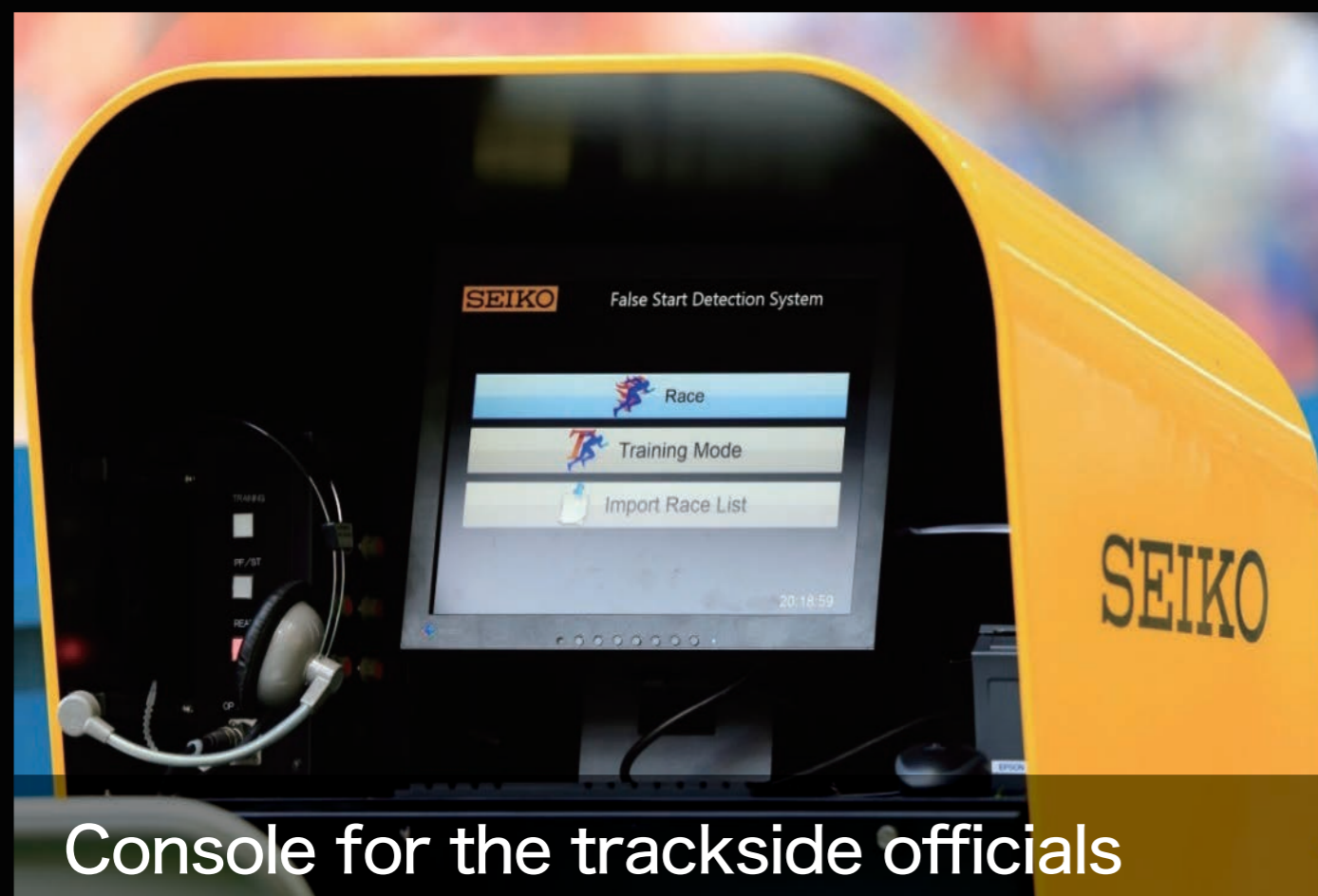


Start Information System

Sensors are built into each starting block and monitor the pressure that the athlete exerts on the footplates. Seiko's Start Information System assists the officials who make the crucial decisions on false starts. A reaction (pressure change) occurring either before the firing of the Start Pistol or less than 1/10th of a second after is judged to be a false start. When a false start is detected, a second pistol sound is generated in less than one second to inform the athletes, the starter and the spectators.



Starting block and its built-in speaker



Console for the trackside officials



Movie



The monitor shows video footage captured by the two HD video cameras together with the wave form data that shows the pressure applied to each block throughout the start process.

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Photo Finish System

The official race time is measured by super accurate photo finish cameras which scan the finish line 2000 times pre second. The cameras are activated by the same electronic signal that generates the gun sound at the start of each race. As the athletes approach the finish, the cameras produce 2000 images per second and a photograph is produced. The photograph is calibrated by time and allows the judge to accurately decide the official finish time for each athlete to the nearest 1/1000th of second. Finish times are always rounded "up" to the next greatest 1/100th of a second for example: a measured time of 9.081 seconds will give an official result of 9.09 seconds. Photo finish images are created from both the outfield view and in-field view so in the event an athlete is masked by another competitor-scrutiny of the in-field camera allows an accurate result to be measured.

