

# 2012 Men's 110m Hurdles World Record Season

Aries Merritt (USA) - 12.80

UPDATED  
2021.02.11

## Hurdle Touchdown Times



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Todd Henson

## 2012 Men's 110m Hurdles World Record Season Aries Merritt (USA) - 12.80

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### Notes:

- The times listed as TV Analysis are taken from [youtube.com](http://youtube.com) videos and generally coming from Television broadcasts. These are not always the best angles or coverage for getting times. They are often trying to tell a story by focusing on one athlete, and sometimes while shifting camera angles an extra frame can get added or removed.
- Where times are taken from the first movement, instead of the gun, there is at least a  $\pm 0.12$  second difference/error. This will show up from the start to the first hurdle and then from hurdle 10 to the finish. The between hurdle intervals should be fairly consistent, but there is still the usual  $\pm 0.03$  second
- Data errors, missing data, spelling mistakes, anything that need correction - please let me know. As always, I try to put together the most complete and accurate report possible.
- I have done the best I could, I hope people find it useful or at least interesting.

Biomechanical Analysis

2012 Men's 110m Hurdles World Record Season - Aries Merritt (USA) (1985)

2012 Memorial Van Damme (Brussels, BEL) (TV Analysis)

FINAL table for Memorial Van Damme, Brussels, BEL. Date: 07-Sep-12. Wind: 0.3 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.80, WR, 8.59. Lane/Place: 6 / 1.

2012 ISTAF (Berlin, GER) (TV Analysis)

FINAL table for ISTAF, Berlin, GER. Date: 02-Sep-12. Wind: 1.2 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.97, 8.48. Lane/Place: 4 / 1.

2012 AIVIA Grand Prix (Birmingham, GBR) (TV Analysis)

FINAL table for AIVIA Grand Prix, Birmingham, GBR. Date: 26-Aug-12. Wind: -0.9 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.95, 8.49. Lane/Place: 3 / 1.

2012 Athletissima (Lausanne, SUI)

FINAL table for Athletissima, Lausanne, SUI. Date: 23-Aug-12. Wind: -0.6 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: DQ, 5 / --.

2012 Olympic Games (London, GBR) (TV Analysis)

FINAL table for Olympic Games, London, GBR. Date: 08-Aug-12. Wind: -0.3 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.92, PB, 8.51. Lane/Place: 6 / 1.

Semi-Final 2

Semi-Final 2 table. Date: 08-Aug-12. Wind: 0.1 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.94, 8.50. Lane/Place: 7 / 1.

Heat 5

Heat 5 table. Date: 07-Aug-12. Wind: 0.7 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 13.07, 8.42. Lane/Place: 7 / 1.

2012 Herculis Meeting International D'Athlétisme (Monaco, MON) (TV Analysis)

FINAL table for Herculis Meeting, Monaco, MON. Date: 20-Jul-12. Wind: 0.0 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.93, PB, 8.51. Lane/Place: 5 / 1.

2012 AVIVA London Grand Prix (London, GBR) (TV Analysis)

FINAL table for AVIVA London Grand Prix, London, GBR. Date: 13-Jul-12. Wind: 0.6 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.93, PB, 8.51. Lane/Place: 4 / 1.

Heat 2

Heat 2 table. Date: 13-Jul-12. Wind: -0.9 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 13.14, 8.37. Lane/Place: 4 / 1.

2012 USA Olympic Trials (Eugene, OR)

FINAL table for USA Olympic Trials, Eugene, OR. Date: 30-Jun-12. Wind: 1.2 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 12.93, PB, 8.51. Lane/Place: 5 / 1.

Semi-Final 2

Semi-Final 2 table. Date: 30-Jun-12. Wind: 1.2 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 13.01, PB, 8.51. Lane/Place: 3 / 1.

Heat 1

Heat 1 table. Date: 29-Jun-12. Wind: -1.6 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: 13.13, 2 / 1.

2012 adidas Grand Prix (New York, NY)

FINAL table for adidas Grand Prix, New York, NY. Date: 09-Jun-12. Wind: 0.9 m/s. Competitor: Merritt, Aries (USA) (1985). Race type: time interval velocity. Results: DQ, 5 / --.

**2012 Prefontaine Classic (Eugene, OR) (TV Analysis)**

FINAL		date	02-Jun-12		wind	2.4 m/s												Henson (2020) - Athlete First: 2012 Aries Merritt world record season		
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10		
Merritt, Aries (USA) (1985)	time		2.52	3.54	4.56	5.58	6.56	7.56	8.56	9.54	10.54	11.58		12.96	3 / 2					
	reaction time	0.151	interval	7 steps	1.02	1.02	1.02	0.98	1.00	0.98	1.00	1.04	1.38			3.06	2.98	3.02		
	velocity		5.44	8.96	8.96	8.96	9.33	9.14	9.14	9.33	9.14	8.79	10.16	8.49		8.96	9.20	9.08		

**2012 Golden Grand Prix (Shanghai, CHN)**

FINAL		date	19-May-12		wind	0.4 m/s		Feng (2016) - Liu Xiang's seven-step starting: discussion on the key issues of 110m hurdles technical training										
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time		2.34	3.38	4.42	5.46	6.50	7.54	8.58	9.62	10.66	11.70		13.26	6 / 4			
	reaction time	0.142	interval	7 steps	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.56			3.12	3.12	3.12
	velocity		5.86	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.99	8.30		8.79	8.79	8.79

