

SkyTrak : The Drilldown

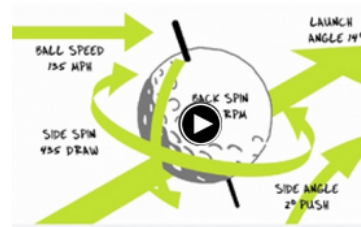
If you're looking for a concise and brief overview of SkyTrak, what it is, how it works and what all the data elements indicate, then please watch our educational video series which explains all of the main points of the SkyTrak system.



What is SkyTrak?



The Technology Behind SkyTrak



What Does All This Data Mean?

However, if you have watched the videos and are craving more details, then this is the place where we will address many of the key questions you may have about SkyTrak.

What is SkyTrak?

The SkyTrak Personal Launch Monitor is a complete Practice, Play and Entertainment System designed for golfer's use at home or away from the course. At its core, SkyTrak is powered by a revolutionary breakthrough in launch monitor technology that provides commercial accuracy and reliability in measuring ball flight data, but at a consumer affordable price.

What is launch monitor technology and is it new?

Technology powering expensive commercial launch monitor systems has been around the professional golf community for years. The primary purpose of a launch monitor is to measure the behavior of the golf ball upon impact and provide immediate feedback for use in club fitting, instruction and golf simulation. The systems that perform this function well and provide reliable information are very expensive and can cost as much as \$25,000. While there



SkyTrak Launch Monitor

are a few products in the market that cost around \$500, those do not capture all the information needed to provide a true simulation of your actual ball flight and results.

How is SkyTrak different from other launch monitors?

Well let's start with the two main types of ball tracking systems used commercially — Doppler and Photometric.

Both types of commercial systems are very good, yet they use two very different methods to achieve their results. To put it very simply – A Doppler system, as you may envision radar working, tracks how your ball flies and where it lands, and then calculates why it went there. On the other hand, a Photometric system measures what the ball is doing immediately after impact with high speed cameras, and then calculates or project it's flight path and distance using very sophisticated algorithms.

SkyTrak uses the photometric approach for reasons we will discuss on more detail.

Which technology is better, Doppler or Photometric?

Both designs have their strengths, but for consumer use, we believe Photometric systems are more versatile allowing for use both indoor and outdoor, plus they require less space. As far as performance, both types provide quality results and overall accuracy. Using a Doppler system indoors, however, is often problematic because to obtain accurate information, a larger space must be used to allow enough ball flight before the ball impacts a net or screen. This is an important distinction and critical to the question of accuracy and reliability of the data you see on your screen. But, in summary, if space and budget are not considerations, either of these commercial alternatives produce highly accurate and reliable results. This accuracy and reliability comes at a very expensive price, however.

Other than commercial systems, what else is out there?

In addition to these tried and proven commercial quality systems, two types of alternative products are sold to consumers.

While not technically considered a “launch monitor” and certainly not used by professionals, there is a consumer system that utilizes a LED, or infrared light curtain to gather club data. Lower-end systems and even some high-end golf simulators use this technology for one simple reason – it’s considerably less expensive. But what exactly is it measuring? With most of these systems, as your club head breaks the infrared curtain of light, it tries to measure variables of the club head such as club speed, face angle, and swing path to project ball flight. However, since nothing about the ball is actually measured, important factors such as the golf ball’s speed and spin rates are calculated, often resulting in inaccurate projections of distance and shot shape. The fact that you don’t even need to hit a golf ball lends itself to potential inaccuracies as to what exactly happened to that golf ball after impact. Most golfers, including high and low handicappers, will quickly learn that there is little value to this data and actually can become frustrated when the ball flight is not representative of what they see on a range or golf course.

The other type of system offered in the consumer category is a low-cost Doppler/radar device that, in all actuality, is more of a speed gun. Unlike the higher-end systems, these devices are incapable of consistently providing an accurate flight model. This type of system does not measure or calculate spin axis/side spin or side angle, and therefore cannot determine ball flight or shot shape - it merely projects a distance value based upon club head and/or ball speed. As a result, such systems are very limited in the type of data they can provide, and thus the number of applications they are suited for are also limited.

