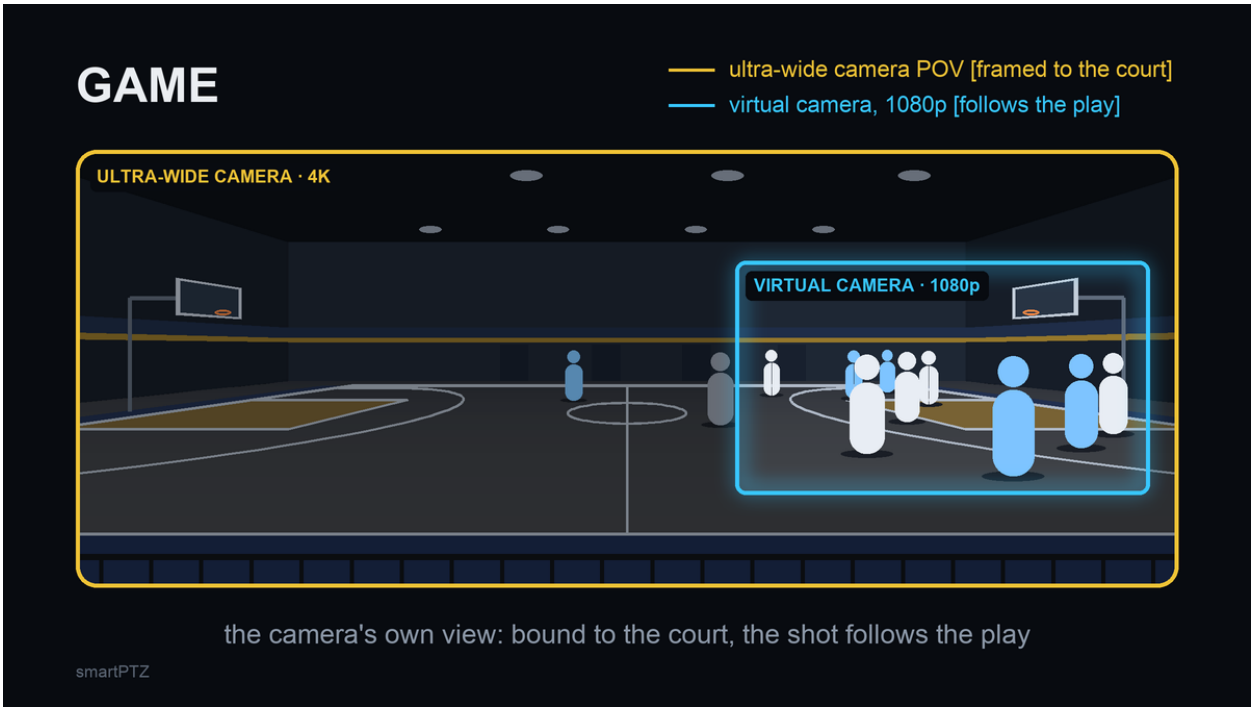
smartPTZ

Game

User manual for smartPTZ Game: a virtual camera that follows team play inside the ultra-wide picture. What it does, how to set it up, the rules it follows, and what each adjustment changes.



The camera's own view: the ultra-wide (yellow) sees the whole court; the virtual camera (blue, the shot that goes out) moves inside it to follow the play.

Applies to smartPTZ 17.7 or later and the current web console. Covers Game with the phone on a tripod, not moving (Gimbal off), and on a DockKit gimbal that pans with the play (Gimbal on).

New in 17.7. Game works on a DockKit gimbal (beta): scan the court once and the gimbal turns slowly with the play while the shot stays wide. **Ball assist** (beta, basketball) leans the shot toward the ball. The shot leads the play further, turns round faster after a turnover, and is held level (**Level camera**, on by default). **Hockey** (beta) and a 60 fps **Game frame rate** (beta) are new, and Game is the default tracking mode.

1. What Game does

Game turns one phone into a camera operator for team sports. The phone stays still and records the whole playing area on its ultra-wide (0.5×) lens in 4K. Inside that picture, the tracker moves a **virtual camera**: a 1080p window that pans and zooms to follow the play. The window is what goes to your stream, your recording and your switcher. Nothing on the phone physically moves.