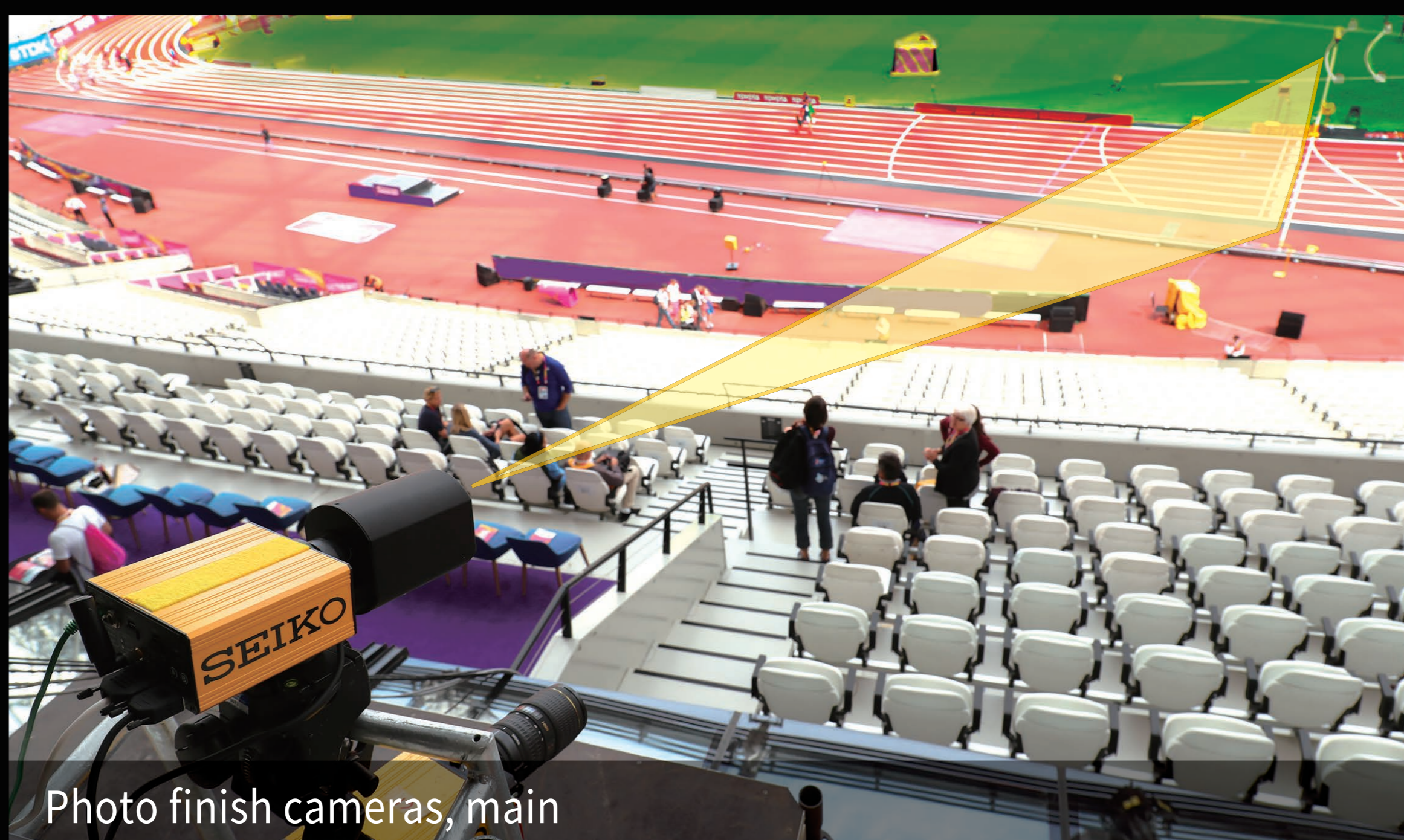


Photo finish cameras, main

