Hole in One!

A successful golfer needs to possess intelligence, farsightedness, and precision. And achieving top performance is largely dependent on finding the right swing. But technique doesn’t only come into play (alongside sharp mental focus, of course) when using the full swing with various irons and woods. Sophisticated accuracy of movement is also required for putting, chipping, pitching and bunker shots. After all, the technique-driven game of golf is among the most complex types of sport in existence. Just one example – no less than 178 muscles in the body are used during a golf swing.

Modern video analysis systems for analyzing golf swing and putting are now considered a virtually indispensable component of golf training, even among amateurs. And, for professional golfers, they’re nothing short of essential. The acquisition and provision of high-quality video files for movement analysis is a core component of the training process.
Recent years have seen major developments in the camera technology involved. However, striving to achieve ever-higher frame rates while retaining high image quality always represented a particular challenge. Hence the need for a computer infrastructure capable of processing several camera feeds simultaneously at the least possible cost.

The British company MIA Sports Solutions from Clayton West, Huddersfield is a global leader in the planning, design and installation of training studios in golf training centers, golf resorts and golf clubs. The latest USB cameras from IDS Imaging Development Systems are integrated into all of the company’s "Tech Ex studios".

The wide range of basic stroke techniques in golf requires differentiated training and thus differentiated analyses. With this in mind, Mia Sports Solutions has developed different studio types. Powerful USB cameras from IDS are integrated into both the Tech:Ex Full Flight studio and the Tech:Ex Putting studio.

**The full swing – achieving optimal flight distance with USB 3 uEye CP Rev.2**

In order to hit the ball a very specific distance, a golfer must master the technique of the full swing. The power of the swing and the quality of the strike can be analyzed and optimized in the Tech:Ex Full Flight studio. Every Tech:Ex Full Flight studio is equipped with four IDS UI-3060CP Rev. 2 cameras, which capture the full extent of the swing motion from four different angles. The camera system is capable of recording live images with two cameras simultaneously.

In every Tech:Ex Full Flight studio, four IDS USB 3 uEye CP cameras help golfers optimize their full swing.
The multi-camera application is made possible by the integrated 128 MB image memory. The USB 3.0 industrial camera ensures excellent image quality and extremely low noise – at a frame rate of 166 fps (full resolution). Thanks to its high speed, the light-sensitive camera provides a cost-effective alternative for visualization tasks in movement analysis. The 2.3 MP Sony sensor IMX174 (1936 x 1216 px) is ideal for this purpose, as it sets new standards in light sensitivity, dynamic range and color reproduction. Meanwhile, the USB 3.0 interface offers Plug & Play connectivity and fast data transmission at speeds of up to 5 Gbit/s.

In Tech:Ex Full Flight studios, the images captured by the cameras are transmitted at a speed of 210 fps to the V1 PRO HD video analysis software, and provide golf professionals with an ideal basis on which to record, analyze, compare and improve their full golf swing.

Fast and precise – USB 2 uEye LE helps golfers "get in the hole"

An ace, or a hole in one, is rare in golf. But regardless of how many times a golfer has to hit the ball to get it onto the green, the ultimate goal is to always to get that ball into the hole. To do this requires a putting shot. The Tech:Ex Putting studio is designed to help golfers practice their putting shots and to analyze their accuracy at getting the ball in the hole. Four IDS UI-1220LE-C-HQ cameras, equipped with the color WVGA sensor MT9V032STC from ON Semiconductor, are used for this purpose. The global shutter enables the capture of fast-moving objects. Thanks to the optional HDR (high dynamic range) mode, the CMOS sensor delivers excellent images even in high dynamic, high contrast scenes. The 1/3" sensor format makes the camera an ideal replacement for standard analog video cameras at no great expense.

In the Tech:Ex Putting studio, the images are transmitted to the analysis software at almost 100 fps. The IDS cameras create the best possible conditions for putting analysis by a golf pro with a view to perfecting those last few, usually match-critical, strikes of the ball to "get in the hole".

Each Tech:Ex Putting studio is equipped with four USB 2 uEye LE cameras from IDS Imaging Development Systems.
Farsightedness

Before each strike of the ball, a golfer can choose between a wide range of clubs – irons and woods – and this choice plays a critical role in the success of the shot. When choosing which industry cameras to install in its Tech:Ex studios, Mia Sports Solutions settled on two uEye models from IDS Imaging Development Systems.

The following were key criteria in determining this selection:

• First-class image quality combined with a very high frame rate to capture as many elements of the golf swing as possible. This works equally well both indoors and outdoors, where fluctuating lighting conditions prevail.

• Extremely short exposure times for capture and analysis of individual key sequences in the golf swing.

• Option of live image transmission

• High image quality at an attractive price

• The camera's range of setting and adjustment options

• Long cable lengths without any loss of performance

The IDS Software Suite also scored highly with Mia Sports. Andrew J. Keast, Director at Mia Sports Solutions, explains: "The IDS SDK offers flexible options for connecting to a range of systems, as well as various control functions. That made it really easy to integrate the IDS cameras into our video analysis system".

Mia Sports Solutions has demonstrated great farsightedness in choosing IDS cameras. The cameras are future-proof, as they have been deliberately designed with current and future generations of high-performance CMOS sensors in mind.
Outlook

The sport of golf has been enjoying increasing popularity worldwide in recent years. Today, 60 million golfers play on 35,000 golf courses around the world. Andrew J. Keast is certain: "There's no doubt that a well-run golf club or resort will generate new members and improve customer loyalty by using a video analysis studio". Every year, the number of people playing golf increases by up to 15%, indicating that golf is well on its way to becoming a sport with mass popularity. This offers great potential for video analysis studios like Tech:Ex. With high-performance machine vision cameras from IDS Imaging Development Systems. Because intelligence and precision are the two most important factors in hitting an ace.

Client

MIA Sports Solutions is widely recognised as a global leader in the design and installation of Performance Golf Studios, under our Tech:EX Studio Solution brand name. The company is servicing a full range of customers from independent golf professionals to large corporate resort clients in Europe, The Middle East, Far East and Australia.

USB 3 uEye CP – Incredibly fast, incredibly reliable, incredible sensors.

Interface: USB 3.0
Name: UI-3060CP Rev. 2
Sensor type: CMOS
Manufacturer: Sony
Frame rate: 166 fps
Resolution: 1936 x 1216 px
Shutter: Global Shutter
Optical class: 1/1.2"
Dimensions: 29 x 29 x 29 mm
Mass: 52 g
I/O-connector: 8-pin Hirose connector
Application: Visualization and analysis, Low-light conditions, Astronomy

USB 2 uEye LE – Compact, versatile and reasonably-priced: The ideal project camera.

Interface: USB 2.0
Name: UI-1220 LE
Sensor type: CMOS
Manufacturer: ON Semiconductor
Frame rate: 87.2 fps
Resolution: 752 x 480 px
Shutter: Global Shutter
Optical class: 1/3"
Dimensions: 48.6 x 44 x 25.6 mm
Mass: 41 g
Applications: Visualization, Objekt tracking, Measuring technology, Traffic surveillance