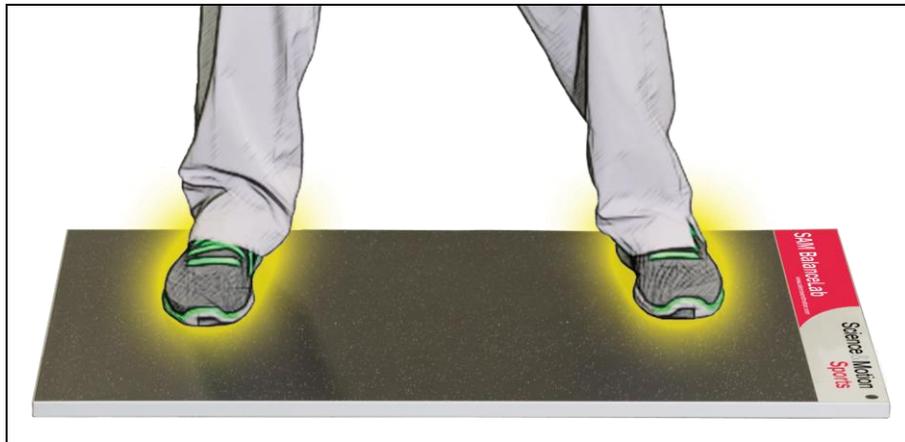


# Science & Motion Sports

## SAM BalanceLab 3 *Pro Edition* *Ultimate Edition* New Features



### Table of Content

New features of BalanceLab 3 .....	2
1. Automatic feet detection .....	3
2. New Performance Parameters for Setup, Power and Control .....	4
3. New data curves .....	5
4. Club selection (club type now can be saved to all recordings) .....	6
5. Improved camera interface for video recording.....	7
6. Automatic hit detection by audio trigger (microphone) or by connection with launch monitor.....	8
7. Improved setting of "Split Position" for feet separation .	9
8. System requirements (please read before installing)....	10

## New features of BalanceLab 3

BalanceLab version 3 includes a lot of new features.

The main differences to the previous version BalanceLab 2 are listed in this chapter to give a quick overview.

The BalanceLab 3 software now has two different editions, Pro and Ultimate. New features that are only available in the Ultimate edition are marked with a colored tag in the following descriptions:

**ULTIMATE**

To learn more about the new features please read through this document.

The table on the right shows a quick overview which of the features are included in the two product editions.

Feature	Product Edition	
	PRO	ULTIMATE
Club type selection	✓	✓
Automatic hit detection Microphone is provided	✓	✓
Impact detection and automatic data crop	✓	✓
Extended Reports	✗	✓
Improved camera interface	✓	✓
Performance Parameters	✗	✓
Extended data curves	✗	✓
Automatic feet detection and stance analysis	✗	✓
Surface protection turf	✗	✓
Launch Monitor Integration Trackman/Flightscope/Foresight	✗	✓

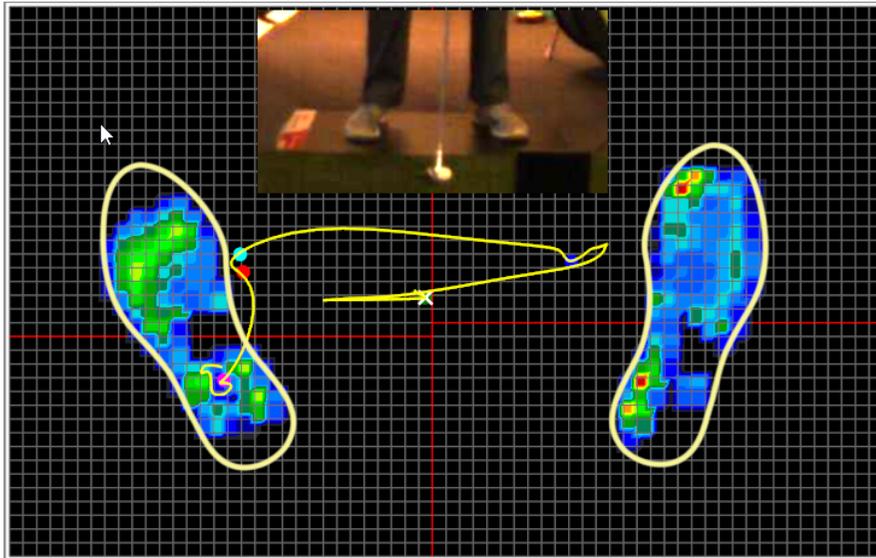
## 1. Automatic feet detection ULTIMATE EDITION

Another new feature in BalanceLab 3 is the automatic feet detection.