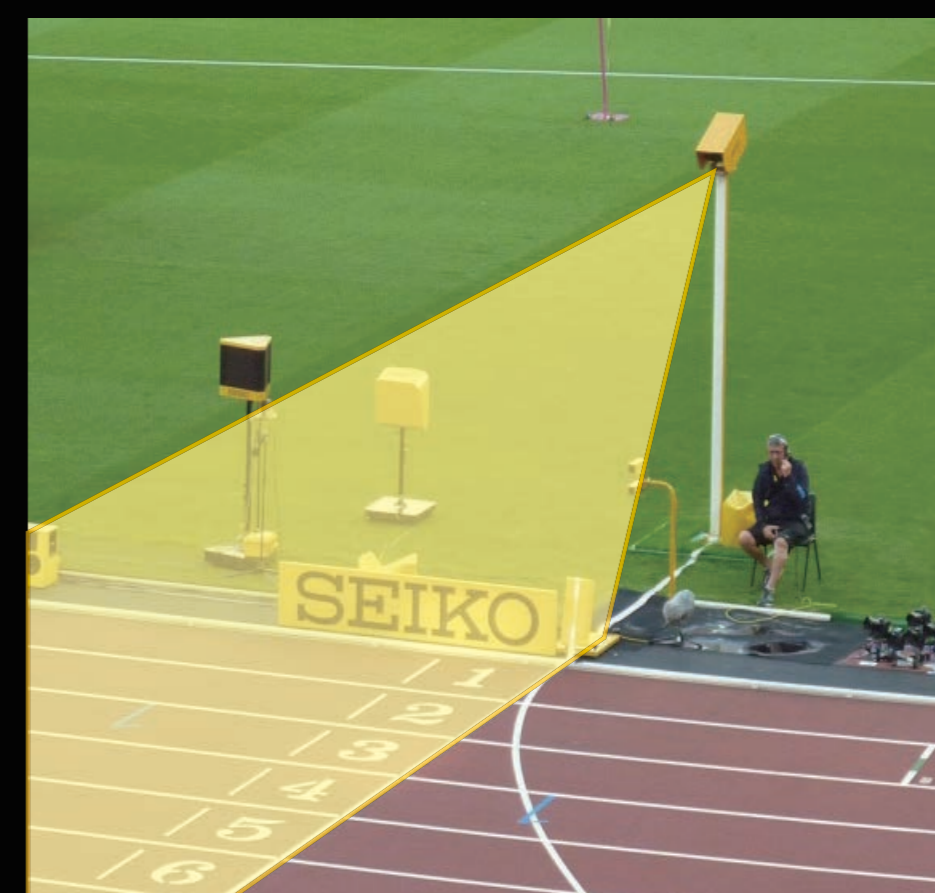
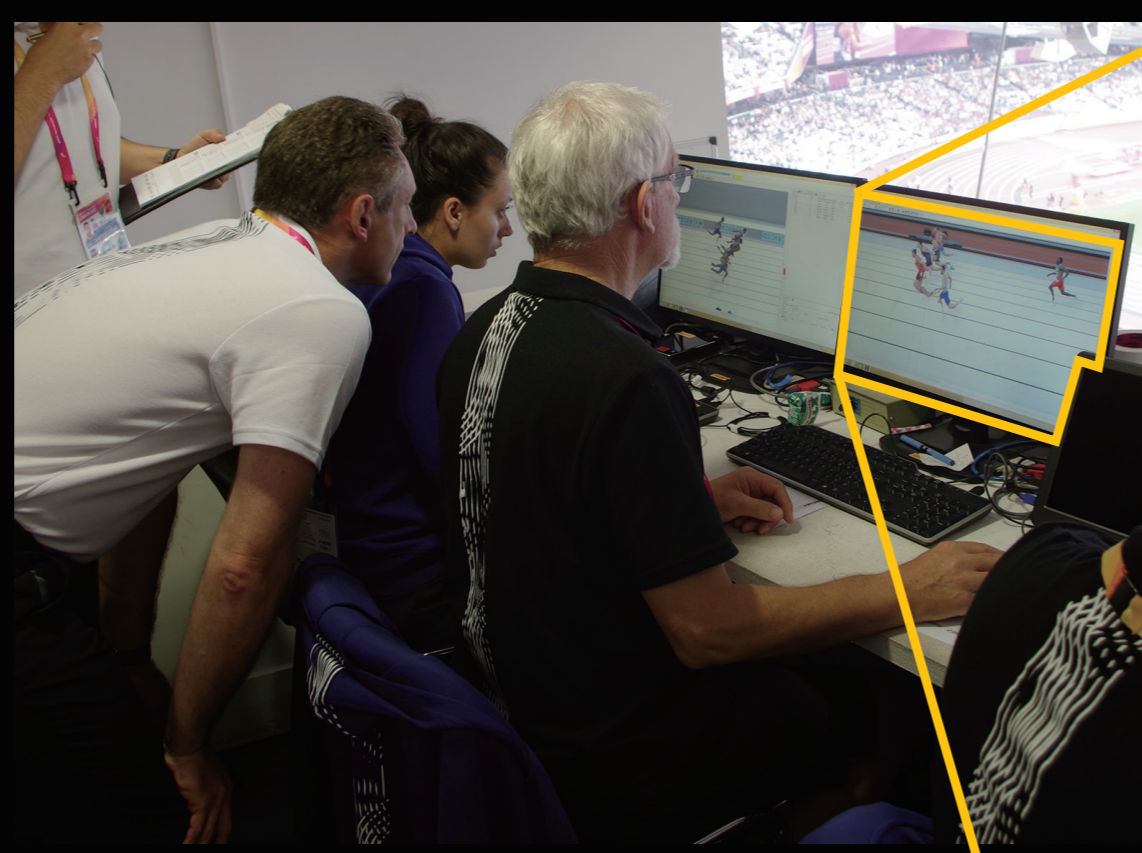


