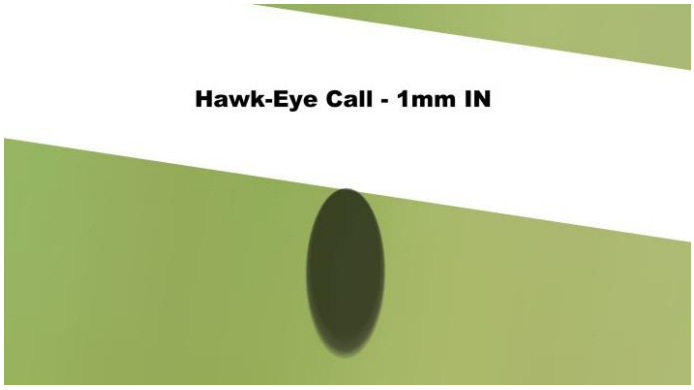
Electronic Line Calling FAQ

Hawk-Eye's Electronic Line Calling

How Hawk-Eye Works

1) Using cameras, Hawk-Eye finds the exact 3D position of the ball at a series of time intervals leading in to a bounce.
2) From these 3D positions, a trajectory of the ball is calculated.
3) Hawk-Eye uses this trajectory to project where the ball will first make contact with the ground and then how much the ball will compress and skid once it has contacted the ground. From this, the "bounce mark" is determined.



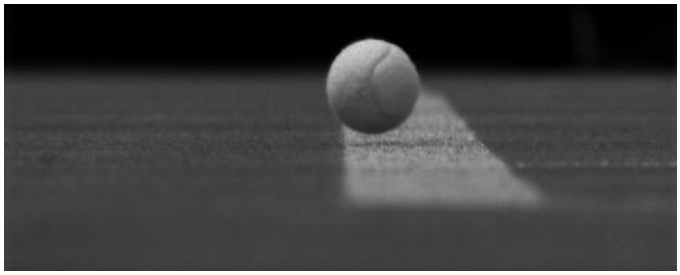
Why a line call can look deceptive on television

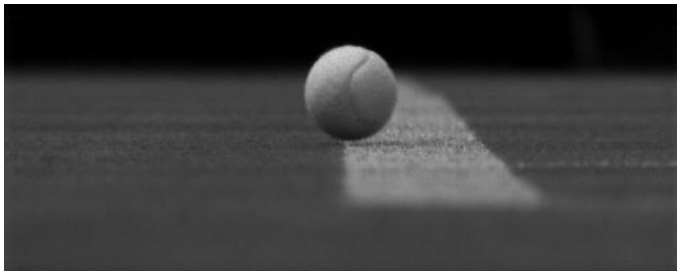
Television replays look deceptive because the cameras are at the wrong angle looking down at the ball. The ball also has a lot of motion blur and the cameras do not work at a sufficiently high frame rate to capture the crucial part of when the ball first touches the ground.

What happens to a ball when bouncing

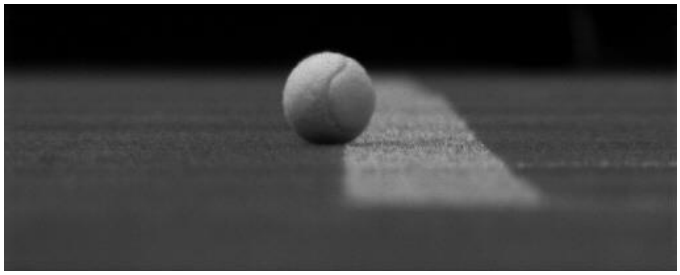
To have an understanding of how to interpret these broadcast images, an understanding of what a ball does when bouncing is required. The following images are not from the particular line call, but help to show what happens. Each frame of video in the next sequence is at 1000 frames per second; the above broadcast footage is at 150 frames per second.

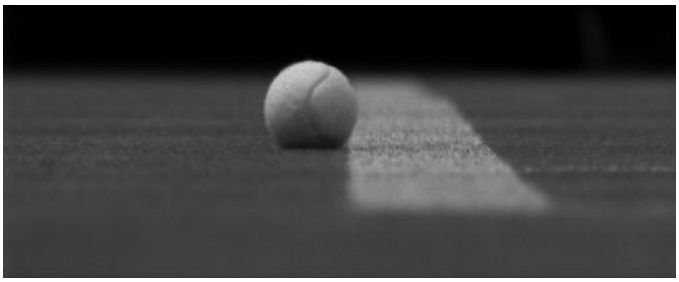
Just before the bounce.