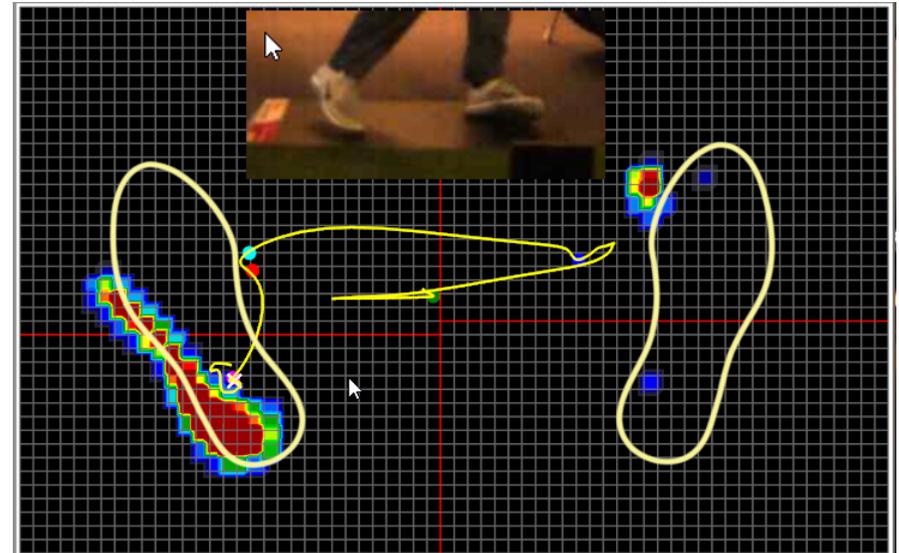
In setup position or during a stable phase when the player stands on the plate without moving, the position of the feet will be detected and stored.

Based on this setup position the software can display the feet in the graphics and the user is able to see what changes appear in foot position during the swing.

### Examples:



*Foot positions in player setup*



*Foot positions in "follow through"*

Additionally the alignment of each foot, the stance direction and the stance angle will be analyzed and displayed in the *Performance Parameter* view:

Setup			
FOOT LEFT	FOOT RIGHT	STANCE WIDTH	STANCE ANGLE
-24.1	13.4	50.8	3.3 open
deg	deg	cm	deg

As additional advantage the separation lines (split position) will be set automatically in the feet detection process.

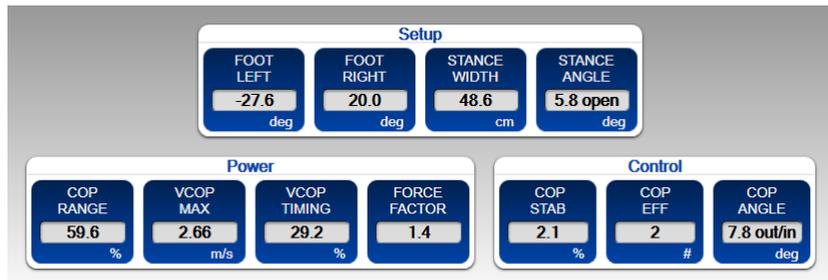
No need to set this lines manually any more.

## 2. New Performance Parameters for Setup, Power and Control ULTIMATE EDITION

Proper and timely weight transfer during the swing is an integral part of successful golf.

However analysis of ground reaction forces is often complicated as the COP patterns are very much individualized and additionally critical to timing. The SAM BalanceLab 3 Ultimate Edition now introduces innovative Performance Parameters and extended data curve diagrams to objectively analyze ground reaction forces in a golf swing.

The Performance Parameters are grouped into three functional categories for SETUP, POWER and CONTROL, and are calculated based on corresponding data curves for COP position, COP movement and Downforce.



Using the Performance Parameters in combination with the launch monitor data is a perfect tool to systematically optimize the individual weight transfer characteristics with regard to distance, ball flight and consistency.