- **Pan**: the window slides left and right (and a little up and down) to stay with the play.
- **Zoom**: the window gets smaller to get closer, down to a little over half the width of the ultra-wide picture (about 1.7×; Solo goes to 2×). Even at 2× a 4K picture still gives a sharp 1080p shot.
- **Wide**: when play is spread out, or nobody is visible, it opens up to the full ultra-wide picture.
- **Level**: the window is held level using the phone's motion sensor, so posts and walls stand upright even when the phone is tilted down at the court (Level camera, beta, on by default; the console's Track tab can turn it off).

The actual camera: what the phone records (ultra-wide, 4K)



The virtual camera: the shot that goes out (1080p)



From the October 4 game. The orange window in the top picture is the virtual camera; the bottom picture is what it sends to the stream. The window is the one the Game tracker's rules give for this moment.

Sports: **Basketball 5v5**, **Soccer 7v7**, **Soccer 11v11** and **Hockey** (beta), each with a Fast and a Moderate pace. All four follow the same rules; each has its own settings (see *Presets*). **Solo (test)** follows a single person and is for trying the tracker out, not for games. After updating to 17.7, every phone starts once on Game, Basketball 5v5, Fast: check the sport before you get ready.

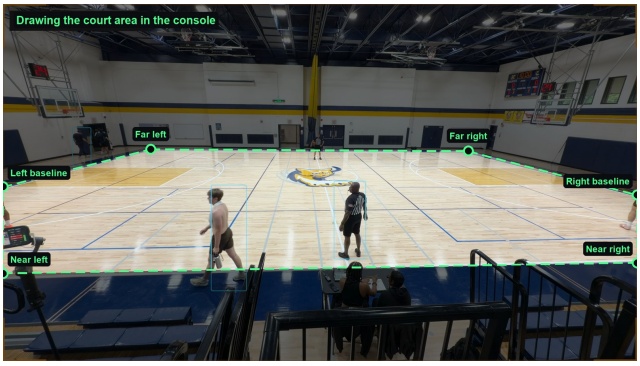
> **Remember.** Game cannot show what the ultra-wide does not see. Everything starts with where you mount the phone.

2. What you need

Item	Notes
iPhone	iPhone 14 or later, running iOS 18 or later.
smartPTZ app	smartPTZ 17.7 or later on the phone, from the App Store. Game is free: no Pro plan needed. A DockKit gimbal is optional (see *With a gimbal*).
Tripod and mount	A tripod or fixed mount, at or near half court, as high as you can safely get it. Height matters more than anything else: players on the far side must not hide behind players on the near side.
Web console	Set the court area from the console: on the **Track** tab, select **Game**, then press **Game** to arm it, define the boundaries of the field or court, and Save. The four steps are listed under the mode buttons, and the one you are on lights up.

Aiming the camera

- The whole court must be in the ultra-wide picture: both baselines and the far sideline, with a little room above the far sideline for players' heads.
- Keep the phone level. A tilted horizon makes every pan look like it is going uphill.
- Expect the scorer's table and the front of the stands at the bottom of the picture when the camera is low. The court area stops them from being tracked.



Setting the court area on the October 4 camera. The green line follows the court's boundary lines; the dimmed part of the picture is ignored.

3. Setting up a game

You can do all of this from the web console, so nobody needs to touch the phone once it is mounted, or on the phone itself (see *On the phone* below).

1 **Mount and connect.** Mount the phone, open smartPTZ, and open the web console with its PTZ-ID. Check that the camera pill shows it online and that the monitor shows its picture.

2 **Choose the sport.** Open the **Track** tab and select **Game**. Under **Game settings**, pick the **Sport** and **Pace** (**Basketball 5v5 · Fast** is the default). Leave **Manual tuning** off for now. Leave **Gimbal** off for a fixed camera on a tripod (it is greyed out when no gimbal is connected; for a gimbal, see *With a gimbal* below). Check the sport now: the phone locks it once Game is armed.