**2012 Colorful Daegu Meeting (Daegu, KOR) (TV Analysis)**

FINAL		date	16-May-12		wind	-0.4 m/s		Henson (2021) - Athlete First: 2012 Aries Merritt world record season										
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time		2.53	3.60	4.60	5.60	6.60	7.60	8.64	9.67				13.21	3 / 1			
	reaction time	0.165	interval	7 steps	1.07	1.00	1.00	1.00	1.04	1.03						3.07	3.04	
	velocity		5.42	8.54	9.14	9.14	9.14	9.14	8.79	8.87				8.33		8.93	9.02	

**2012 Arkansas Twilight (Fayetteville, AR)**

FINAL		date	04-May-12		wind	1.0 m/s		Henson (2020) - Athlete First: 2012 Aries Merritt world record season										
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time		2.50	3.53	4.55	5.57	6.57	7.54	8.54	9.54	10.54			13.03	5 / 1			
	reaction time		interval	7 steps	1.03	1.02	1.02	1.00	0.97	1.00	1.00					3.07	2.97	
	velocity		5.49	8.87	8.96	8.96	9.14	9.42	9.14	9.14	9.14			8.44		8.93	9.23	

**Heat 3**

		date	04-May-12		wind	2.9 m/s		Henson (2020) - Athlete First: 2012 Aries Merritt world record season										
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time		2.50	3.53	4.53	5.53	6.52	7.51	8.50	9.51	10.52	11.54		12.99	5 / 1			
	reaction time		interval	7 steps	1.03	1.00	1.00	0.99	0.99	1.01	1.01	1.02	1.45			3.03	2.97	3.04
	velocity		5.49	8.87	9.14	9.14	9.23	9.23	9.23	9.05	9.05	8.96	9.67	8.47		9.05	9.23	9.02

**2012 John McDonnell Invitational (Fayetteville, AR)**

FINAL		date	21-Apr-12		wind	0.9 m/s		Henson (2020) - Athlete First: 2012 Aries Merritt world record season												
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10		
Merritt, Aries (USA) (1985)	time		No Information Available												13.25	/ 1				
	reaction time		No Information Available																	
	interval		No Information Available																	
	velocity		No Information Available																	

**Heat 2**

		date	21-Apr-12		wind	1.2 m/s		Henson (2020) - Athlete First: 2012 Aries Merritt world record season												
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10		
Merritt, Aries (USA) (1985)	time		No Information Available												13.25	/ 1				
	reaction time		No Information Available																	
	interval		No Information Available																	
	velocity		No Information Available																	

**2012 IAAF World Indoor Championships (Istanbul, TUR) (TV Analysis)**

FINAL		date	11-Mar-12		Henson (2020) - Athlete First: 2012 Aries Merritt world record season													
			H1	H2	H3	H4	H5											
Merritt, Aries (USA) (1985)	time		2.48	3.48	4.50	5.50	6.50											
	reaction time	0.135	interval	7 steps	1.00	1.02	1.00	1.00					0.94			7.44	4 / 1	3.02
	velocity		5.53	9.14	8.96	9.14	9.14					10.34	8.06				9.08	

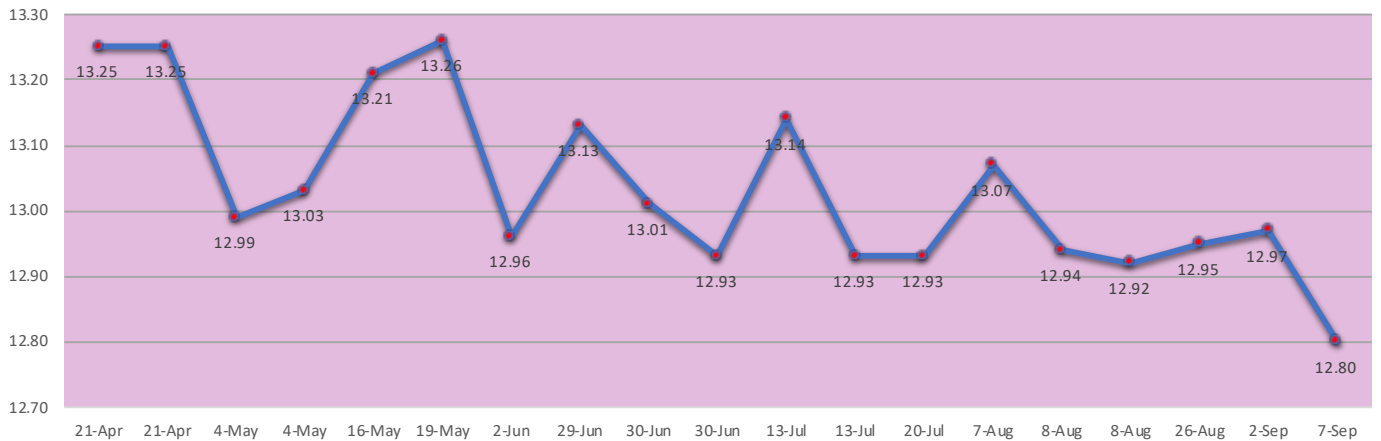
**2012 USATF National Indoor Championships (Albuquerque, NM) (Altitude) (TV Analysis)**