Photo finish cameras, sub



Judge at photo finish room



Movie

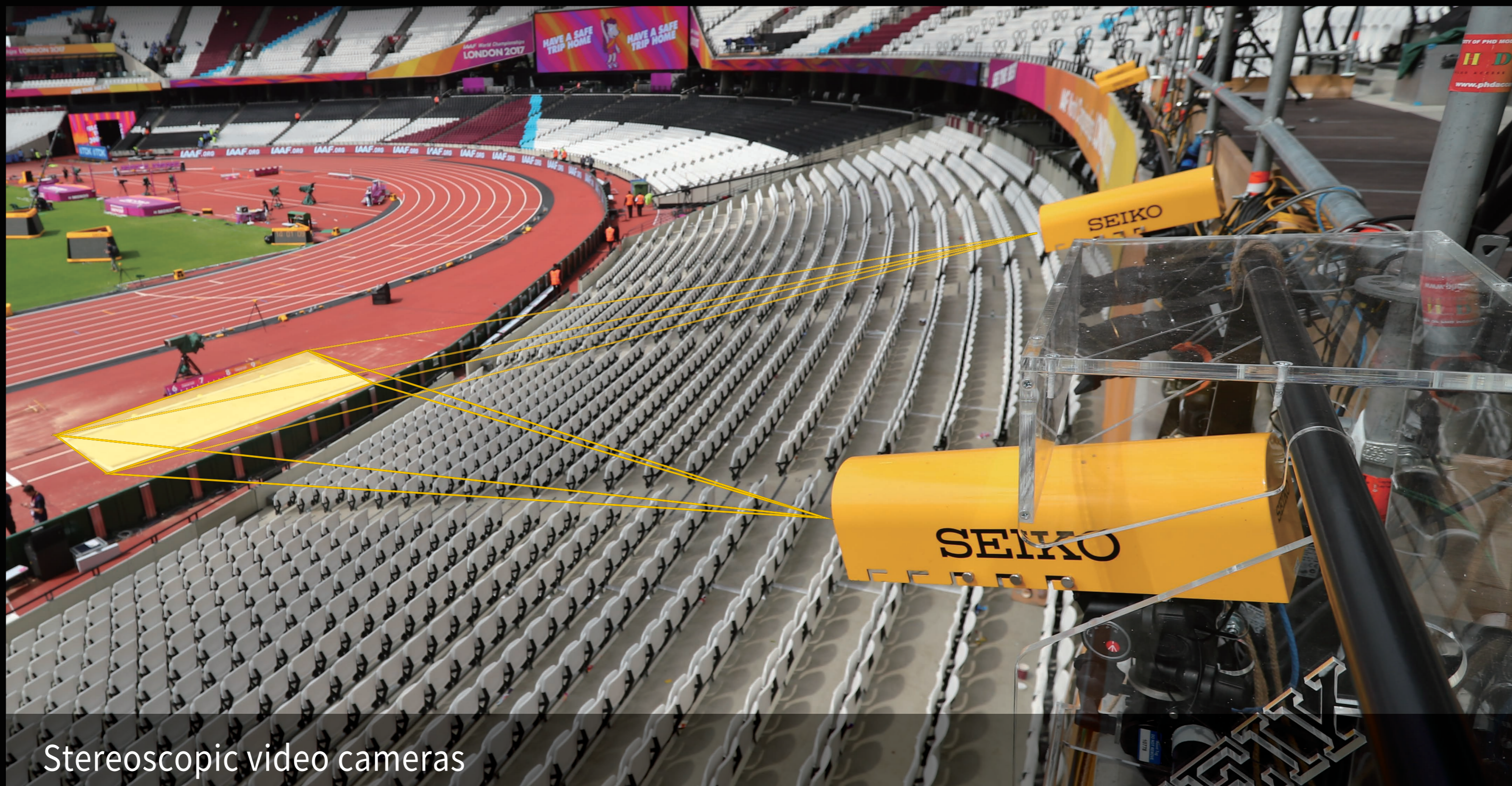


Photo finish cameras scan the finish line 2000 times per second

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VDM Video Distance Measurement System