In short, these alternative consumer technologies offer low-cost methods to provide some launch data and/or simulation of ball flight, but is it really your ball flight? Is it really your launch data? Will it make you a better golfer? If you cannot answer ‘Yes’ to all of these questions, then you may just have a toy made for entertainment, opposed to a serious tool designed to help you improve your game and be entertained.

OK, now tell more about where SkyTrak fits in?

As a personal launch monitor, SkyTrak is suited for almost any application that a commercial quality launch monitor can be used for, and maybe more. SkyTrak enables you to have your own practice range, hit at simulated targets, play challenges, participate in games and enjoy your practice time much more than ever before.

SkyTrak is a Photometric, or camera-based system, similar to commercial systems of this type that take high-speed pictures of the golf ball right after impact. One big advantage is that it works very well indoors in limited space and can be used outdoors, too, because we only have to measure the first few inches of ball flight to gather sufficient data to accurately model your ball flight. These first few inches are not as vulnerable to current conditions, such as wind, impacting your results. And even more important, SkyTrak measures EXACTLY what the ball is doing, because when projecting ball flight and shot shape this is much more important than just having club head data. By measuring the golf ball's behavior, we can not only accurately project the ball's flight path and distance, but we make sure you have the accurate feedback required for productive practice.

Also, SkyTrak has been designed with the consumer in mind. It has its own rechargeable battery, serves as its own WiFi hotspot so it can operate with no wires, power cables or other tethering. Weighing less than two pounds and less than 7 inches tall, it is totally portable so you can take it anywhere. And it is so simple to use. Just put it on a mat (preferred) or the ground in a level place, open the app and you are hitting balls in less than a minute. But, the most important difference in SkyTrak is its revolutionary technology to provide the accuracy and reliability of a commercial quality system, **at a fraction of the price**, so the time you invest in games and practice at home, will result in seeing the same improvements on the course.

What else should I know about a Photometric system?

Photometric systems require the placement of the golf ball on the hitting mat within a certain defined area. SkyTrak makes this easy by providing a laser dot to indicate the precise placement in order to capture high-quality images with accuracy and consistency. Also, while it's not required, if your ball has a distinguishable mark (such as a logo) facing toward SkyTrak, this will boost the system's ability to detect and measure spin accurately.



Photometric Capture Area

The images captured in the first few inches after impact are used to measure all of the ball flight parameters necessary to feed the ball flight model so you see your real shot shape and carry distance for practice and play. SkyTrak also allows the inputting of certain variables and environmental factors like weather and course conditions.

How do we know that SkyTrak is accurate?

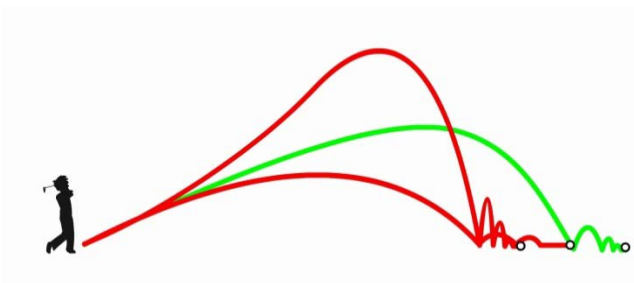
You may wonder how we test and confirm SkyTrak's accuracy and overall performance. SkyTrak has performed robot testing at Golf Laboratories, the golf industry's #1 independent testing facility. Using a variety of shot types, ball speeds, and golf clubs, the measured results were virtually indistinguishable from the leading commercial launch monitors in the industry across the 5 most important parameters – ball speed, launch angle, back spin, side spin/spin axis, and side angle.



Robot Hit Testing at Golf Laboratories

With over 10+ years of usage, the SkyTrak ball flight model has been tested thoroughly with robot and human hit testing for measured carry/total and offline distances. Unlike some professional-grade launch monitors, SkyTrak's ball flight simulations are not affected by atmospheric conditions like wind, humidity, etc. (unless you turn these on in the session settings).

