded, completing the network around all four stands at the stadium.

"I believe what Direct Control Systems, Trend and ourselves have achieved on existing plant and in working buildings is as impressive as any BMS system around today, including the new Wembley Stadium, where they had a clean slate and a much greater budget," said stadium manager, Tony Diffley, who is dedicated to ensuring Villa Park's systems always function when required and as energy-efficiently as possible.

"Each week my assistant manager, Josh Tooth, receives a function sheet showing the days and times when HVAC zones should be set to come on. He programs these for the week ahead, so systems come on automatically as required. If the schedule changes, he can make changes easily, wherever he is: from his office PC, or remotely using Trend 916 Mobile Display Software on his PDA, or via the internet using Trend 963 Client Server Display Software on his laptop. The Trend 963 allows

alterations to be carried out by three users at any one time.

"Similarly, he can use his mobile phone, PDA or laptop to receive alarms and monitor or adjust the systems as required – even from the other side of the world, if necessary."

The only zone operating under regular time settings is The Holte, which keeps standard pub opening hours.

Prior to the installation of a Trend BMS, Villa Park's HVAC plant was controlled by relatively simple local controls. It tended to be left running continuously because it was too time consuming and expensive in terms of manpower to visit each area within the stadium to switch them on and off before and after each event, especially as many functions run until 1.00am.

The first BMS at Villa Park was installed when Direct Controls installed Trend controllers in the



Trinity Road stand during its construction in 2001. This stand has eight plant rooms, each with at least one Trend outstation: these are IQ220, IQ231 and IQ241 controllers, as required. Since then the Trend BMS has been expanded with more sensors and the outstations have been networked together. This backwards compatibility philosophy, where generations of IQ controllers installed over many years work together seamlessly, provides a benefit to Aston Villa of protecting their investment and removing the need for extensive retraining on new products. Wireless sensors were employed in several locations to avoid the cost and complexity of hard wiring.

A Trend 963 Client Server real time user interface with clear, logical graphics provides easy supervisory access to the BMS for monitoring and control. Whereas the training ground and The Holte pub are on the IP network, the "Villa Village" club shop is on a standalone system using a Trend IQ221 controller. This is accessed via a modem on an internal telephone extension.

The under pitch heating at Villa Park

has its own boiler with its original controls, but turf temperature sensors are connected to the Trend BMS and plant faults are monitored. Several lighting rigs are moved around the pitch to encourage grass growth. "At the end of the present football season the turf will be taken up and relaid," explained Josh Tooth. "We will use that opportunity to install additional pitch temperature sensors as well as new sensors to monitor its moisture level and light levels. These will all be brought onto the Trend BMS for monitoring.

"Some of the HVAC systems in the North Stand, which houses the Club's administrative offices, are connected to the Trend BMS following refurbishment projects. However we are not expanding the BMS there any further because the stand is to be demolished and replaced by a new stand in the near future. All the systems in the new stand will be on the Trend BMS from day one."

Many of the stadium's supply and extract fans, such as in the kitchens and boxes, have been fitted with variable speed drives. These enable the BMS to adjust fan speeds

automatically as required, which provides a considerable energy saving compared with running them continuously at maximum speed.

There are plans to install light level sensors throughout the stadium and to monitor and control lighting from the Trend BMS. Lighting will be arranged in zones, similarly to the heating zones already on the system.

Among the Club's other plans are emergency power generators. Naturally, these will be added to the IP network and monitored via the Trend BMS.

Reflecting on the systems which keep Villa Park running on match days, Tony Diffley said, "While most football stadia call in several BMS engineers and operators as well as tradesmen from contractors for games and other events, Villa Park has only me and my assistant, supported if necessary by a contract plumber and electrician and a technician from Direct Controls, all of whom are on call in case we need them. The fact that everything here works so well is a fantastic testament to the reliability of our Trend BMS, of Direct Controls as its designer and installer, and of our other contractors who service the electrical and HVAC plant so well."

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