Beyond Fair
Using Technology to Improve the Sport for Athletes, Coaches, Administrators...and the Fans in the Bleachers.

Simplicity and complexity collide whenever a track and field meet is hosted in the US. On the one hand, the sport is the most primitively simple of all sports: the challenges have changed little since cave dwellers debated who would be the first to run to a certain tree, or who could throw a rock or spear the furthest, or who could jump the highest or furthest.

On the other hand, Track and Field is competing for an audience with sports where modern technology has practically made complexity an art form: even the simple concept of advancing a ball ten yards on four downs has been coupled to a super computer to produce an onscreen visual aid; and practically all sports have their own version of the question, “What is Mark Maguire’s hitting percentage with runners on second and third and nobody out?”

Whatever Mark Maguire’s hitting percentage in this situation actually is, the answer will involve an analysis of a database containing information going back many years, and the calculation will be made with a computer. Without computerized technology these kind of statistics are just not available in a timely way. Similarly, an innovation like the yellow ‘first and ten’ line used in televised football is impossible without the assistance of incredible computing power.

Given that the same creative technological environment is available to baseball, to football, and to Track and Field, what do recent advances in technology have to offer the sport – at all levels?

The invisibility issue...

In Track and Field, applied technology can obviously help answer the basic questions: “Who was fastest?” “What was their time?” “How far was that throw?” or “What was that last jump?” Modern digital photofinish technology can establish finishing order instantly; it can assign times accurate to a precision of 1/1000th of a second. And modern technology doesn’t just measure times; distances can be computed in seconds by using laser-based electronic distance measurement devices, and they are computed to a level of accuracy that a steel tape measure in normal use will never equal.

This is the clearly understandable justification for investing in technology; however, when technology accomplishing these tasks is working at its best it is as invisible to the fans as the super computer producing the yellow line on television in a football game.

What does invisible mean in a Track and Field context? Imagine the following situation: the track coaches at Luddite U. have been pushing for new technology for their program. Finally, they manage to convince the Athletic Director to pay for new equipment: a digital photofinish system, for example. At the first meet, the AD heads down to the track to see what difference this new technology has made. What return does he see on his sizeable investment?

Prior to the arrival of the new technology, athletes were corralled back in their lanes after a race and made to stand around while the hand timers gathered in a group, discussed finishing order – perhaps engaged in a heated debate over who was in third place - compared times and averaged them to an approximate agreement, then they wrote their collective conclusions on a sheet of paper, and sent the piece of paper back upstairs to the press box.

But since the arrival of the new technology things have changed: the hand timers have gone. After a race the athletes drift away to find their sweats, while up in the press box an operator evaluates the digital image of the finish on a computer screen.

With a click of the mouse, each of the competitors in the start list is given a fully automatic time. These times are then printed on a sheet of paper and placed in a tray...where they sit and await the arrival of the volunteer who will take them down and pin them on the notice board.
Assuming that the volunteer who was posting results in the past still has the same job, then, as far as the AD or the other spectators in the bleachers are concerned, there will be no noticeable difference in the way things are running despite the sizeable investment in the new technology.

The AD probably won’t care about the unseen improvements that are delighting the head track coach: many less volunteers are needed since the hand-timers were released to other more demanding assignments at the meet; there are no coaches complaining about their athletes being incorrectly placed in close races; there are also fewer parents, athletes, coaches, etc. complaining about spelling mistakes in the posted results. What is more, with no debate over finishing order and times, the meet moves a little quicker and stays on schedule. Nevertheless, what the AD and the fans see in terms of improvement is minimal.

The interconnectedness of all things...

As well as technology having the ability to be invisible, it can also be ubiquitous. Computer data can be everywhere and anywhere at all times. For this reason most track and field technology uses an internal framework to provide information for all the components in the picture – this internal framework is the database. At its simplest, the database is usually just a list of all the athletes in the meet: this is the type of thing that can be used at an all-comers meet where heats are created on the fly at the start line. At the other end of the complexity spectrum are commercial products which will seed events, draw up heats, score the event... and even print labels for the athlete goody bags.

Whether simple or complex, the function of the database is the same, to ensure that once information has been correctly entered, it will available everywhere, just as accurately, and no more typing will be needed.
created. This official was able, by virtue of a wireless link to the database containing the list of competitors, create start lists in the seconds before each race went to the line and then transmit this information wirelessly back to the timing area where it was used in the photofinish system to identify the competitors. The result of the implementation of this state of the art technology was a breakthrough for the meet.