### Brief description of parameters for POWER and CONTROL:

<b>POWER</b>	The four parameters of the category "POWER" are highly relevant to achieve maximum power of the golf swing:
<b>COP RANGE</b> 59.6 %	The range between the maximum lateral weight shift to the right and the maximum shift to the left
<b>VCOP MAX</b> 2.66 m/s	The maximum lateral COP speed in right/left direction during the downswing, which is the maximum change of lateral COP position per time.
<b>VCOP TIMING</b> 29.2 %	Time of the maximum lateral COP speed in the downswing. The timing is calculated relative to the time between TOB and Impact.
<b>FORCE FACTOR</b> 1.4	The amount of downforce at Impact relative to the reference downforce at Start.
<b>CONTROL</b>	The parameters of the category "CONTROL" are related to the grade of body movement control the player achieves during the swing:
<b>COP STAB</b> 15.2 %	COP stability in frontal direction. It shows the range between the maximum weight shift to the toes and the maximum shift to the heels
<b>COP EFF</b> 1 #	Efficiency of the lateral COP shift by counting the number of changes in direction of the lateral COP movement between Setup and Impact
<b>COP ANGLE</b> 5.8 out/in deg	The main direction of the COP movement between Start and Impact relative to target direction.

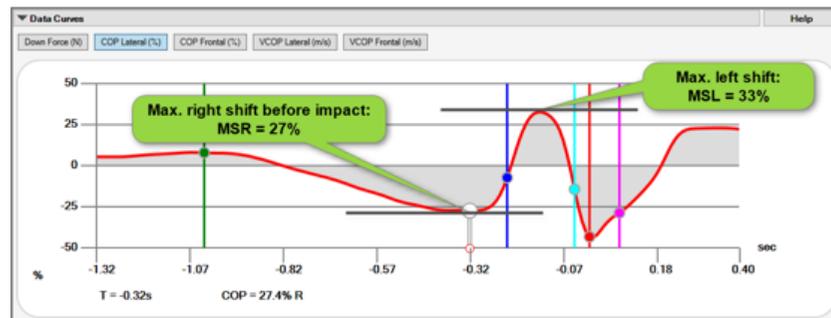
### 3. New data curves ULTIMATE EDITION

The BalanceLab 3 Ultimate Edition introduces 4 new data curves for extended analysis of player weight shift transfer during the golf swing.

Additional to the down force (pressure) of the player, the new curves also show the amount of COP position change in lateral and front/back direction and the speed of the COP movement.

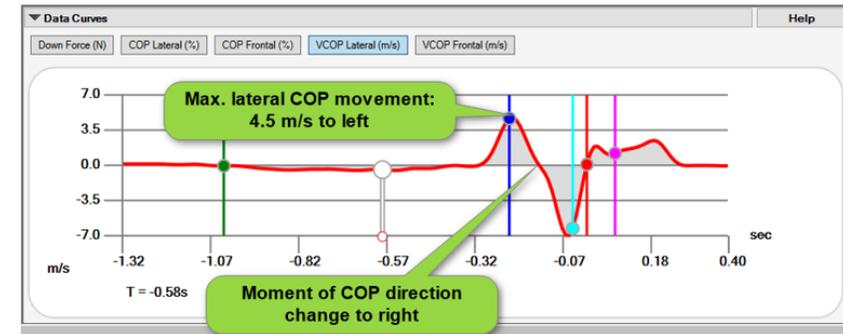
#### Examples:

##### COP position lateral



To load and unload your body and to transfer this energy to the club, a lateral weight shift is necessary. If the weight shift is too small then the corresponding golf swing lacks of power and is controlled by the upper body. A big lateral weight shift range means, that you are actively using your lower body to build up power and to accelerate the club properly.