What is a “flight model” and why is it important?



The SkyTrak system is powered by a sophisticated and time-proven ball flight model. This proprietary flight model is the engine that takes all the ball flight parameters and calculates an accurate flight path. While SkyTrak is a new product, the flight model we use is not. We have been refining and improving our proprietary flight model for more than a decade. Our flight model has been used for over a decade in a professional-grade launch monitor and benefits from years of usage and testing to confirm its accuracy.

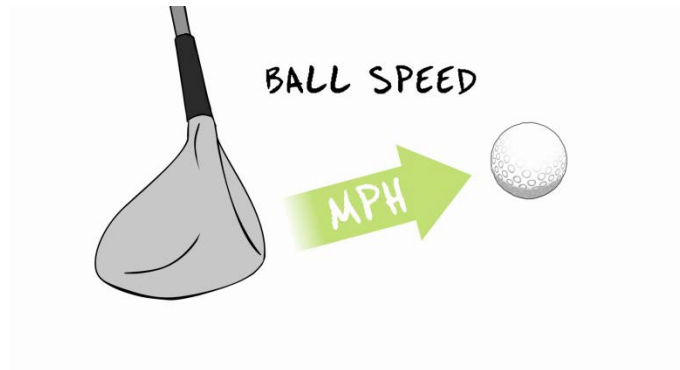
What data parameters does SkyTrak measure? Why?

Our primary goal for SkyTrak is to provide the core set of data that you need to improve while providing a superior experience and level of entertainment. Many systems take the approach of providing every possible shot parameter whether it's usable or not. We pared down the long list of captured data and present every shot with only the data you need to measure your performance. Without subjecting you to data-overload, knowing your numbers is crucial to game improvement. But, if you just don't care about numbers, these key parameters and more have to be measured and captured accurately, to feed the ball flight model so you see your real shot shape and carry distance for practice and play.



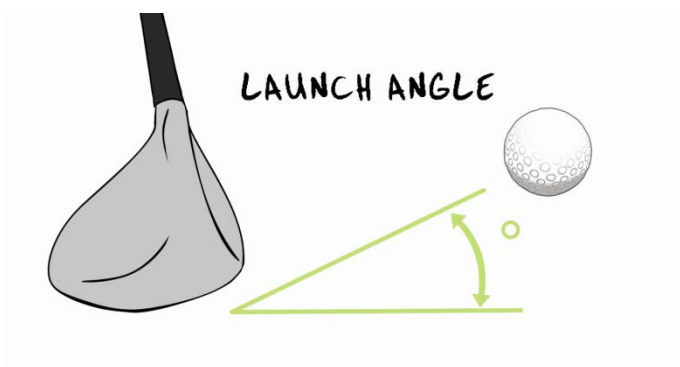
Numeric Data Screen

Here are the important parameters:



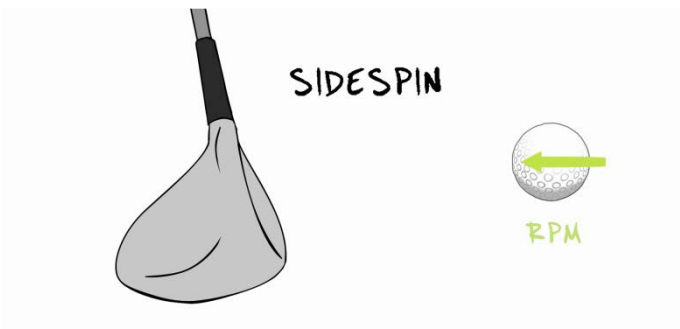
Ball Speed

Probably the most important element is ball speed. It has the greatest effect on total distance out of all the data collected. Ball Speed is affected by club head speed, the impact position on the club face and any rebound of the ball. This is an easy one because basically the higher the speed the longer the distance potential.