FINAL		date	26-Feb-12		Henson (2020) - Athlete First: 2012 Aries Merritt world record season													
			H1	H2	H3	H4	H5											
Merritt, Aries (USA) (1985)	time		2.50	3.52	4.56	5.54	6.54											
	reaction time	0.138	interval	7 steps	1.02	1.04	0.98	1.00					0.89			7.43	6 / 1	3.04
	velocity		5.49	8.96	8.79	9.33	9.14					10.92	8.08				9.02	

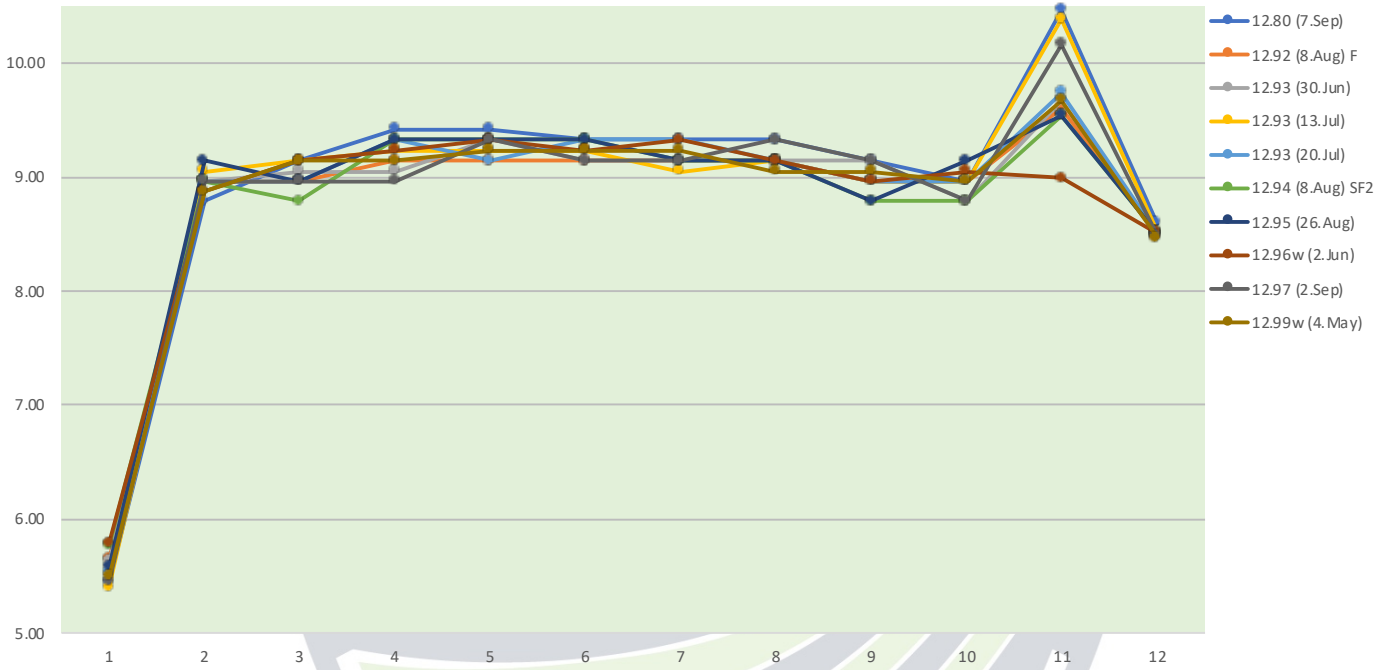
**2012 Leonard Hilton Memorial Invitational (Houston, TX)**

FINAL		date	13-Jan-12		Henson (2020) - Athlete First: 2012 Aries Merritt world record season													
			H1	H2	H3	H4	H5											
Merritt, Aries (USA) (1985)	time		2.53	3.53	4.53	5.52	6.52											
	reaction time		interval	7 steps	1.00	1.00	0.99	1.00					0.94			7.46	5 / 1	2.99
	velocity		5.42	9.14	9.14	9.23	9.14					10.34	8.04				9.17	

**Aries Merritt 2012**

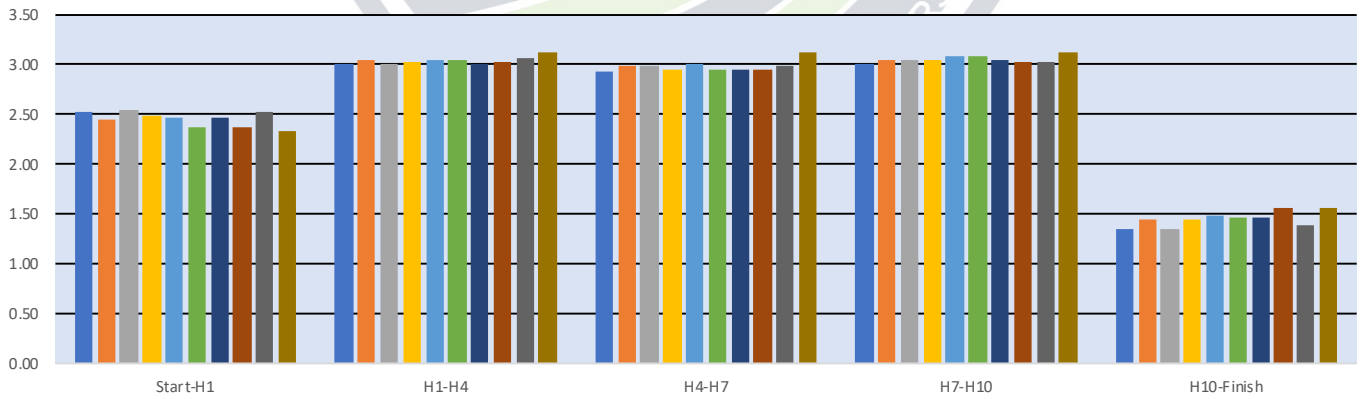


### Hurdle Rhythmic Units - Top 10 Times (average 12.932)



Time Intervals (s)

