

Joseph Palmowski BSME, Chase M. Pfeifer PhD., Thomas Frederick PhD.

Introduction

Sports performance testing such as the 10 or 40 yard dash and Pro-Agility are great indicators of an athlete's ability. Due to the cost of state-of-the-art timing gates, the majority of high school and junior college programs use hand timing (stop watch) to perform these tests which are subject to larger variability and false scores (average 0.31sec faster).

Through collaboration with the University of Nebraska Athletic Department a wireless timing gate system has been designed for use on any test that requires a timing gate at a fraction of the price of other products on the market.

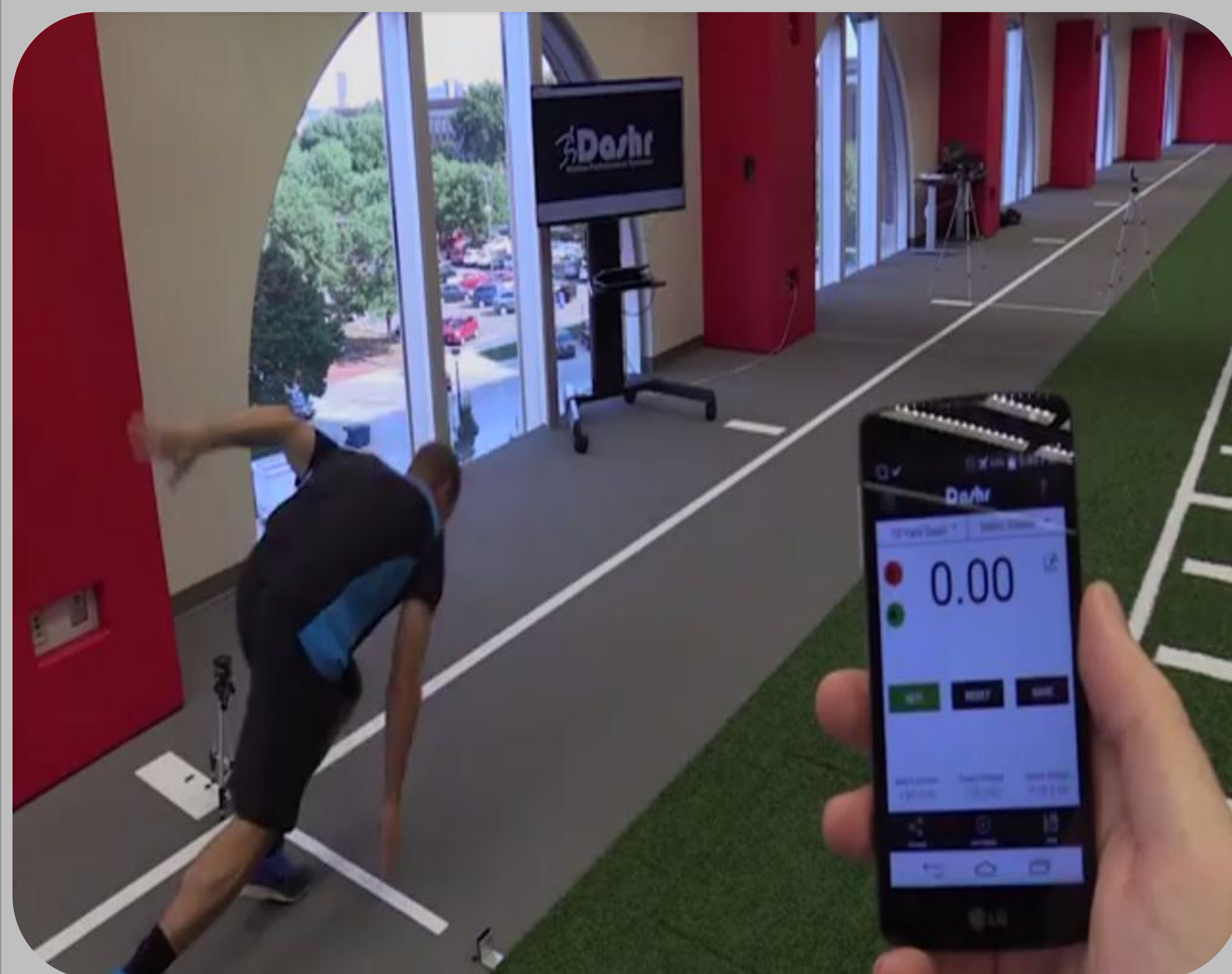


Figure 1. Olympic Bobsledding Gold Medalist Curt Tomasevicz running the 10-yard dash.