Launch Angle

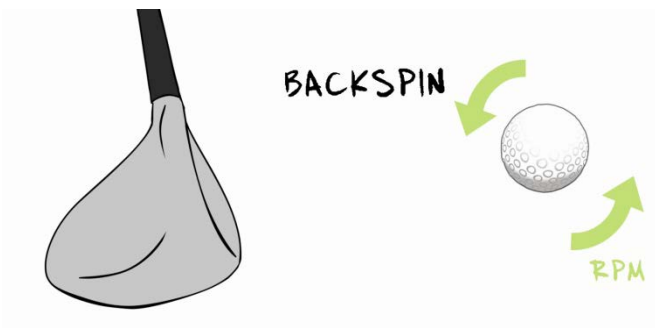
The launch angle measures the vertical angle of the golf ball in relation to the ground as it leaves your club. It has the greatest impact on how high the ball flies. With higher launch angles, you see higher shots. Ideally, your shot will follow an optimal launch angle which means they are not too high or too low.



Side Spin

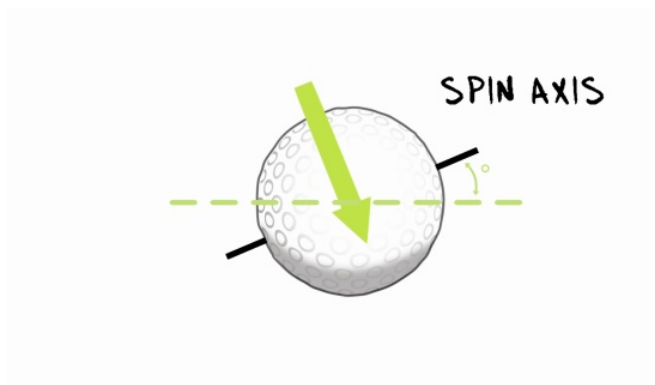
Another key element is side spin. You can think of this as the horizontal rotation of the ball in relation to the ground as it leaves your club. Why is it important? It's the determining factor for what type of shot you hit. Whether it was straight, hook, draw,

fade or slice. You want to see low side spin so your ball flies straighter. We use a formula to extract a side spin number from spin axis so that it is easier to understand. The larger the number, the more curve the ball had. A negative number means the ball curved left and a positive result means it curved right.



Back Spin

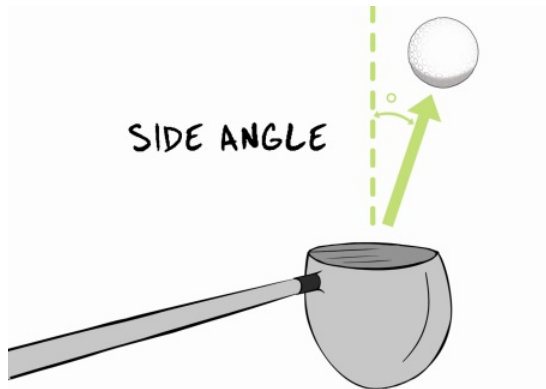
Back spin measures the vertical rotation of the ball in relation to the ground as it leaves the club face. It has the greatest effect on ball flight efficiency and is helpful for play under windy conditions. You can control the height of the shot with back spin, the more back spin the higher the ball flies.



Spin Axis

Related to back and side spin is the spin axis which represents a horizontal or vertical line through the middle of the golf ball. If spin axis is zero, then the ball flies in a straight line. If the spin axis is tilted left or right, then the ball flies along a curved path to the left or right. The idea here is to keep the club path and face heading in the same direction

through impact, with the resulting spin axis remaining as close to zero as possible.



Side Angle

SkyTrak measures side angle as well. Side angle is the direction the ball travels in relation to the target line as the ball is leaving the club face. How does it work? Too much side angle causes the ball to start further offline to the target. With less side angle and less side spin, the ball will travel straighter to the intended target.

Why is SkyTrak an important tool for improving your game?

There are many reasons that owning a realistic practice and play system will help you develop and improve. The primary reason for having SkyTrak in your arsenal is that it helps you practice the right things the right way.