3 **Arm Game.** Press **Game** once. The button turns amber (**Game · Ready**) and the phone switches to the ultra-wide lens. The court area appears on the monitor by itself: the console turns on Tracker view so you see the phone's full picture, with six green points on the edges of the picture (full screen). Check that the whole court is in view; re-aim the tripod if not. The amber message names the sport and pace; if it is wrong, press **Change sport**, which cancels Game so you can pick another.

4 **Place the six points** on the edge of the playing area (see the picture under *Aiming the camera*). From half court the baselines run off the sides of the picture before they reach the near sideline, which is why there are six:
   - *Far left* and *Far right*: the far corners, where each baseline meets the far sideline.
   - *Left baseline* and *Right baseline*: where each baseline leaves the side of the picture.
   - *Near left* and *Near right*: the near sideline, at each side of the picture.

   Put the near edge **on** the near sideline, not below it: the bench and the scorer's table should be outside. If a baseline reaches the near sideline inside the picture (a camera further back), put its baseline point on that corner. Then press **Save court area**. To skip it, press **Cancel**: the whole picture counts, so everyone in it is tracked.
   Soccer: the same six points, named for the field: the far corners, where each *goal line* leaves the side of the picture, and the near *touchline*. When the whole field does not fit in the ultra-wide, the goal-line points sit on the picture's edges. Put the far edge right on the far touchline: spectators stand just behind it.

5 **Save.** Press **Save court area**. The console turns Tracker view back off (if it turned it on) and waits for the phone to confirm. The amber Ready message then says *Court area saved*, and the green outline appears on the phone's own screen and in Tracker view.

6 **Start.** Press **Game** again. It turns green (**Game · On**) and the virtual camera starts following play. If the court area is still open, this press saves it first, then starts once the phone confirms, so the points are never lost.

7 **Check it.** Set **View** to **Tracker** for a few seconds. You should see the green court outline, cyan boxes on the players only, and the orange window showing what the shot is. Set it back to **Program**.

Careful. Tracker view goes to **every** output: the stream, the recording and your switcher. Use it before you go live, or put this camera on Preview in your switcher first. It switches back to Program by itself after 60 seconds unless you press Pin.

On the phone

The same editor is on the phone's own screen. Tap **Game** on the phone and the six points appear over the picture (instead of the *Game Tracker Ready* message). Drag them with a finger and tap **Save**, then tap Game again to start. The bar with **?**, **Reset**, **Cancel** and **Save** runs along the top of the picture, where the lens and Game pills normally sit: those pills step aside while you edit and come back when you Save or Cancel; the Recording pill stays. While Game is armed, the green **Court** button at the bottom left opens the editor again.

Every time Game is armed, the points start on the edges of the picture. The **Edit court area** link (console) and the **Court** button (phone) reopen the editor before you start with what you just saved. Arming Game from the console opens the editor in the console only.

With a gimbal (Gimbal on)

On a DockKit gimbal, Game pans the camera to stay with the play, and the virtual camera frames and zooms inside the picture as usual. The court then moves through the picture as the gimbal turns, so its boundaries are not drawn on the live picture: the gimbal scans the whole court once, and you draw the boundaries on the scan. Court scan is in beta.

