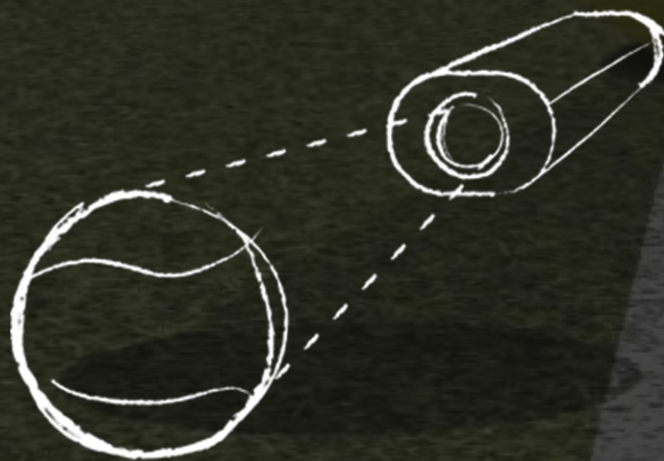




# Electronic Line Calling Technology

How it works



## How it works

Hawk-Eye's Electronic Line Calling service is now used by over 80 global tournaments every year, making the game fairer for players and acting as an exciting broadcast enhancement feature.



### CAMERA TECHNOLOGY



#### Camera Set Up

Up to ten cameras set up around the court to capture live images.



#### 2D (x,y)

Vision processing is used to identify the centre of the ball.



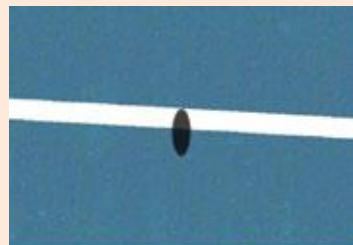
#### 3D (x,y,z)

System triangulates information from each calibrated camera to provide a 3D position of ball.



#### 4D (x,y,z,t)

Process repeated for each frame so that 3D positions of ball can be combined to produce single trajectory of flight of the ball.



#### Bounce Mark

Trajectory is then used to calculate exact contact area ball made with court during the bounce phase.



#### Virtual Reality

Data is quickly and clearly shown via intelligent virtual reality software.

## Accuracy & Reliability

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During ITF testing in 2006 Hawk-Eye passed a number of stringent parameters, meaning that it would be the first electronic line calling system to be officially accredited. Results showed the system to have a mean error of only 2.6mm when compared to a high speed camera located on the playing surface.

Since then, testing of the system is an on-going process at all events prior to main draw competition, including tests conducted outdoors, encompassing situations that take the following factors into consideration:

- Wind (and therefore camera wobble)
- Bright sunlight at different times of the day
- Shadows covering part or the majority of the court
- Dark or overcast conditions
- Artificial floodlights

Although the accuracy of the existing system has been proven to meet the ITF rules and regulations, the company is constantly developing and refining the system to raise the bar further still. Equally Hawk-Eye listens to feedback from customers and officials to ensure that Hawk-Eye remains the very best in the market in accuracy, reliability, speed and from a broadcast point of view.

Regarding accuracy specifically, it's interesting to observe high speed video footage (1000fps), similar to that obtained during ITF testing, see link below:

**Video:** <https://vimeo.com/135357489>

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