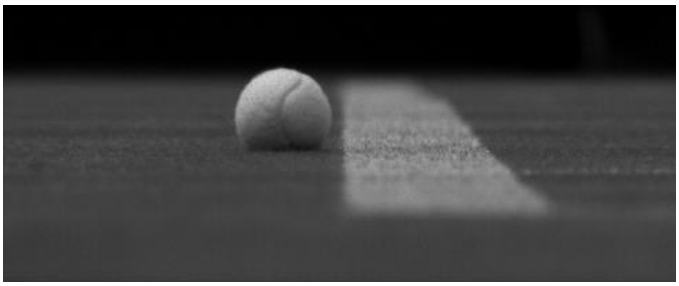


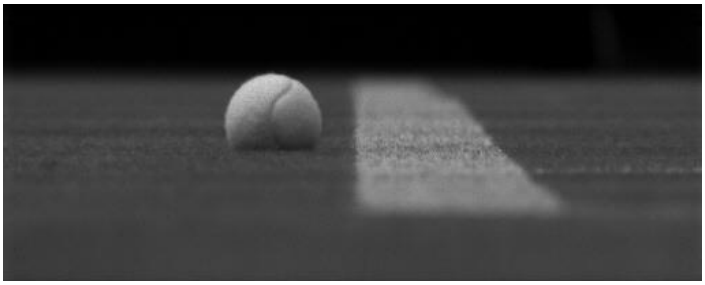


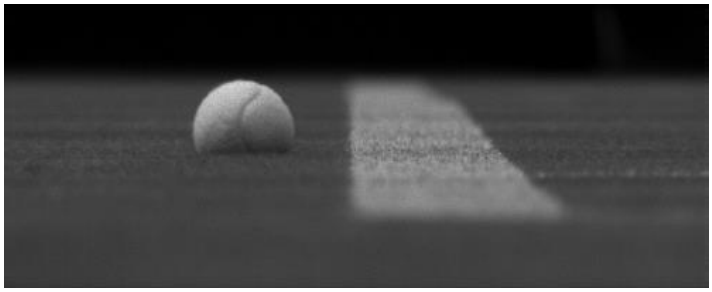
Ball just touches the line.



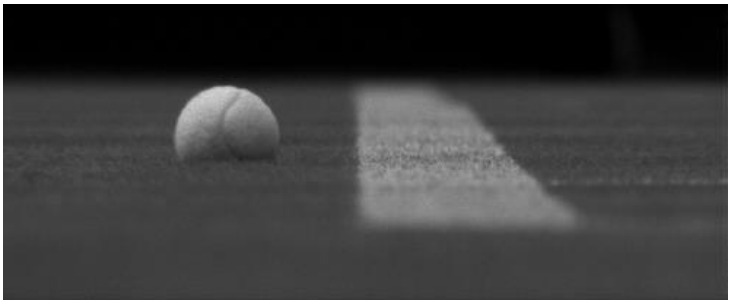


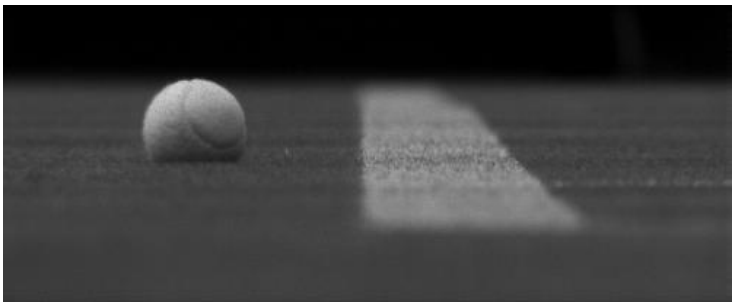




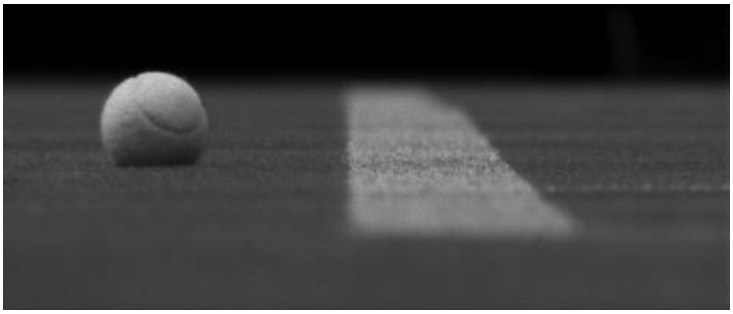


The same time has elapsed between this frame and the first frame in this sequence as between a single frame of the broadcast footage.





The ball is still on the ground, but now at least 10cm (the width of a line) beyond where it first made contact with the ground.



HAWK-EYE
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