AN INTRODUCTION TO UNDERSTANDING BALL LAUNCH & CLUB DATA
This guide is designed to provide a foundational understanding of the ball launch and club performance data measured by Foresight Sports' GC2 Smart Camera System and HMT Head Measurement Technology. A basic description of how these conditions impact ball flight performance has also been included, as well as reference guides for determining optimal ball launch conditions.

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Introduction to Ball Launch Data

Foresight Sports’ GC2 Smart Camera System uses high-speed, high-resolution cameras to capture ball launch conditions with a high degree of accuracy.

Introduction to Launch Condition

The launch condition is described by a combination of the following measured ball launch parameters –

- Ball Speed
- Total Spin
- Launch Angle
- Azimuth
- Spin Tilt Axis

The combination of these measured launch characteristics will determine the ball trajectory, peak height, decent angle, carry and total distance.

The following pages will describe each of these measured ball launch parameters and calculated ball flight parameters.
BALL SPEED
The measurement of the golf ball's velocity measured just after impact. Ball speed is the main component in generating distance.

LAUNCH ANGLE
The initial vertical angle of ascent relative to the ground plane measured in degrees. The launch angle, combined with ball spin and speed, will determine the ball carry and total distance.

AZIMUTH
(Also known as side angle or deviation angle)
The initial horizontal angle relative to the target line. The azimuth, combined with side spin, will determine the final ball position down range relative to the target-line.

SIDESPIN
A component of total spin that defines ball curvature or shot shape. Also related to the spin-tilt axis.

BACK SPIN
A component of total spin that defines ball lift and trajectory.

TOTAL SPIN
The total amount of spin around the tilt axis that creates curvature and lift.
**SPIN-TILT AXIS**

The Spin-Tilt Axis is the axis that the golf ball rotates around to create shot curvature and lift.

When the spin-tilt axis is oriented to the left (looking down range), the ball’s trajectory will move from right to left. [See example 1]

When the spin-tilt axis is oriented to the right (looking down range), the ball’s trajectory will move from left to right. [See example 2]
**PEAK HEIGHT**
The apex of the trajectory measured from the ground plane.

**OFFLINE**
The end position distance right or left measured from the target-line.

**CARRY**
The total distance of flight produced by initial launch condition.

**TOTAL DISTANCE**
The combined ball flight with bounce and roll.

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### Optimized Launch Data

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## Ball Launch Table

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Introduction to Club Head Data

As with the GC2 Smart Camera System, Foresight Sports’ HMT Head Measurement Technology uses high-speed, high-resolution cameras to capture club head information with a high degree of accuracy.

This portion of the reference guide provides a basic description of the club head conditions that are measured by the HMT Head Measurement Technology.

Introduction to Head Measurement

Head Measurement is the measurement of the delivery of the club head described by path, face plane, velocity and impact location of the golf ball.

The following pages will briefly describe each of these measured parameters.
**CLUB SPEED**
The velocity that the club head travels measured just prior to ball contact.

**ANGLE OF ATTACK**
The descending or ascending path of the club-head measured in degrees.

**EFFICIENCY**
The ratio between club head and golf ball velocities to determine the quality of the ball strike.

Described as ball speed divided by head speed = ratio, efficiency or smash factor.

**CLUB PATH**
The swing path measured in a horizontal plane relative to the target-line.
**FACE ANGLE**
The dynamic measurement (in degrees) of the club head’s face plane position at a right angle 90 degrees perpendicular relative to the target line or swing path. Also known as yaw.

**FACE TO TARGET**
The face angle relative to the target-line at impact.

**FACE TO PATH**
The face angle relative to the club path. The main components in generating side angle and the curvature of the golf ball.

**LIE**
The dynamic measurement in degrees of the club head’s face plane position horizontally relative to the ground plane. Also known as roll.
**LOFT**
The dynamic measurement in degrees of the club head’s face plane position vertically relative to the ground plane. Also known as pitch.

**CLOSURE RATE**
The rotation of the club head heel to toe measured about the shaft in degrees per second or rpm.

**IMPACT LOCATION**
The measurement (in millimeters) of the contact point of the golf ball on the club face relative to face center.
**F-AXIS**
The perpendicular axis measured relative to the directional path that the golf ball rolls or slides up the club face.

In a typical shot where ball impact is centered on the club, the F-Axis and Spin-Tilt Axis should coincide.
Get the App

Foresight Sports’ Performance Fitting App delivers the ball launch, ball flight and club head analysis data explained in this tutorial to your iPad™ or Android tablet in real time. Connected to your GC2a via Bluetooth, the Performance Fitting app provides intuitive, fully-illustrated depictions of ball flight and club head data insure easy analysis of each and every shot. And when your fitting session is done, your data can be emailed directly to you or your customer.

Foresight Sports’ Performance Fitting App is available now online at the Apple Store and Android Market.

Questions?

We’re here to help. For product related issues or questions, please contact our customer support team at 858.880.0179 or online at support@foresightsports.com