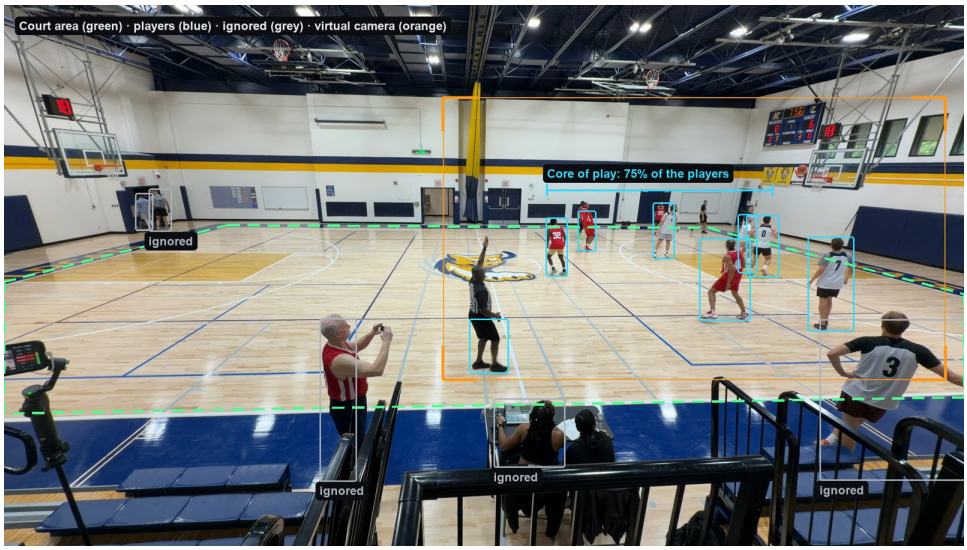
1. **Mount and turn Gimbal on.** Put the phone on the gimbal at half court, as high as you can, and check the console shows the gimbal connected. On the **Track** tab, select **Game** and turn **Gimbal** on. The switch is greyed out until a gimbal is connected.
2. **Scan the court.** Under **1 · Scan the court**, aim the camera at centre court and click **Scan court**. The gimbal pans smoothly from 60° left to 60° right (about 10 seconds) and comes back, and the phone builds one picture of the whole court. Don't touch the phone or the gimbal; the console shows the progress, and the picture appears in about a minute.
3. **Set the boundaries.** Under **2 · Set the boundaries**, click **Draw court**. Drag the six points to the edges of the playing area on the scan, the same way as for a fixed camera (the near corners are in this picture too), and Save. A dashed green outline shows the saved court on the scan.
4. **Arm and start.** Press **Game**: it turns amber and the gimbal turns to the centre of the court. Press **Game** again to start. The gimbal mostly holds still. It turns only when the players have stayed near one side of the picture (the outer fifth) for about 4 seconds, then pans slowly, about 3° a second, and the shot keeps following play while it turns. It turns at most once every 15 seconds. With the gimbal the shot stays wide: at least 90% of the picture while play is mid-court, 75% once play is in an end. It glides back to the centre when the players leave or Game is switched off.
5. **Check it.** Pan a little and look at Tracker view: the green outline (marked *Court from scan*) should stay on the court lines as the gimbal turns.

Remember. Scan again whenever the tripod or the gimbal has moved. If the gimbal is disconnected, Game runs as a fixed camera with the court area drawn on the live picture.

4. The rules the Game tracker follows

The tracker looks at the picture ten times a second. Each time, it decides who the players are, where the play is, and how the shot should move. These are the rules, in that order.

How the tracker sees a moment of play



The rules on one frame of the October 4 game. Inside the court area (green), the players (blue) count; the spectator on the bleachers, the player on the sideline, the scorer's table and the people by the door are ignored (grey). The core of play is the narrowest stretch holding 75% of the players, and the virtual camera (orange) is built around it, its bottom edge kept above the near sideline.

Who counts as a player

Rule	What it means
Inside the court area	A person counts only if their feet (the bottom of their box) are inside the court area, or just outside its edge. The allowance grows with distance like everything else in the picture: a few pixels along the far sideline, a short step at the near sideline. People standing behind the baselines or along the far wall are ignored.
Not cut off at the bottom	Anyone cut off by the bottom edge of the picture is in front of the court, not on it.
Not too big	Anyone taller than 45% of the picture, or more than 1.8 times the height of a typical player, is standing near the camera, not playing.
Short gaps are bridged	A player the detector misses for a moment is kept at their last position for up to 1 second, so the shot does not jump when someone is briefly hidden.