##### COP speed lateral



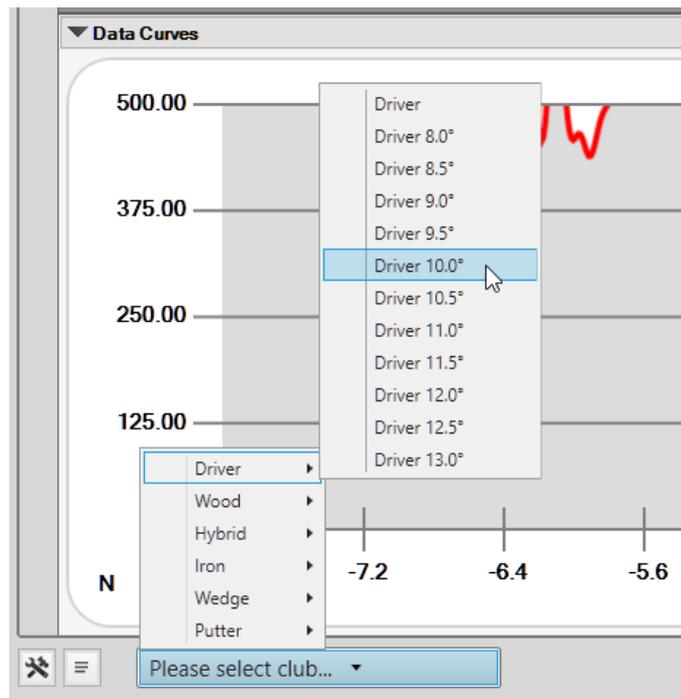
The VCOP speed curve allows to inspect the dynamic aspects of the COP movement, which is moment of activation of the COP shift, and the extent of COP movement, both critical for the activation of the kinematic chain and for creating maximum power in a swing. The higher the COP speed, the faster the COP is moving. A high lateral COP speed peak early at begin of downswing corresponds to a distinct activation of the lower body and helps players to increase their clubhead speed and thus their total distance.

#### 4. Club selection (club type now can be saved to all recordings)

Version 3 introduces a club type selection for each swing recording. The club type will be saved to the database and will be visible when the swing is in replay mode.

This is important as the balance data might be different depending on the club that is used (e.g. iron or driver).

To select a club click on the box and a menu will open with all available options:



In the Replay screen the club type is displayed at the bottom of the data selection bar on the left:



It is possible to set the club type also for recordings that are actually finished.

## 5. Improved camera interface for video recording

BalanceLab 3 has a complete new camera interface and also improved settings for many cameras.

Basically the following cameras are supported:

### **a) all cameras that provide a Windows "Direct Show" driver.**

All USB Webcams (Logitech/Philips/Microsoft) belong to the group of supported cameras.

Many other more professional cameras also provide drivers for Windows. Examples are: Basler, Allied Vision, Imaging Source and many more.

If you are unsure if your camera is supported please contact Science & Motion Sports or the camera manufacturer and ask for a Windows driver/interface.

### **b) IDS uEye camera family ([www.ids-imaging.com](http://www.ids-imaging.com))**

For these cameras the complete interface is implemented. Many very specific parameters of the camera can be adjusted, mainly this is exposure time, speed, gain, picture size.

A new feature of BalanceLab 3 are camera profiles. A camera can be configured and settings can be stored inside a specific profile.

This makes it possible to configure multiple or different cameras and then easily select one of them for the next recording is done. It is even possible to change the camera when the recording is started.

### **Examples:**

a) Different camera profiles for different conditions like sunlight or indoor lighting. Camera is configured to optimal setting for both conditions and camera can quickly be switched from one profile to the other.

b) Different cameras for front, back or side view of the player. All cameras can be configured and during a recording you can decide which view actually should be recorded.

## 6. Automatic hit detection by audio trigger (microphone) or by connection with launch monitor

The BalanceLab 3 software now supports automatic hit detection to control recordings. There are two options to achieve automatic hit detection:

- a) by sound trigger of impact (sound when ball is hit by the club will be detected by a microphone)
- b) if a launch monitor is connected to the BalanceLab software, the launch monitor will send the trigger for a detected swing



Launch Monitor plugin is needed to use this functionality. The plugin is part of the "Ultimate" edition of BalanceLab 3. For BalanceLab 3 Pro edition the plugin needs to be purchased as an upgrade

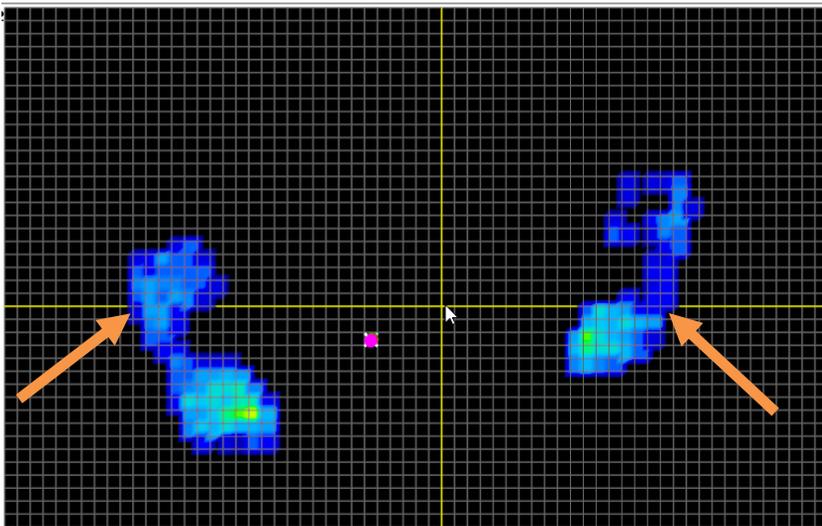
### **Advantages of swing recording with automatic hit detection:**