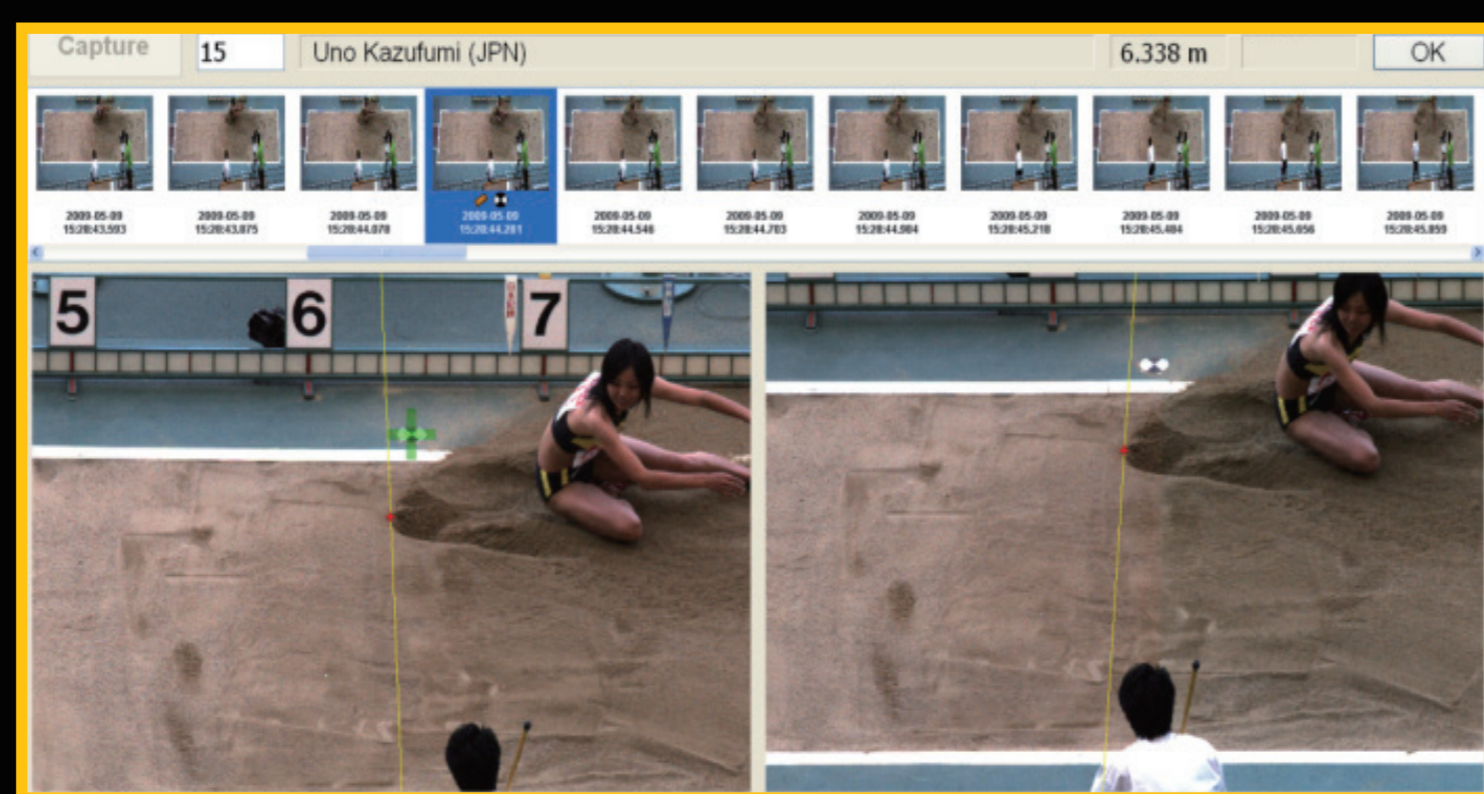
The stereoscopic cameras capture the point of landing. The specially created software allows a judge to line up a cursor on the point of landing, and the VDM system will automatically calculate the distance based on the three-dimensional analysis using two camera images.



