

“How many people exactly?”




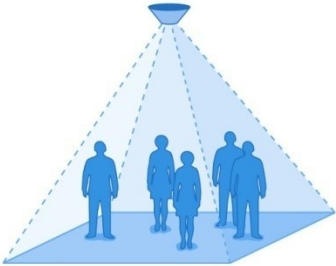
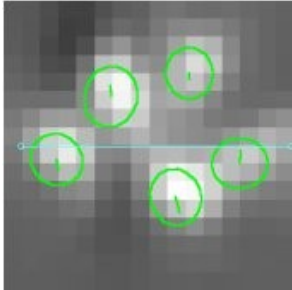
From a safety perspective, how do you know, at a point in time, how many people attending a concert are on your pitch – especially when they are allowed to flow from one area to another ?

This was the challenge which faced the Wembley Stadium team in May 2008. The concert promoter was keen to allow “free flow” of concert goers from the pitch to seating areas on level 1 by the side of the pitch. This presented a challenge to the Health & Safety Compliance Team who need to ensure adherence to the Safety Certificate (which links the maximum number of people allowed on the pitch to the time it would take to evacuate in an emergency).

Initially, the usual options of positioning staff at entrances to the pitch (from the moment turnstiles opened) to manually count people or use PDAs to assist counting were considered. However there were clearly concerns over the practicality of doing this over a seven hour period with any guarantee of accuracy, particularly as the pitch could potentially hold between 20,000 and 25,000 people. There was also concern that a manual counting approach would provide no real-time management information. Accordingly, the IT Team looked at other technologies and discovered a company in Nottingham (*Axiomatic Technology Ltd*) which utilises Irisys Thermal Counters to provide establishments such as children’s play centres and swimming pools with accurate information on the number of people in an area and rates of entry/exit.

How does it work?

Thermal cameras mounted overhead are able to follow sources of heat (in this case a person's head) across a pre-configured grid, only when the person passes completely across two pre-configured count lines and out of the grid is a count registered. The cameras have the advantage of being able to track people in both directions and are not affected by variations in light (often a problem at concerts when using traditional imaged-based cameras).

		
Irisys Outdoor Thermal Camera	Field of view	Thermal camera tracks heat sources across grid

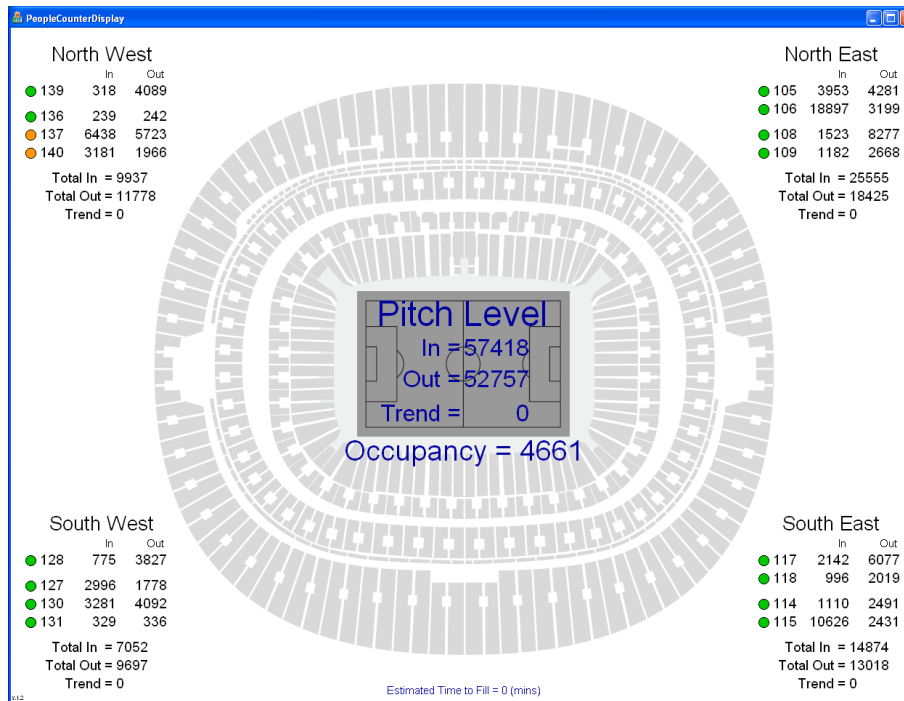
From the camera information, Axiomatic have developed software to enable a real-time display of flow rates and overall occupancy in a given area. The cameras normally cover a maximum entrance of about 4 metres but can be linked together to cover wider distances.

Following a successful demonstration by Axiomatic (with 98% accuracy), it was agreed to pilot the technology with cameras mounted in a number of vomitories (tunnel entrances) at a football match and use manual counting to check the accuracy.