### Hurdle Phases - Top 10 Times





2012 Memorial Van Damme (Brussels, BEL) (TV Analysis)

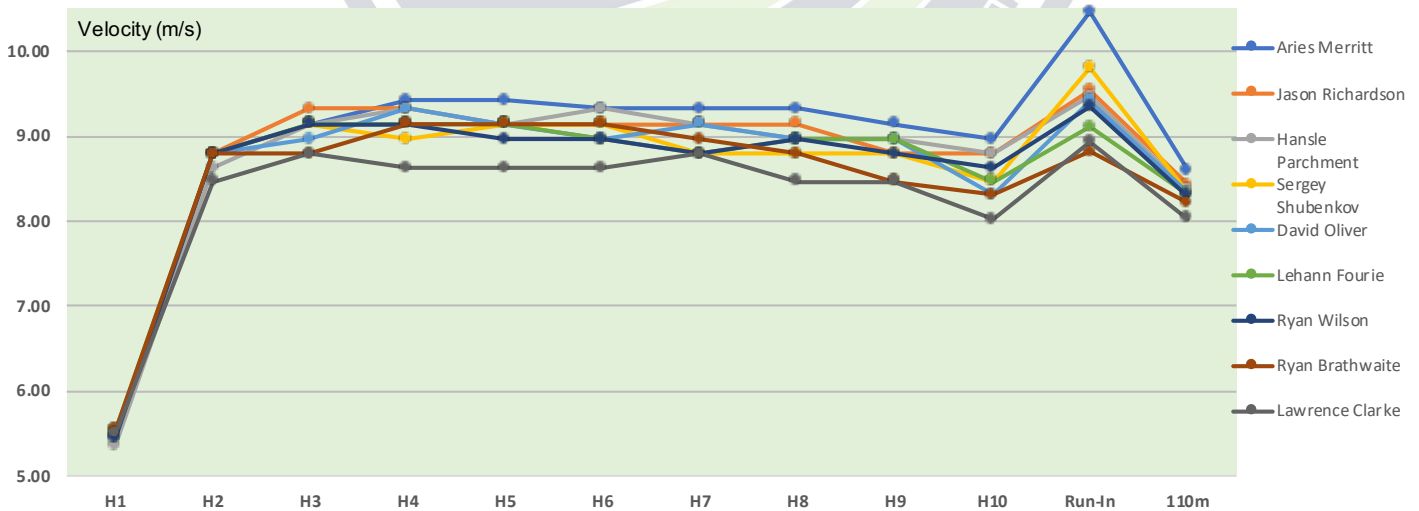
110m Hurdles

Date: 2012.09.07

Wind: 0.3 m/s

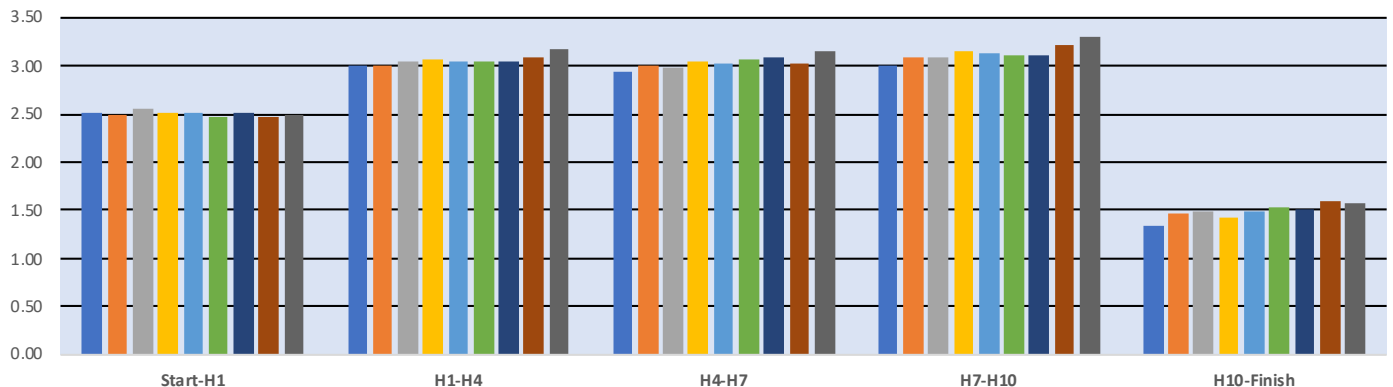
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.52	3.56	4.56	5.53	6.50	7.48	8.46	9.44	10.44	11.46	12.80	13.21	6 / 1	3.01	2.93	3.00
	reaction time	0.145													9.11	9.36	9.14
	interval	7 steps	1.04	1.00	0.97	0.97	0.98	0.98	0.98	1.00	1.02	1.34	WR				
	velocity	5.44	8.79	9.14	9.42	9.42	9.33	9.33	9.33	9.14	8.96	10.46	8.59				
<b>Richardson, Jason (USA) (1986)</b>	time	2.50	3.54	4.52	5.50	6.50	7.50	8.50	9.50	10.54	11.58		13.05	5 / 2	3.00	3.00	3.08
	reaction time	0.147													9.14	9.14	8.90
	interval	7 steps	1.04	0.98	0.98	1.00	1.00	1.00	1.00	1.04	1.04	1.47					
	velocity	5.49	8.79	9.33	9.33	9.14	9.14	9.14	9.14	8.79	8.79	9.54	8.43				
<b>Parchment, Hansle (JAM) (1990)</b>	time	2.56	3.62	4.62	5.60	6.60	7.58	8.58	9.60	10.62	11.66		13.14	4 / 3	3.04	2.98	3.08
	reaction time	0.157													9.02	9.20	8.90
	interval	7 steps	1.06	1.00	0.98	1.00	0.98	1.00	1.02	1.02	1.04	1.48					
	velocity	5.36	8.62	9.14	9.33	9.14	9.33	9.14	8.96	8.96	8.79	9.47	8.37				
<b>Shubenkov, Sergey (RUS) (1982)</b>	time	2.52	3.56	4.56	5.58	6.58	7.58	8.62	9.66	10.70	11.78		13.21	1 / 4	3.06	3.04	3.16
	reaction time	0.165													8.96	9.02	8.68
	interval		1.04	1.00	1.02	1.00	1.00	1.04	1.04	1.04	1.08	1.43					
	velocity	5.44	8.79	9.14	8.96	9.14	9.14	8.79	8.79	8.79	8.46	9.80	8.33				
<b>Oliver, David (USA) (1990)</b>	time	2.52	3.56	4.58	5.56	6.56	7.58	8.58	9.60	10.62	11.72		13.21	2 / 5	3.04	3.02	3.14
	reaction time	0.171													9.02	9.08	8.73
