It's All In The Timing

How would you like to lose the gold by one-thousandth of a second?

American Tim McKee had the misfortune to swim for Olympic gold just as a quantum leap in Olympic timing technology overshot the bounds of common sense.

When McKee competed in the 400-meter individual medley in Munich in 1972, Olympic swimming had just converted from stopwatches to the use of electronic touchpads. Official times were still sliced no finer than a hundredth of a second, but the touchpads could differentiate a winner to the thousandth of a second.

McKee tied for first place with Gunnar Larsson of Sweden to the hundredth of a second, but lost by two thousandths of a second. A time so fine, it turned out, that it could have been affected by a coat of paint, given disparities of millimeters common in even the best competitive pools.

The next time two Olympic swimmers tied to the hundredth-Americans Nancy Hogshead and Carrie Steinseifer in the 100-meter freestyle at the Los Angeles Olympics in 1984-they were both given the gold medal. And they never did find out who won to the thousandth.

"It wouldn't have said who really won," says Hogshead, now a second-year law student at Georgetown University. "All it would have told us is that maybe somebody's lane is a thousandth of a second shorter. A blink of an eye is 25 hundredths of a second. A hundredth is a tiny amount of time, and a thousandth is a sliver on a sliver."
Sports timing has come a long, slow crawl from the stopwatches of the first modern Olympics in 1896 to the microprocessors of the Centennial Olympic Games scheduled for Atlanta next week. The drama and data communicated by timing devices to a worldwide audience next summer betrays the drama more intense and the data more dramatic than in the Olympics’ timed events, where the infinitesimal becomes astronomical in importance.

Swatch Timing, the Atlanta Games’ official timer, will have hundreds of timing devices in action. Prominent among these is Swatch Timing’s “Scan-OVision” technology, based on a digital photo-finish camera that aims a vertical hairline slit along the finish line and scans that slit electronically 1,000 or 2,000 times per second, depending on the event. The digital picture passes instantly onto a computer hard disk and is displayed on a video screen, where another hairline, a vertical cursor, can define the leading edge of each contestant’s torso to the thousandth of a second.

Just two Olympic games ago, race finishes were still done on film that had to be developed and examined over the virtual eternity of five minutes. Now digital technology allows the finish picture, with its cursors and times, to be produced 30 seconds after the race ends.

Even today, however, not everyone is comfortable with the growing wonders of timing technology. Running tracks may be designed with much greater accuracy than swimming pools, but even here, the accuracy of electronic timing may exceed the accuracy with which it can be reliably used, suggests Dr. William J. Mallon, a Durham, North Carolina, physician and leading Olympic historian. “About 10 years ago, I actually questioned whether they should continue to break those ties based on the photo,” he says. “If the camera is turned a tenth of a degree off exact, it can mean thousandths of a second.”

Camera alignment is critical and accurate to the thousandth of a second, insist designers of the digital finish systems. Acceptance of new technologies comes slowly, points out Doug DeAngelis, president of Lynx System Developers Inc., whichvirtually owns the college and high school market in the United States for digital photo-finish systems.

“Five us of were within one hundredth of a second. About 30 seconds after we crossed the line, they flashed the photo finish up on the big screen with the vertical cursor, and you could see who won. It’s very precise, clear enough that you can see a nose or somebody’s finger sticking out.”

Automatic timing is a lot older than one might think. The first report of electrical race timing was in England in 1892. Electrical timing was used at the Stockholm Olympics in 1912 to help separate winners in close races. The starter’s pistol triggered a clock at the finish line, where the clock was stopped at the end of the race when the chief judge closed a circuit and triggered a camera.

The 1932 Olympics used the "Kirby camera," which photographed the finish line and simultaneously photographed a tuning fork chronometer. The first Olympic "slit camera," the predecessor of the digital camera, went to work in 1948, and in 1952, a clock was added that put times on the slit camera finish photos to the hundredth of a second. Not until 1972, however, did the Olympics officially record times in hundredths rather than tenths. For that reason, and because races were routinely started, stopped, and timed electronically, 1972 is often cited as the beginning of the era of digital timing.
as the first year of fully automatic timing.

But is it fully automatic even now? Race judges still have to watch the cursor move on the video screen to decide who wins, places, and shows. Olympic timing futurists look toward the transponders used in auto and horse racing that--mounted on animal or vehicle--are read like a supermarket bar code as they pass the finish line to give not just the time but the identity of each passing contestant. Reportedly tested on racers in Japan, the devices are still too unwieldy to inspire anything but outrage in runners asked to wear them.

"That's the type of thing being looked at for the future," says Mike Gibbons, resident engineer in Atlanta for Swatch Timing. "It could be used in marathons, where you have a whole bunch of people coming across the line."

The "silent" starting gun is another pending technology, in which the actual starting gun is electronic and the only noise is the amplified sound at each competitor's starting block. At present, competitors hear both the gun itself and its amplified signal, which some say can be confusing. Seiko used the silent gun at the World Athletic Championships in Goteborg, Sweden, last August, where the company also introduced a digital photo-finish camera that scans 4,000 times a second. Like other new technologies, the silent gun will take a while to get its foot in the Olympic door, says Mitchell, who competed in Goteborg. A regular sounding gun has a shocking effect," he says. "It makes you cringe and jump. The automated gun is more relaxing, soothing. When you've been raised your whole life on somebody shooting a .38 in your ear and then you hear this little soft sound like a video game, it requires a very different kind of concentration."

False starts are another potential area of full automation that still depends on human judges, despite the ability of computers to read disparities between signals from starting guns and foot pressure on starting blocks, or between the time one relay swimmer hits the touchpad and the next leaves the starting platform.

"We did a new system last year to make an automatic recall on false starts," says Gibbons, "but the rules in track and field say the only person who has the right to recall is the starter. So this is absolutely new, but we can't use it."

False-start technology, however, has become an important means of Olympic training, however. One function of the QuickStart system, designed by Colorado Time Systems and used at the U.S. Olympic Training Center in Colorado Springs, is to help relay swimmers practice shaving the time between lengths--as Tracy Caulkins did in 1984, when she helped the U.S. team to a gold in the 4 x 100 medley relay by leaving her block a hundredth of a second before the previous swimmer hit the touchpad (swimmers are given two hundredths of a second leeway in leaving the starting block).

"She was a hundredth of a second from being disqualified," says fellow swimmer Hogshead. "That is what we call a perfect start, and everybody on the relay was glad we had electronic proof."

"Athletes welcome electronic proof," she continues. "Hand-held stopwatches were so inaccurate, and it used to be a judgment call. Now it's no longer left to human error, the naked eye. When you win a gold medal by a hundredth of a second, you're happy you didn't leave it to human error."

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