The break-beam sensor technology relays a wireless message to a mobile device providing user-friendly interface for coaches, athletes, trainers, etc. Sensors can be used for both standard and custom tests while storing athlete specific times on the device and the cloud. This allows users to get creative with testing and set down the clipboard.

Validation Testing

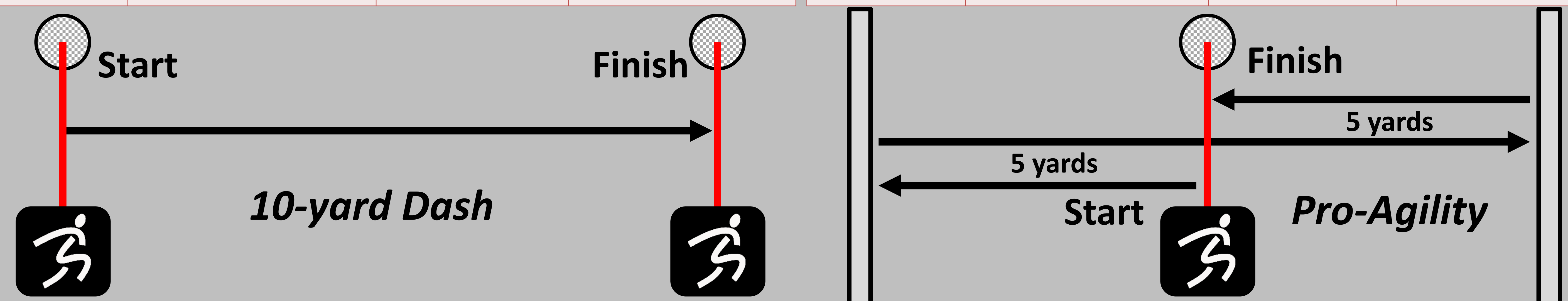
Testing was performed for both the 10 yard dash and Pro-Agility events. A high-speed camera recording at 240 Hz was used to validate this system.

Table 1. 10-yard dash data for 10 consecutive tests.

10-yard Dash			
Iteration	High-Speed Video Time (s)	Dashr App Time (s)	Difference (s)
1	6.095	6.094	0.001
2	5.733	5.733	0.000
3	5.388	5.389	0.001
4	5.286	5.289	0.003
5	5.204	5.203	0.001
6	4.991	4.990	0.001
7	5.245	5.247	0.002
8	5.303	5.301	0.002
9	5.666	5.666	0.000
10	6.242	6.242	0.000

Table 2. Pro-Agility data for 10 consecutive tests.

Pro-Agility			
Iteration	High-Speed Video Time (s)	Dashr App Time (s)	Difference (s)
1	5.124	5.126	0.002
2	5.904	5.904	0.000
3	5.082	5.083	0.001
4	5.658	5.658	0.000
5	4.378	4.377	0.001
6	5.041	5.041	0.000
7	5.278	5.279	0.001
8	4.674	4.675	0.001
9	5.999	5.996	0.003
10	5.037	5.038	0.001



Discussion & Future Direction

Testing revealed that the Dashr system differed from the high-speed camera by 0.001 ± 0.001 sec and 0.001 ± 0.0009 sec for the 10-yard dash and Pro-Agility respectively. These findings suggest that further testing should be performed with a camera recording at a higher frequency. The 240 Hz camera is accurate down to 0.004 sec proving that the Dashr system is accurate down to 0.01 sec. A higher frequency may prove that the Dashr as accurate as 0.001 sec.



Dashr is planning to place this system on the market for retail purchase in 2017 allowing for athletic programs with even the lowest budgets the opportunity to perform professional athletic performance testing. Additional add-on systems including motion sensors, force plates, and computer vision are in the works to provide state-of-the-art motion performance equipment at an affordable price. We expect that these devices will also have applications in movement research as well as the rehabilitation environment.