	interval	7 steps	1.04	1.02	0.98	1.00	1.02	1.00	1.02	1.02	1.10	1.49					
	velocity	5.44	8.79	8.96	9.33	9.14	8.96	9.14	8.96	8.96	8.31	9.41	8.33				
<b>Fourie, Lehann (RSA) (1987)</b>	time	2.48	3.52	4.52	5.52	6.52	7.54	8.58	9.60	10.62	11.70		13.24	3 / 6	3.04	3.06	3.12
	reaction time	0.133													9.02	8.96	8.79
	interval	7 steps	1.04	1.00	1.00	1.00	1.02	1.04	1.02	1.02	1.08	1.54	AR				
	velocity	5.53	8.79	9.14	9.14	9.14	8.96	8.79	8.96	8.96	8.46	9.10	8.31				
<b>Wilson, Ryan (USA) (1980)</b>	time	2.52	3.56	4.56	5.56	6.58	7.60	8.64	9.66	10.70	11.76		13.26	8 / 7	3.04	3.08	3.12
	reaction time	0.144													9.02	8.90	8.79
	interval	7 steps	1.04	1.00	1.00	1.02	1.02	1.04	1.02	1.04	1.06	1.50					
	velocity	5.44	8.79	9.14	9.14	8.96	8.96	8.79	8.96	8.79	8.62	9.35	8.30				
<b>Brathwaite, Ryan (BAR) (1988)</b>	time	2.48	3.52	4.56	5.56	6.56	7.56	8.58	9.62	10.70	11.80		13.39	9 / 8	3.08	3.02	3.22
	reaction time	0.156													8.90	9.08	8.52
	interval		1.04	1.04	1.00	1.00	1.00	1.02	1.04	1.08	1.10	1.59					
	velocity	5.53	8.79	8.79	9.14	9.14	9.14	8.96	8.79	8.46	8.31	8.82	8.22				
<b>Clarke, Lawrence (GBR) (1990)</b>	time	2.50	3.58	4.62	5.68	6.74	7.80	8.84	9.92	11.00	12.14		13.71	7 / 9	3.18	3.16	3.30
	reaction time	0.148													8.62	8.68	8.31
	interval		1.08	1.04	1.06	1.06	1.06	1.04	1.08	1.08	1.14	1.57					
	velocity	5.49	8.46	8.79	8.62	8.62	8.62	8.79	8.46	8.46	8.02	8.93	8.02				



Time Intervals (s)

Hurdle Phases



Aries Merritt

Source: May, J., & Graubner, R. (2012) Retrieved from <http://www.fqs.uni-halle.de> (TV Analysis) (in German)

2nd - 9th Places (TV Analysis)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=vASApHGZrU>