Stereoscopic video cameras

モニター画面

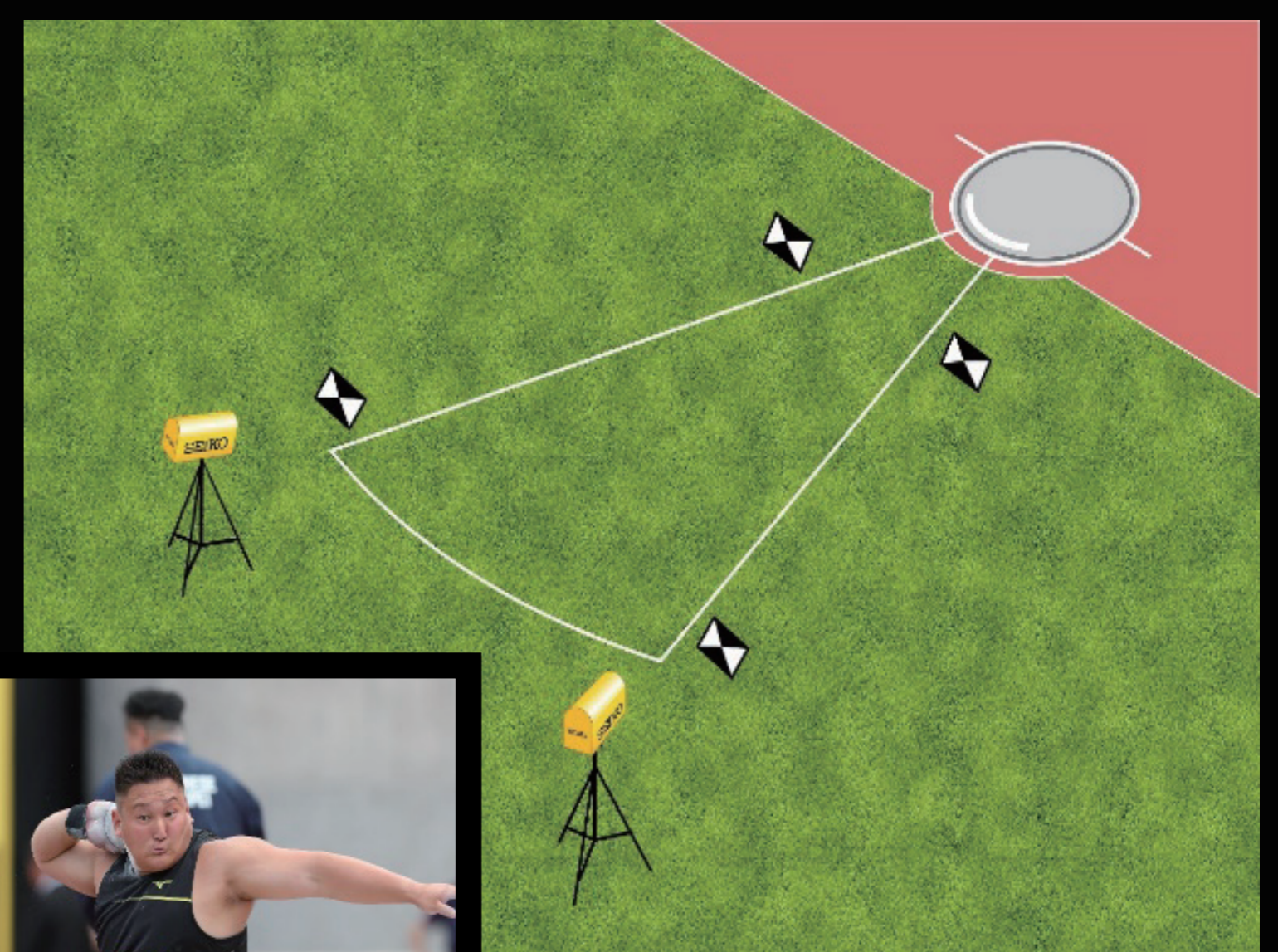
Movie_1



Movie_2



The judge line up a cursor on the point of landing on the two camera images.



VDM is also used for measuring Shot put

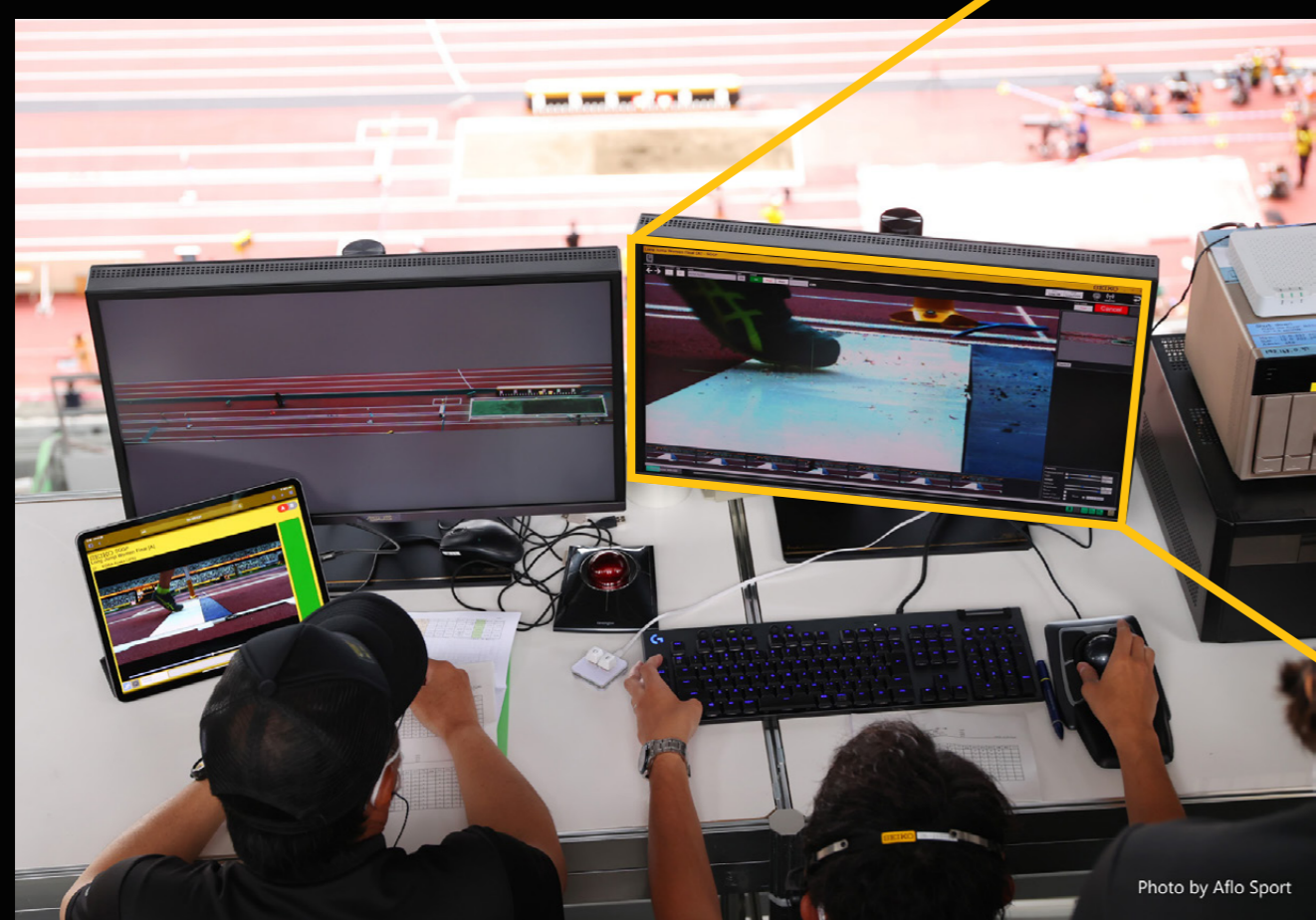
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JMS Jump Management System