What the shot is built around

Rule	What it means
The core of play	The shot is built around the narrowest left-to-right stretch of the court that holds 75% of the players (60% for Soccer 11v11, where 22 players spread over a full field; 70% for Hockey, where the goalies stay at the ends). A trailing referee, a defender hanging back, or a couple of stragglers do not hold the shot wide.
Aim at the middle player	The shot aims at the median player of that core group, not the middle of the extremes, so one runner does not drag the shot with them.
How tight	The group fills a set share of the shot's width (see Tightness, below), with a little margin around it. The shot never zooms closer than about 1.7× (2× for Solo).
Headroom	The shot reaches from just below the nearest players' feet to well above their heads: in basketball, above the backboard, so the rim and board stay in near the basket; in soccer, room for a high ball. Measured on the players themselves, so it holds at any distance.
Feet in, but not the table	Once zoomed in, the bottom of the shot never drops much below the near sideline, so the scorer's table and the stands stay out of the shot.

How the shot moves

Rule	What it means
Small shifts are ignored	A soft dead zone (15% of the shot's width) around the aim point: small movements of the group do not move the shot. The pull grows gradually as play moves further, so there is no stop-start at a hard line.
No ping-pong	Once the shot is moving one way, play must pull the other way for just over half a second (0.6 s) before it turns round.
Fast breaks override	When play moves across the court quickly for at least 0.4 seconds, the dead zone and that hold are dropped, and the shot moves faster to keep up. Play standing still is never a fast break.
Catch-up	When the aim is a quarter of the shot's width from its centre, the shot moves at fast-break speed without waiting for a fast break.
Stays at one end	Once play is in one half, the shot stays on that side, leaning a little toward that basket, until play is clearly in the other half for half a second.
Play standing still	When play stops with the shot wider than it needs (a free throw), it tightens to the players within about 3 seconds.
Zoom only on lasting change	The shot only re-zooms when the size it wants changes by 20% or more and stays changed for 2 seconds. Then it eases there slowly.
Eased motion	Every pan and zoom speeds up and slows down smoothly, with a speed limit, so there are no hard starts, stops or overshoots.

When nobody is visible

- For a short drop-out the shot keeps drifting the way it was going for up to 1 second.
- After that it holds still. If nobody has been seen for 5 seconds (a timeout, a break), it eases back to the full wide shot and picks play up again as soon as players reappear.

5. Manual adjustments

With **Manual tuning** off, the sport and pace pick the settings for you (the sliders show them, greyed out). Turn **Manual tuning** on to move the sliders yourself. Changes take effect immediately, even while Game is running.

Presets

Sport and pace	Tightness	Lead	Smoothness
Basketball 5v5 · Fast	65	30	70
Basketball 5v5 · Moderate	60	25	80
Soccer 7v7 · Fast	55	35	65
Soccer 7v7 · Moderate	50	30	75
Soccer 11v11 · Fast	45	40	70
Soccer 11v11 · Moderate	40	35	80
Hockey · Fast	55	25	55
Hockey · Moderate	50	20	65
Solo (test)	60	30	55

Tip. Change one slider at a time, by about 10, and watch at least one full possession before changing anything else.

Tightness: how close the shot is

Tightness sets how much of the shot's width the core group fills: from about 35% at 0 (lots of room around the players) to about 77% at 100 (players fill most of the shot). The shot never gets closer than about 1.7×, so on a small group the highest settings stop making a difference.

- **Raise it** if the shot feels loose: players look small and there is a lot of empty floor.
- **Lower it** if players at the edge of the play keep getting cut off, or the shot feels cramped.

Lead: how far ahead of the play the shot aims

Lead aims the shot ahead of where the group is moving, by up to about one second of their movement at 100 (half a second for Solo). At 0 the shot aims exactly at the group.

- **Raise it** if the shot arrives late on fast breaks and the ball-handler is at the edge of the frame.
- **Lower it** if the shot overshoots and swings back on turnovers. Youth games usually want less lead.

Smoothness: how heavy the camera feels

Smoothness sets how quickly the shot reacts and how fast it is allowed to pan. More smoothness looks calm and broadcast-like but reacts later; less looks alert but can feel twitchy on a busy floor. Fast breaks always get a higher speed limit, whatever the setting.

- **Raise it** if the shot wanders or twitches when nothing much is happening.

- **Lower it** if the shot is consistently behind the play when possession changes.