2012 ISTAF (Berlin, GER) (TV Analysis)

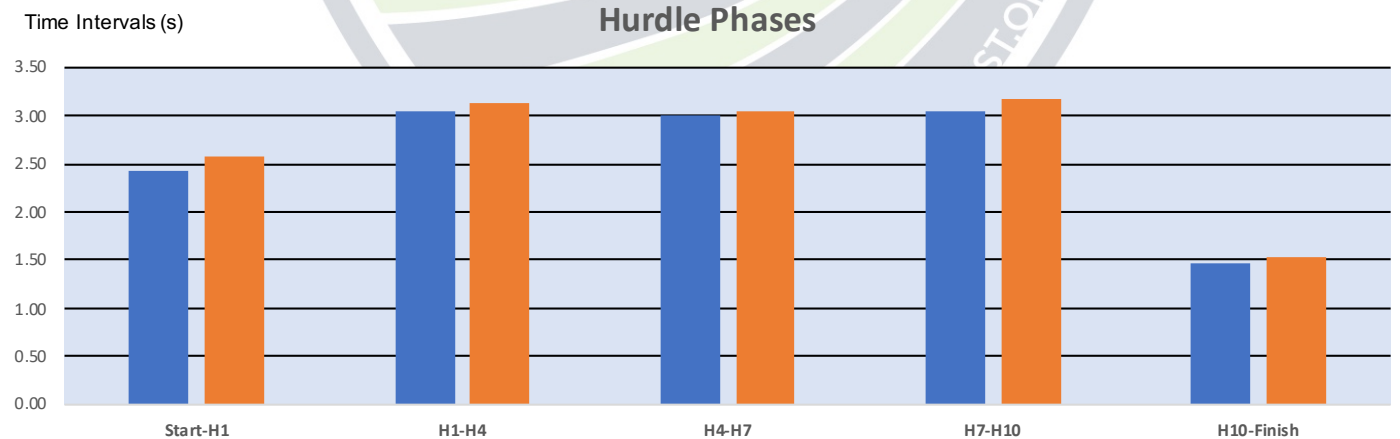
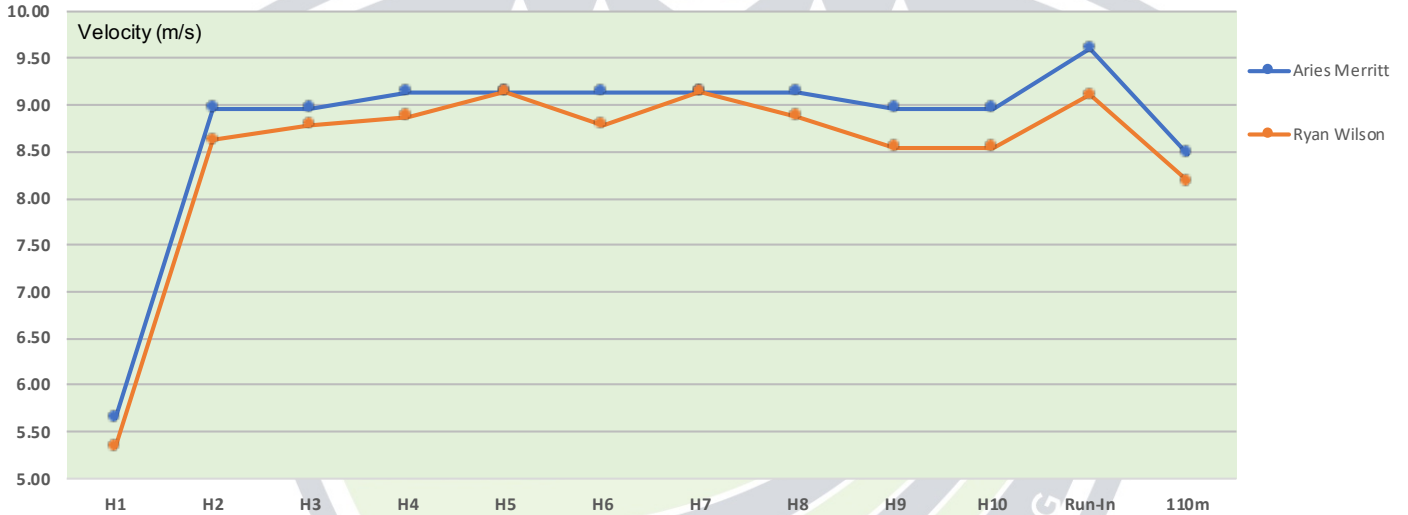
110m Hurdles

Date: 2012.09.02

Wind: 1.2 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.43	3.45	4.47	5.47	6.47	7.47	8.47	9.47	10.49	11.51	12.97		4 / 1			
	reaction time	0.164													3.04	3.00	3.04
	interval	7 steps	1.02	1.02	1.00	1.00	1.00	1.00	1.00	1.02	1.02	1.46			9.02	9.14	9.02
	velocity	5.65	8.96	8.96	9.14	9.14	9.14	9.14	9.14	8.96	8.96	9.60	8.48				
<b>Wilson, Ryan (USA) (1980)</b>	time	2.57	3.63	4.67	5.70	6.70	7.74	8.74	9.77	10.84	11.91	13.45		7 / 2			
	reaction time	0.192													3.13	3.04	3.17
	interval	7 steps	1.06	1.04	1.03	1.00	1.04	1.00	1.03	1.07	1.07	1.54			8.76	9.02	8.65
	velocity	5.34	8.62	8.79	8.87	9.14	8.79	9.14	8.87	8.54	8.54	9.10	8.18				



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 640 x 360 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=rBQjGzlpOk0>