Quality practice in a convenient, mobile setup

Many golfers are setup to fail by practicing the wrong mechanics over and over. With the immediate and detailed feedback you get on the core measurement parameters you'll know whether you're doing it right or wrong and can make adjustments to improve both performance and consistency.

Entertaining and fun

While our primary focus is helping golfers improve, why not make improvement fun and entertaining at the same time? With a powerful, intuitive, and graphically appealing user interface and graphics, SkyTrak provides a superior simulation environment that animates ball flight so you can see your improvement. With challenges and games, you will learn how to make the ball do what you want it to do, even if you don't realize you are learning. Over time, by playing games and challenges, your shot making skills will improve on the golf course.

History

You'll be able to see your performance improve over time with the history and trends from each and every practice session. Seeing and tracking your progress is the best way to get an accurate gauge of your overall improvement and also great incentive to keep practicing.

Learning new shots

There are golfers and then there are shot makers. Do you find yourself struggling with a particular situation on the course? Do you see a shot that a more experience golfer makes and want to learn how to do it? With SkyTrak you can work on these shots in the privacy of your home, so the next time you try that shot live on the course, you're ready and more confident.

Can I use SkyTrak with any tablet?

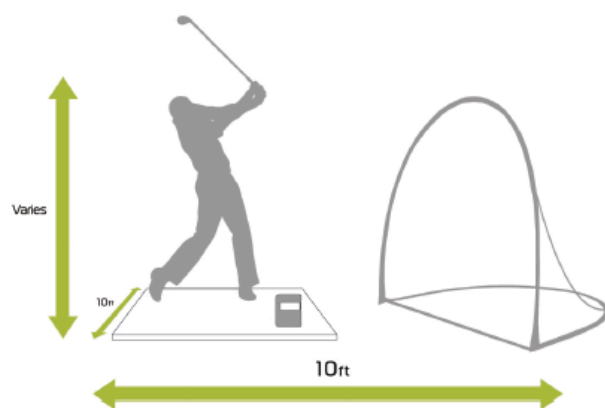
At the moment, you must have an iPad Air to use SkyTrak. Our team is working to make the system available for Android and PC users. We will make announcements for availability and approximate timeframes when we know them.

Can I use it anywhere, indoor and outdoor?

As long as there is enough room to safely swing a golf club, you have enough room to use the SkyTrak system. Suggested indoor dimensions are a minimum of 10' wide x 10' deep with a variable height, depending on your physical height and length of your club.

Minimum Unobstructed Area Dimensions

- Ceiling height: Safe ceiling height varies and depends on your physical height and the length of your club.
- Length: 10 feet (3,35m)
- Width: 10 feet (3,35m)



CAUTION: Always use a safety net and a hitting mat specifically designed for golf if the hitting area or the ball flight area is restricted such as indoors or in the back yard of a residence.

SkyTrak is completely portable and can be used both indoors and outdoors on a mat. If you're using the system indoors, then you'll need to use a hitting net. The system has an internal battery providing over 4 hours of use when fully charged and wirelessly connects to your iPad. Outdoor performance may vary in certain lighting conditions. Avoid the sun shining or reflecting directly into the lens of the SkyTrak device.



You should use new, or relatively new, quality distance, performance, or Tour type golf balls in good clean condition. The type and condition of the ball you use will affect ball flight data, most noticeably ball speed and spin. Ball imperfections, mud, excessive markings, cut covers, and/or otherwise identifiable markings on the ball, etc. can affect SkyTrak's dimple recognition capability, making ball data difficult to analyze.

How does it work with no connection?

You may find yourself in a place that doesn't offer a WIFI connection. Will SkyTrak still work? Yes, SkyTrak will connect to your iPad directly and continue to send all the data through from your practice session. Then the next time you connect to a WIFI network, the data will be synced to your history. This feature provides you with the convenience to practice anywhere without worrying about having access to the internet.



Can I use SkyTrak with an existing golf simulator?

We are actively working with potential partners to integrate their system with SkyTrak. While we are not yet ready to make announcements, we will keep everyone posted on our progress.