More Game switches

Switch	What it does
Ball assist (beta)	Basketball only, off by default (Track tab, or Settings □ AI Tracking on the phone). The phone also looks for the ball. The players still set the shot; the ball steers it, so the shot leans toward the ball. Balls off the court (a coach, the bench) are ignored, and when the ball is lost the shot simply frames the players. It takes effect the next time Game starts.
Game frame rate (beta)	Camera tab: 30 or 60 fps for the ultra-wide while Game is Ready or On, if the phone supports it. It can't change while streaming or recording, and takes effect the next time Game gets ready.
Record full camera (testing)	While Game runs, the phone also records the whole camera picture beside the normal recording and saves it to Photos when tracking stops. About 7 GB an hour, and the phone works harder; it stops by itself if it falls behind. Leave it off for real games.

Lending a phone as a camera? On the phone, Settings □ App □ **Share this phone** walks you through Guided Access, so whoever holds it can only use smartPTZ, and can lock smartPTZ Settings too.

6. Troubleshooting

What you see	Likely cause	What to do
Game does not start, or stops, when recording at 4K	At 4K the phone records on the wide lens only, and tracking is off.	Set Record to 1080p or 720p on the console's Output tab to use Game.
The shot keeps including the bench, the stands or the scorer's table	No court area, or its near edge is drawn below the near sideline.	Arm Game again and adjust the court area so the near edge sits on the near sideline and the baseline points sit on the baselines. Check in Tracker view that those people have no cyan box.
The shot stays wide most of the time	Play is spread out; Tightness is low; or people outside the court are being counted.	Check the court area first. Then raise Tightness by 10.
The shot is late changing ends	Smoothness is high or Lead is low for this pace of game.	Lower Smoothness by 10, or raise Lead by 10. Try the Fast pace preset.
The shot overshoots, then swings back	Lead is too high.	Lower Lead by 10.
Recording drops frames, or the phone is overloaded, with Record full camera on	Recording the whole camera picture as well is a lot of work for the phone.	Turn Record full camera off on the Track tab.
The shot zooms on the referee	The referee is the only person inside the core of play (for example during a stoppage).	Known limitation. It recovers when play restarts.
Console says *Phone overloaded · dropping frames*	The phone is doing too much at once (4K capture, tracking, encoding, streaming and recording).	Plug the phone in, keep it cool and out of the sun, lower the stream bitrate, and keep Tracker view off during play. A struggling phone checks the picture less often, so the shot reacts later.
The court area does not come up when Game is armed	The phone is offline, or the console's preview is not Direct or Bridge.	The amber Ready message says which. Set More □ Preview to Direct or Bridge, then press Game off and on again.
The console says the phone didn't confirm	The phone's smartPTZ is older than 17.7.	Update smartPTZ from the App Store.
Players under a basket on the near side are ignored	A baseline point is too high and cuts off the corner of the court.	Arm Game again and move the baseline point down to where that baseline leaves the picture.

What you see	Likely cause	What to do
The court outline is in the wrong place	The tripod moved after the area was drawn.	Arm Game again and move the points to the court lines. With Gimbal on, scan the court again and redraw it on the new scan.
The Gimbal switch is greyed out	No gimbal is connected, or Game is armed.	Put the phone on the gimbal and check the console shows it connected. Press Game off to change it.
With Gimbal on, the court area does not open on the monitor	With the gimbal, the boundaries are set on the court scan, not on the live picture.	Use **1 · Scan the court** and **2 · Set the boundaries** on the Track tab, or turn Gimbal off.

Quick reference

- **Before the game:** mount high at half court, choose sport and pace, press Game once, adjust the court area and Save, press Game again, check Tracker view, back to Program.
- **With a gimbal:** turn Gimbal on, scan the court, draw the court on the scan, then press Game twice. The gimbal turns rarely and slowly; the shot stays wide.
- **Who is followed:** people with their feet inside the court area; the shot is built around the 75% of them that are closest together.
- **Too loose:** Tightness up. **Late:** Lead up or Smoothness down. **Twitchy:** Smoothness up. **Overshoots:** Lead down.