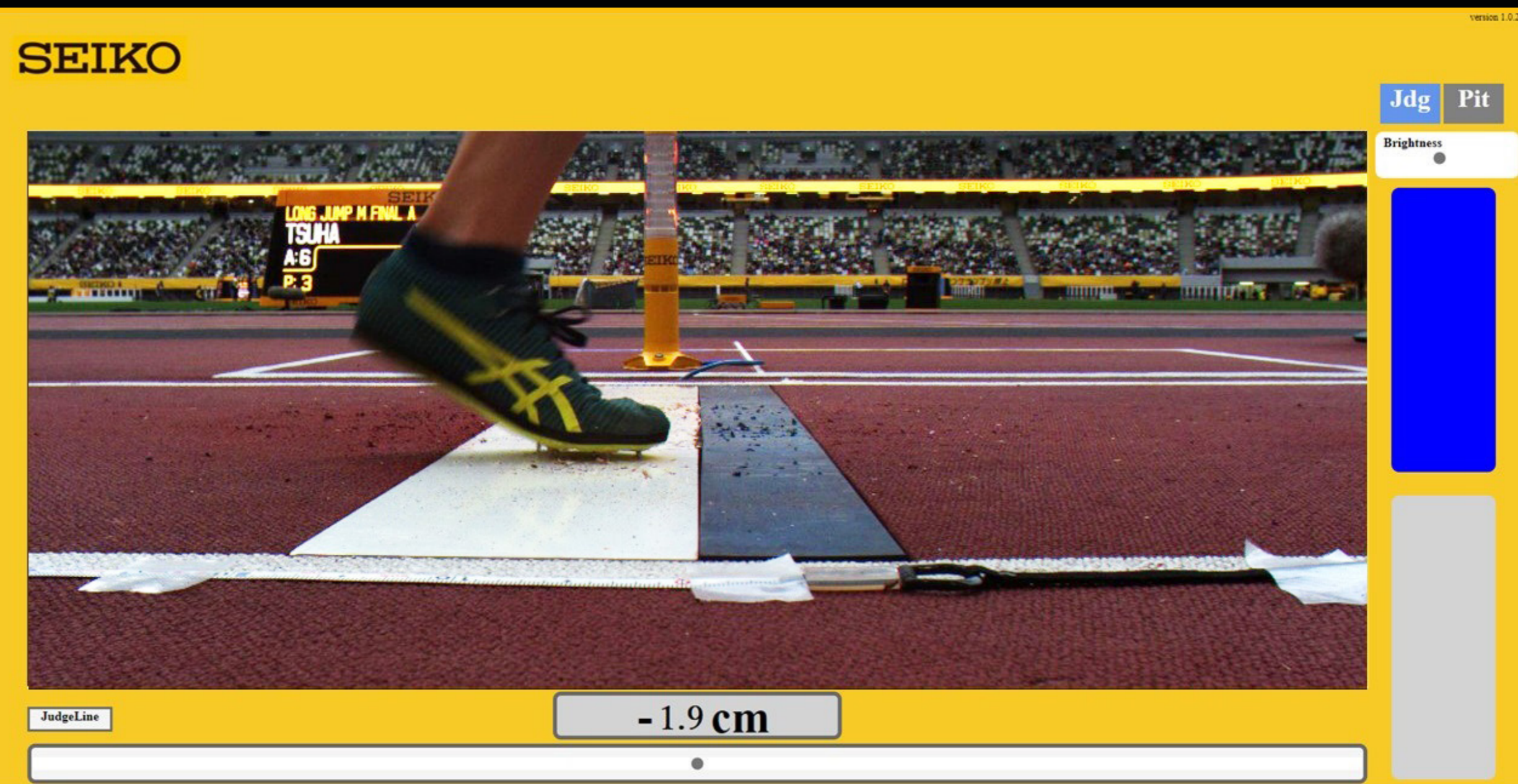
We use a 300FPS high-speed camera to determine the validity of a take-off in the long jump and triple jump events.

First, the video operator captures clear images of the exact moment of an athlete's take-off, and those images are immediately displayed on a monitor in the judging room. The judges then determine whether the jump was valid or invalid. A light installed next to the take-off board instantly signals the result, flashing either green (valid) or red (invalid). In addition, athletes can evaluate their own take-offs by looking at the same images on a monitor beside the pit. At the same time that the system shows the validity of an athlete's take-off, it also provides exact information on the distance from the take-off line to the forward position of the athlete's foot on the take-off board.

In the past, these judgments relied on a plasticine indicator strip along the edge of the take-off board. Replacing that with digital technology has made far more accurate judgments possible and has also allowed the judging system to comply with the rule revision implemented in November 2021.,



The operator captures the image of the athlete's take-off.