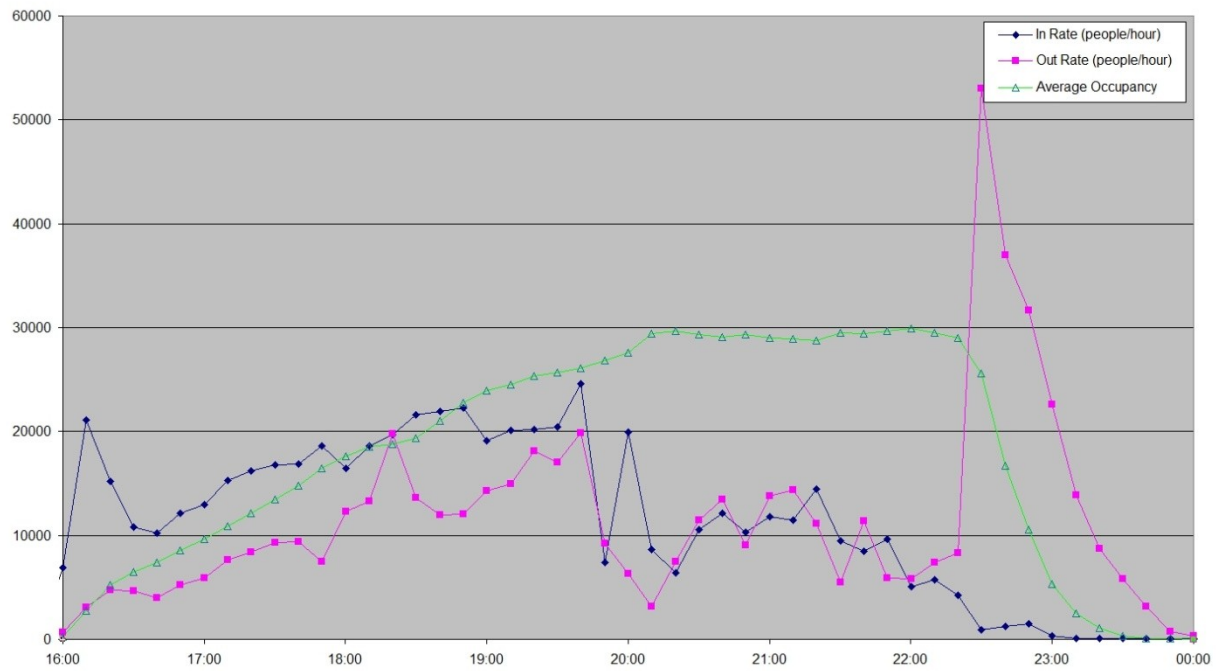
The pilot was a great success and the go-ahead given to roll-out 16 cameras covering the 8 vomitories at Wembley Stadium which are designed to give concertgoers access to and from the pitch. As with many projects of this type there were a number of challenges to overcome, including; upgrading the IT network quickly to accommodate the cameras (the network is used to provide power and transmit camera data), finding a method of installing the cameras discreetly and securely in the vomitories, as well as designing the right type of display for use in Event Control to give instant views of pitch flows and occupancy.

With the support of Axiomatic, their hardware supplier Irisys, and the Wembley team these challenges were overcome and following consultation with the Police and the Local Authority, the system was used to support the "live" event operation. The technology worked flawlessly, with an overall accuracy of 95% on the first evening of the event. As with many of these types of project, the main issues revolved more around the process of managing people when the pitch was full rather than the technology. Following some changes to procedures, the system was used for the second day of the event with stunning results,

not only did the technology perform flawlessly again but during the event the information was used to actively increase the capacity on the pitch as confidence grew in the information being provided, enabling far more people to be near the main act. For example, using the flow rate information in conjunction with the Stadium's real-time turnstile entry figures, it was possible to predict how long it would take to fill the pitch, as well as the current location of concertgoers (in terms of those outside the Stadium, those on the concourse inside and the actual occupancy on the pitch).



Following the event subsequent analysis of the data collected has been used to challenge the original design calculations about the maximum number of people able to flow on and off the pitch through the specially designed vomitories. The system has also been used to back-up what, until now, have only been theories about crowd movement. For example how many times concertgoers enter and leave a "free-flow" pitch (typically 4 times), how the pitch fills between a support band being on and the main act, how people tend to leave by the same vomitory they entered regardless of where they have ended up on pitch. This has given Wembley and the Local Authority real information which is being used to change the way events are run in the future.



Doors opened 16:00. Support Act on-stage 18:30. Main Act on stage 20:00. Main Act finished 22:30

This year the system is being extended to include 38 cameras at pitch level enabling free flow from any entry/exit onto the pitch and more opportunities for Wembley to offer “free flow” to promoters and in turn a better experience for concertgoers.

Quotes

“This is an invaluable and unique system which has enabled decisions about crowd management to be based on real-time factual information rather than observation and theory. Some of the events we are staging this year would be extremely difficult to manage without this technology.”

Nick Woodhouse, Head of Wembley Stadium Health & Safety Compliance.

“I am delighted that we have been able to provide a robust and value-adding system using innovative technology and creative thinking. This could not have been achieved without tremendous support from the Wembley Team and excellent technical implementation from Axiomatic Technology Ltd.”

Paul Jennings, Head of IT Wembley Stadium

“I am proud of the way our team rose to the challenge working with Wembley to deliver a large and complex project, completing both the hardware installation and custom live display software in time to meet the live event deadline. We are delighted that the information has proved to be so useful to the Stadium Control Centre, and to be expanding the system to further improve the free-flow of concertgoers.”

Quote from David Moore, Technical Director, Axiomatic Technology Ltd.

“Irisys were delighted to be involved with this innovative and exciting project and have assisted Axiomatic throughout to ensure that high levels of accuracy were achieved. Irisys’ detectors have been used extensively in retail, but never in such an innovative application in a prestigious stadium like Wembley.”

Nick Stogdale, Irisys Customer Services Director.

References

Axiomatic Technology Ltd. www.peoplecounting.co.uk

Irisys www.irisys.co.uk

Wembley Stadium www.wembleystadium.com