2012 AVIVA Grand Prix (Birmingham, GBR) (TV Analysis)

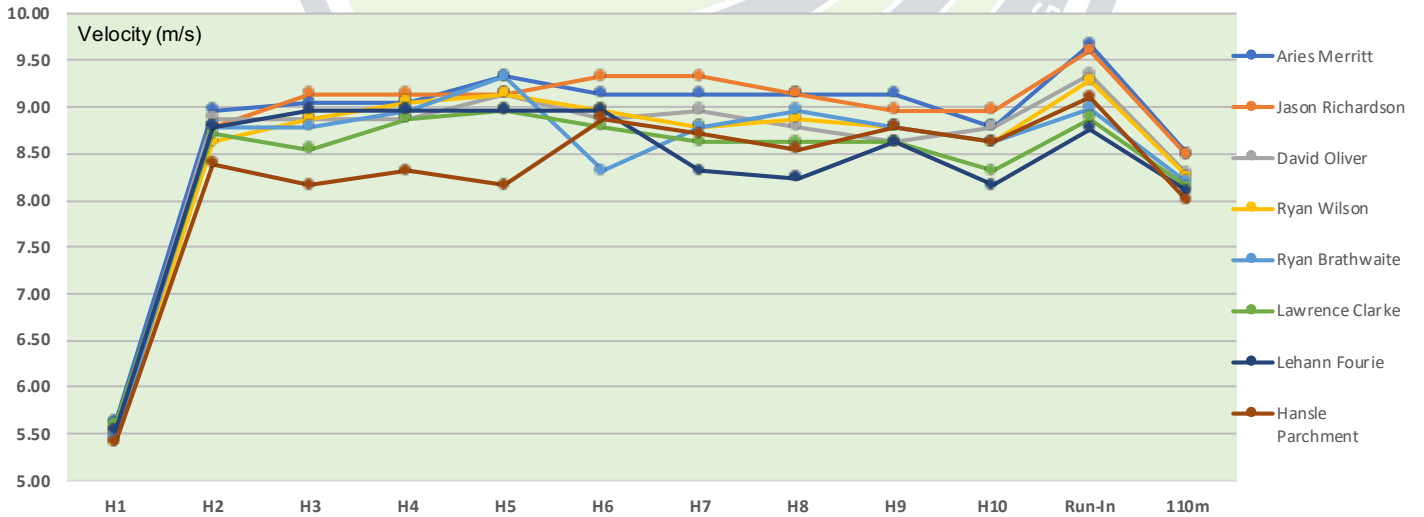
110m Hurdles

Date: 2012.08.26

Wind: -0.9 m/s

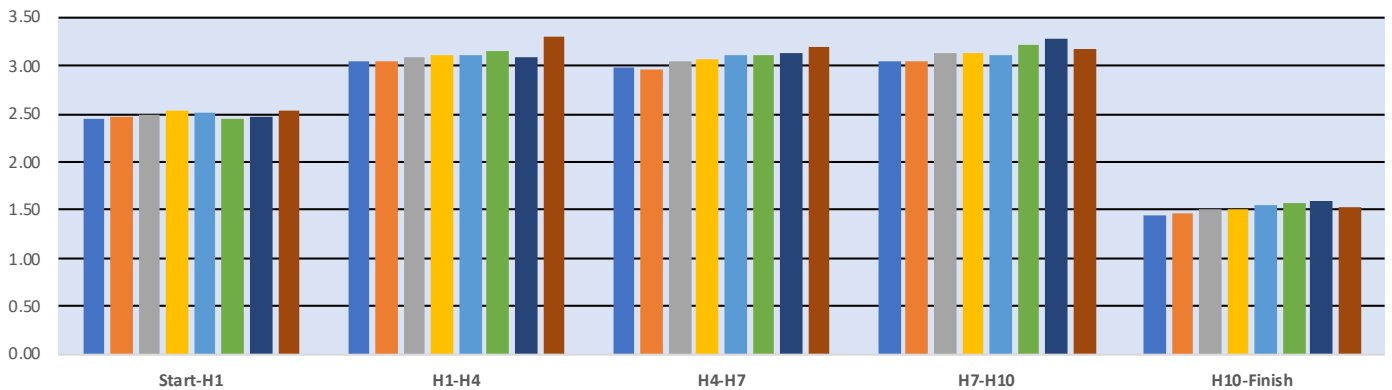
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.44	3.46	4.47	5.48	6.46	7.46	8.46	9.46	10.46	11.50	12.95		3 / 1			
	reaction time	0.146													3.04	2.98	3.04
	interval	7 steps	1.02	1.01	1.01	0.98	1.00	1.00	1.00	1.00	1.04	1.45			9.02	9.20	9.02
velocity		5.62	8.96	9.05	9.05	9.33	9.14	9.14	9.14	9.14	8.79	9.67	8.49				
<b>Richardson, Jason (USA) (1986)</b>	time	2.48	3.52	4.52	5.52	6.52	7.50	8.48	9.48	10.50	11.52	12.98		2 / 2			
	reaction time	0.165													3.04	2.96	3.04
	interval	7 steps	1.04	1.00	1.00	1.00	0.98	0.98	1.00	1.02	1.02	1.46			9.02	9.26	9.02
velocity		5.53	8.79	9.14	9.14	9.14	9.33	9.33	9.14	8.96	8.96	9.60	8.47				
<b>Oliver, David (USA) (1990)</b>	time	2.50	3.53	4.56	5.59	6.59	7.62	8.64	9.68	10.74	11.78	13.28		4 / 3			
	reaction time	0.154													3.09	3.05	3.14
	interval	7 steps	1.03	1.03	1.03	1.00	1.03	1.02	1.04	1.06	1.04	1.50			8.87	8.99	8.73
velocity		5.49	8.87	8.87	8.87	9.14	8.87	8.96	8.79	8.62	8.79	9.35	8.28				
<b>Wilson, Ryan (USA) (1980)</b>	time	2.54	3.60	4.63	5.64	6.64	7.66	8.70	9.73	10.77	11.83	13.34		1 / 4			
	reaction time	0.156													3.10	3.06	3.13
	interval	7 steps	1.06	1.03	1.01	1.00	1.02	1.04	1.03	1.04	1.06	1.51			8.85	8.96	8.76
velocity		5.40	8.62	8.87	9.05	9.14	8.96	8.79	8.87	8.79	8.62	9.28	8.25				
<b>Brathwaite, Ryan (BAR) (1988)</b>	time	2.52	3.56	4.60	5.62	6.60	7.70	8.74	9.76	10.80	11.86	13.42		7 / 5			
	reaction time	0.160													3.10	3.12	3.12
	interval		1.04	1.04	1.02	0.98	1.10	1.04	1.02	1.04	1.06	1.56			8.85	8.79	8.79
velocity		5.44	8.79	8.79	8.96	9.33	8.31	8.79	8.96	8.79	8.62	8.99	8.20				
<b>Clarke, Lawrence (GBR) (1990)</b>	time	2.45	3.50	4.57	5.60	6.62	7.66	8.72	9.78	10.84	11.94	13.52		6 / 6			
	reaction time	0.146													3.15	3.12	3.22
	interval		1.05	1.07	1.03	1.02	1.04	1.06	1.06	1.06	1.10	1.58			8.70	8.79	8.52
velocity		5.60	8.70	8.54	8.87	8.96	8.79	8.62	8.62	8.62	8.31	8.87	8.14				
<b>Fourie, Lehann (RSA) (1987)</b>	time	2.48	3.52	4.54	5.56	6.58	7.60	8.70	9.81	10.87	11.99	13.59		8 / 7			
	reaction time	0.139													3.08	3.14	3.29
	interval	7 steps	1.04	1.02	1.02	1.02	1.02	1.10	1.11	1.06	1.12	1.60			8.90	8.73	8.33
velocity		5.53	8.79	8.96	8.96	8.96	8.96	8.31	8.23	8.62	8.16	8.76	8.09				
<b>Parchment, Hansle (JAM) (1990)</b>	time	2.54	3.63	4.75	5.85	6.97	8.00	9.05	10.12	11.16	12.22	13.76		5 / 8			
	reaction time	0.155													3.31	3.20	3.17
	interval	7 steps	1.09	1.12	1.10	1.12	1.03	1.05	1.07	1.04	1.06	1.54			8.28	8.57	8.65
velocity		5.40	8.39	8.16	8.31	8.16	8.87	8.70	8.54	8.79	8.62	9.10	7.99				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=57ZM5zZkbXs>



