Player Analysis Technology Approval report

PlayReplay tracking system

Test code: PAT-24-033

Serial no: n/a

Software version(s):
Smartphone app: iOS/Android

Firmware version: v0.240408.0 (08/04/2024)

Issue date: 08/05/2025

Objective: To test and evaluate the PlayReplay tracking system according to Rule 31 of the 2025 Rules of Tennis.

Result: Approved

SUMMARY

The PlayReplay system (the "System") is a camera-based ball and player tracking system used to provide line calls, match stats and training games. Two cameras are fixed to the top of each net post, capturing ball and player positions through image analysis software. On court computers communicate with a single on-court touchscreen placed next to the Chair Umpire. The screen allows for Umpire or player control over line calling and view shot statistics.

Players can create an account and sign into the device to store their tracking data. A 'tournament mode' can be toggled on/off which prevents coaching information being transmitted. This 'tournament mode' is locked with a countdown or a code to access coaching modes. Restrictions on the access by a player to PlayReplay data components during periods when coaching is and is not allowed are as follows:

COMPONENT	NO COACHING	COACHING
PlayReplay device	Permitted	Permitted
On-court display	'Tournament mode' only	Permitted
Smartphone app	Not permitted	Permitted

NOTE Approval does not attempt to, nor does it in fact, establish the accuracy or reliability of data or fidelity of its transmission, including (but not limited to) the provision of 'in'/ 'out' decisions for the purposes of line-calling.

MAIN COMPONENTS

The main components of the system are described in table 1 and depicted in figure 1.

Table 1 - Description of main components of PlayReplay tracking system

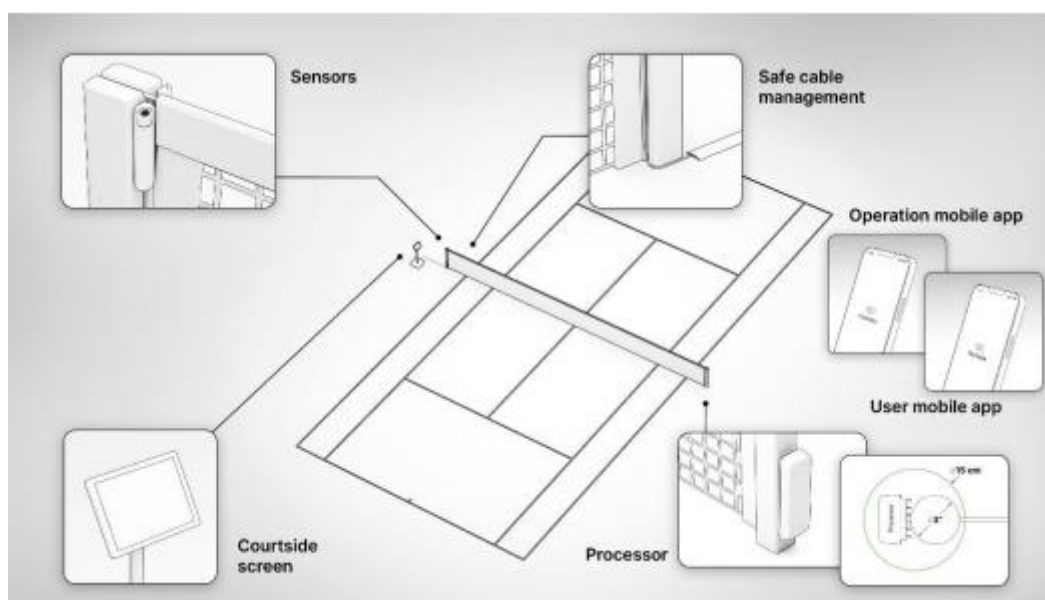| COMPONENT	FUNCTION(S)
On-court cameras	Capture images
On-court computers	Process images to generate 3D position data
Cloud Servers	Process, store, and transmit data
On-court touchscreen	Control system and communicate data to Umpire, player or coach
Remote/public smartphone app	Communicate data to player or coach
Venue/private admin app	Control data made public and toggle 'tournament mode' on/off

Figure 1 - Overview of PlayReplay system with labelled elements

DATA CAPTURE AND PROCESSING

Two cameras mounted at the top of each net post capture images of the court. These are processed by the on-court computers at the base of the net posts to allow the ball, players and court markings to be identified.

The cameras, computer, switch and screen use a private wired connection and links with the venue network router which sends data to cloud servers. The local system operates such that the System maintains tracking capabilities without a network connection. The private admin apps use a private wireless network to communicate with the on-court devices. Transmitted data is encrypted and data communicated from the tracking system to the smartphones is anonymised. Data is not stored on any removable devices.

The PlayReplay device uses the location of the ball, player and court lines to calculate ball and player trajectory data. The data calculated includes:

- In/Out/Fault
- Bounce Footprint
- Bounce distance To Lines
- Shot Type
- Shot Trajectory
- Shot Speed
- Ball height At Net
- Ball spin
- Player Positions
- Rally Length Distribution
- Shot Distribution Percentages
- Shot Placements
- Player Hit Positions
- Shot Speed Statistics
- Spin Statistics

The user interfaces are configurable and are being continually updated to suit user needs.

The system is designed to operate as both a review and a real-time Electronic Line Calling (ELC) system. The real-time System features an additional speaker to make audible out calls. Aside from this, the hardware is identical. The System is designed to be used in both umpired and non-umpired scenarios. In the non-umpired scenario, the central console will be player facing, and players may interact with the device, rending the 'tournament mode' critical in this scenario under Rule 30 of the Rules Of Tennis.

COMMENTS

Start/stopping data capture is player driven. One started, the system functions independently of the players (does not require any player input).

DATA COMMUNICATION

Line calling, single shot and aggregated shot data can be communicated to the user's smartphones and the on-court screen through visual feedback. The real-time electronic line calling system features an audio call to indicate 'out' or 'fault' calls; the review system does not have an audio signal.

Different modes are selectable using the on-court display: singles match, doubles match, zone training, and freeplay. 'Tournament mode' can be selected from the landing page at the beginning of a match. When 'tournament mode' has been selected, limited statistics are shown such that the shot to be reviewed can be identified, but no otherwise unnecessary coaching information is available.

A user can optionally join a session using their smartphone by connecting to the on-court system. Single shot selection, as well as aggregated match data are available to all users that have joined the session. Your own shot data is available to you, and your opponents' is available if they approve permission.

2D and 3D ball trajectories, bounce mark plots, shot speeds, types and player positions, as well as target zones for practice and coaching can be overlayed on a virtual court to communicate data to players.

COMMENTS

Coaching information such as the single shot and aggregate shot data are available through the on-court display and the smartphone app. 'Tournament mode' can be recognised by a roving umpire from a distance through a visible banner on the screen. This mode must be enabled when coaching is prohibited. Upon selecting to exit the 'tournament mode', to start a mode with the coaching data available, a countdown timer will begin, which can be manually overridden with a code.

ADDITIONAL INFORMATION

Client:
PlayReplay AB
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Date received: 30/04/2024

Report prepared by: Tom Hewson
Report authorised by: David Cole
Revision number: 0

Please note:
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