- No need to operate keyboard or mouse for recording of swings
- Impact event marker and optionally all other markers will automatically be set (no need to do this manually)
- Recordings will be automatic cropped to a defined length before and after impact (can be defined in settings)

## 7. Improved setting of "Split Position" for feet separation

In BalanceLab 3 the horizontal split line to separate front and back for each foot can be set to different positions for each of the feet.

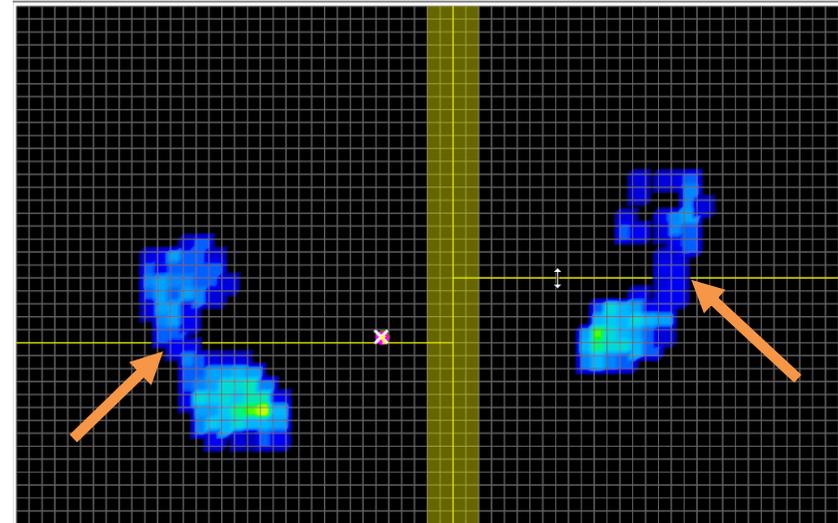
### Example for BalanceLab 2:



If the player stands on the platform with feet not in line it is impossible to set the separation line to a position where both feet are properly separated in front/back direction.

Balance results will not show the exact right numbers in this case.

### New feature for BalanceLab 3: Different vertical split position for each foot



By pressing the mouse button while over the left or right side of the platform you can set a split position for each of the feet individually. So all results generated from front/back balance of the feet will be correct.

## 8. System requirements (please read before installing)

BalanceLab 3 includes a high performance video recording engine to recording and realtime processing of video.

A highly important thing for balance data in combination with video is that both data streams are synchronized as good as technically possible. This will be achieved by frame by frame video recording. Each frame (video picture) will be synchronized with the balance data. This needs some serious CPU performance during recording.

### **Minimum system requirements:**

- CPU: i5 or i7 DUAL core CPU
- Graphics: Dedicated graphics card recommended. Latest Intel onboard graphics may be ok too. DirectX 9 or better must be installed.
- Memory: 4 GB minimum
- Harddisk: Depending on usage a minimum of 50 GB free disk space is recommended on drive C.
- Operating System: Windows 7 / 8 / 8.1 / 10 (Windows XP is not supported)

### **Recommended system requirements:**

- CPU: i5 or i7 QUAD core CPU
- Graphics: Dedicated graphics card recommended. Latest Intel onboard graphics may be ok too. DirectX 9 or better must be installed.
- Memory: 8 GB or better

- Harddisk: 100-200 GB free disk space on drive C.
- Operating System: Windows 7 / 8 / 8.1 / 10 (Windows XP is not supported)

If your system does not meet the requirements you can try to install the software and limit the camera performance. E.g. lower resolution like 640x480 pixels and lower frame rate <50 FPS.

If you search for an ideal system please look for i5 or i7 CPUs with the appendix HQ, MQ or QM.

Example: i7-3740QM / i7-3820QM