What it meant was that there were approximately 108,000 spectators at Penn who, for the first time, were able to read from the scoreboards in the stadium the results of each race – complete with names – immediately the races were evaluated. Without the wireless interchange of data between the database, the starting line, and the timing area, this would not have been possible.

If a discus falls in the sector...

One way to lift the undesirable cloak of invisibility is to ensure that athletes, coaches and fans are provided with information. For track events this can include scoreboard displays of start lists, running time clocks for the event in progress, ‘quick time’ freezing of the running time clocks for instantaneous unofficial times or splits, and, finally, the timely display of results. Fans of track events are used to these enhancements that technology has to offer, and they have even come to expect them at most meets.

For Field events the electronic display of information is not something that has a long history – except at the very highest level of competition: the Olympics, World Championships, etc... When it comes to the application of technology, the throwing and jumping events often tend to get second billing at a meet (is it an accident that the sport is known in the US as Track AND Field?). A consequence of this is that frequently throwers and jumpers do not get to see their marks and/or results displayed on scoreboards or infield displays. Hence the title for this section: What if a discus throw set a new record and nobody knew about it?

Would anybody cheer?

Thankfully, several technological factors are helping to improve the visibility of Field events: the increasing use of handheld computers to administer the field events, recent advances in wireless communication technology, and the introduction of powerful alpha-numeric infield display boards. All of this has become possible because of the dramatic reductions in cost of much of the new technology – Electronic Distance Measurement systems no longer cost upwards of $50,000; these days they are so affordable that high schools are buying them for their programs.

The technology is not only cheaper than it was, it is also easier to use and much more powerful. Using the built-in networking capabilities, the handheld units down on the infield - or even in a throwing area outside the stadium - can utilize the latest wireless technology to call up from the database a flight list for an event, to send data to scoreboards and infield displays, communicate with wind gauges during the horizontal jumps, and – at the same time – control Electronic Distance Measurement equipment. Some of the latest products also have the ability to calculate event rankings, final round qualifiers, and do instantaneous conversions between metric and US measuring system. What is more, this information can be instantly and automatically displayed on scoreboards.

With the introduction of electronic tools on the infield, and the display of all events on scoreboards, then athletes, coaches, and fans are able to track the progress of all athletes, not just the ones who compete on the track. All fans of Field events should take heart from the picture of the scoreboard at Hayward Field that accompanies this article. Not only are the results of the Men’s High Jump being displayed for all to see while the Women’s 10,000 takes place on the track, but also every jump of every athlete in the competition was tracked on the infield displays.

Scoreboards and Infield Displays are the most obvious and familiar ways of getting information to the fans, but there are other techniques that have recently become accessible to meets at all levels. Television and the Internet can both be used as "scoreboards."

At the 2000 Olympic trials in Sacramento fans were treated to instantaneous displays of results as the races were evaluated. What most fans were probably not aware of was that this same information was also going instantaneously to TV and to the internet. Three separate websites were displaying the results data live – the Sacramento Bee, Quokka, and www.cyberscoreboard.com. The television commentators were also seeing data on monitor screens linked to the photofinish computers and the handheld computers on the infield, as was the stadium announcer.

The final component in the use of technology is, ironically, a human one. On one of the last days of the Trials, the display on the video scoreboard of the final of the women’s 800 meters results paused after first and second place times appeared on the screen. The stadium announcer drew the crowds’ attention to the delay, pointing out that third place would decide who would go to the Olympics.

Seconds ticked by as up in the timing booth senior USATF officials were examining the digital images of the race finish from all the available camera angles. Finally, after reviewing all the images they gave the photo-finish operator the green light to display their call: 3rd place Joetta Clark-Diggs, 4th place Meredith Rainey-Valmon. The crowd erupted as it became clear that the 800 team for Sydney would comprise women who all had a connection to the Clark family.

Here was true synergy at work, clearly the sum of the whole was greater than the sum of the components that comprised it: the interaction of the athletes, the photofinish technology, the officials, the scoreboards, and the announcer all combined to raise the excitement level – and the entertainment value – of the event for the crowd. And the size of the crowds at events like Sacramento and Penn Relays should leave no-one in any doubt that when Track and Field is well presented – and technology plays a key role in that presentation, the fans will come in droves – whether it is to Collegiate dual meets, or to the National Championships.