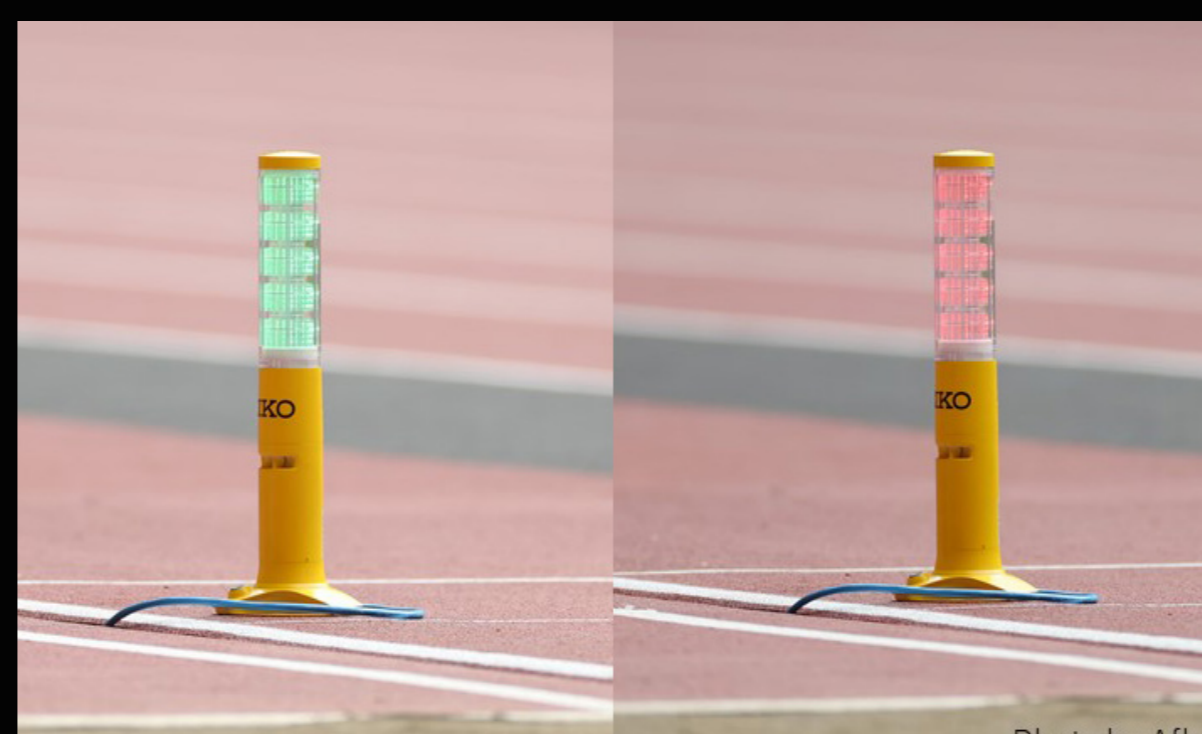


Following the judges' decision, the system measures the distance to the take-off line.

Movie



A highly specialized camera is used to record the video.



The lamp flashes green for a valid attempt or red for an invalid attempt.



The just-recorded take-off image is displayed on a monitor beside the pit for the athlete to check.

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Triple Jump Phase Measurement

Starting from this tournament, we install high-resolution (4096 x 3000 px) cameras capable of recording 60 frames per second (60 FPS*) to capture a wide area from the run-up to the sandpit. These cameras are placed at elevated locations such as the spectator stands. With this setup, we are able to measure the triple jump's run-up speed and the distance, height, and speed of each phase of the triple jump (hop, step, and jump). We intend to provide this valuable information to both the athletes and the spectators.

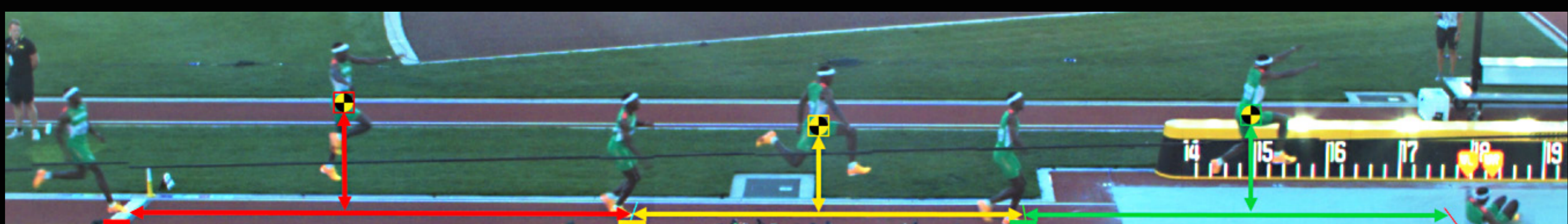
*FPS: "frames per second" indicates the number of individual frames that comprise a video in each second. So, 60 FPS would mean that 60 images are displayed per second.



Cameras are installed in elevated locations such as the spectator area



The footage is captured using a high-resolution camera at 60 frames per second(FPS)



We measure the approach speed for the triple jump, as well as the distance, height, and speed of each of the three components (hop, step, and jump)

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