

Hawk-Eye Goal Line Technology

How does it work?

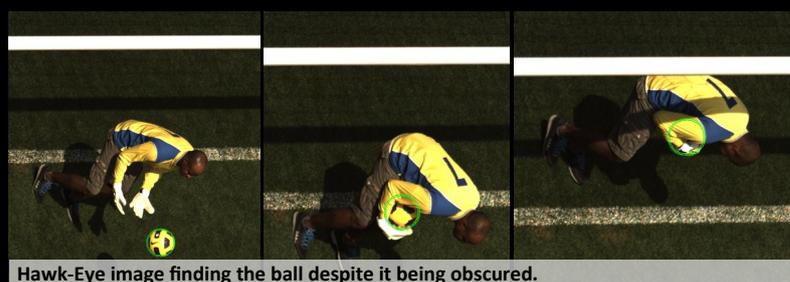


Typical camera positions.

Hawk-Eye camera.

CAMERA TECHNOLOGY

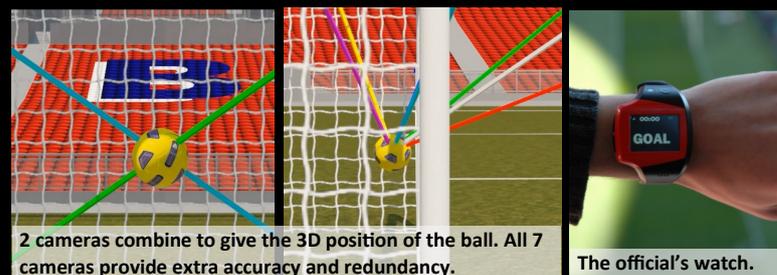
Hawk-Eye install 7 cameras per goal, the most common location is on the roof of the stadium, however there is a great deal of flexibility in the camera positions.



Hawk-Eye image finding the ball despite it being obscured.

VISION PROCESSING

The images from each of the cameras are processed to find the ball within the image and also identify areas which are definitely NOT the ball. The system is able to find the ball if only a small part of the ball is visible in the image. The system can work with any pattern and specific vision processing techniques are used to identify each ball. The system is unaffected by mud on the ball or any adverse weather conditions.



2 cameras combine to give the 3D position of the ball. All 7 cameras provide extra accuracy and redundancy.

The official's watch.

GOAL ALERT

Control software combines the information from all cameras and is able to track the ball within the goal area. As soon as the system detects that the ball has crossed the goal line, it instantaneously sends a signal to the official's watch. The watch has been developed exclusively for Hawk-Eye by industry leaders Adeunis. It is technically possible to also provide a "near miss" signal to the watches so the referee also receives a positive confirmation that the ball did not cross the line in a close incident.



Milan vs. Juventus Serie A 2012: Milan goal disallowed

REALIABILITY AND ACCURACY

The system is able to locate the ball even if it is only found in 2 of the 7 cameras. There has never been a goal line incident where the ball would not have been seen by any of the Hawk-Eye cameras.

The system is millimetre accurate, which ensures that no broadcast replays could disprove the decision. The system accuracy is not affected by any variances in the painting of the goal line or if the posts are not perfectly vertical.



Hawk-Eye high speed camera view.

DEFINITIVE REPLAY

Hawk-Eye utilises a dedicated high speed camera capable of removing the players from the image, to ensure the ball is fully visible. This provides the definitive replay for broadcast and digital media.

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