



## Interview with Joe Killpatrick

In swimming, timing is everything. Just ask Joe Killpatrick, the man who revolutionized the way the swimming is judged. His children, two sons and a daughter, were swimmers in high school. His sons went on to swim in college, and his oldest son is a head coach for the Mach Team, a swim team in Minnesota. When asked if Killpatrick was a swimmer, he said, "Well, I was a Boy Scout Waterfront Director in southern Illinois in my high school years."

As a research scientist for Honeywell, Killpatrick invented the laser gyroscope known as the Ring Laser Gyro (RLG). "It's now used on over 90 percent of the world's commercial airliners," he said. "It is a major product of Honeywell." Killpatrick owns about 43 patents, most for the RLG and variations of the device.



Killpatrick became interested in determining human reaction time when his children began swimming. "Later, a friend and member of the National Swimming Rules Committee brought me a shoebox full of tapes from a national competition week," Killpatrick said. "The truth of what was going on became obvious from the many hours of analysis of those tapes." Human reaction time led to inaccuracies in timing swimmers in competition, leading to inaccurate finishes and winners.

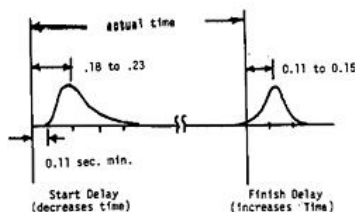
Killpatrick decided to do something about it. He became an advisor to the National Swimming Rules Committee and later a member of that committee for several years.

"I chaired the automatic timing committee for many years in the late '70s and early 80s," he said. "During that time, I led the effort to write the timing rules to properly handle hand timing and integrated backups."

### The Solution

Killpatrick's research led to swimming software that helped to alleviate human reaction time errors. He wrote several papers, including "Timing Accuracies for Swimming" and "Judging Accuracies for Swimming," in which he discussed swim timing and the statistical data and methods used to arrive at the standard correction factor.

The standard correction factor, Killpatrick discovered through his research, is 0.15 seconds. He determined this human factor is the statistical median delay incurred by manual start and finish timing. Based on his findings, when using a manual start and touchpad (automatic) finish, the time is corrected by adding .15 seconds to the recorded start time. When automatic start and button (manual) finish is used, 0.15 seconds is subtracted from the recorded time.



Human Start and Finish Reaction Time  
Figure 2

Figure 2 from "Timing Accuracies for Swimming" by J.E. Killpatrick, © 1975

Naturally, Colorado Time Systems (CTS) used Killpatrick's research in developing their swim timers. "My connection with CTS began in the early years in which my work on timing and the proper use of backup timing led to the first use of integrated backup timing," Killpatrick said. "This had 0.15 delay correction and the 'gate' for malfunction of 0.3 seconds built into the timing system."

Killpatrick spent his research career at Honeywell, a total of 44 ½ years, and has

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since retired from his role as Chief Scientist. "Now my title is Mister," he said. Killpatrick still follows swimming, in particular his grandchildren who also swim competitively.

For additional information on swim timers, visit [www.coloradotime.com](http://www.coloradotime.com).

See a copy of [Timing Accuracies for Swimming by J.E. Killpatrick](#).

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