2012 Olympic Games (London, GBR)

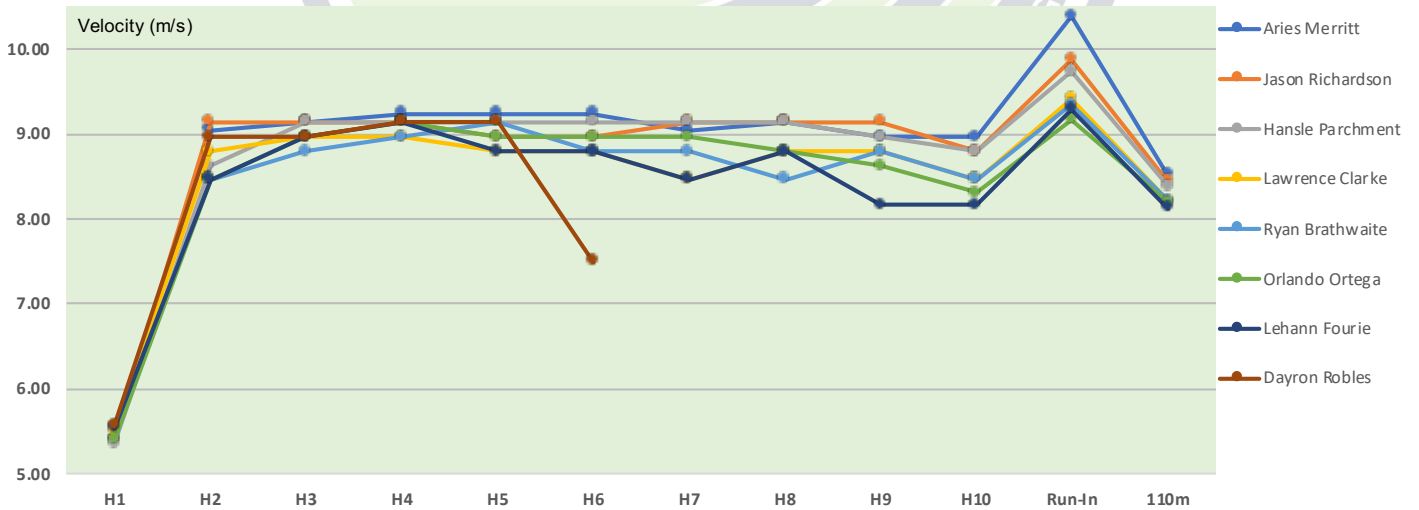
110m Hurdles

Date: 2012.08.12

Wind: -0.3 m/s

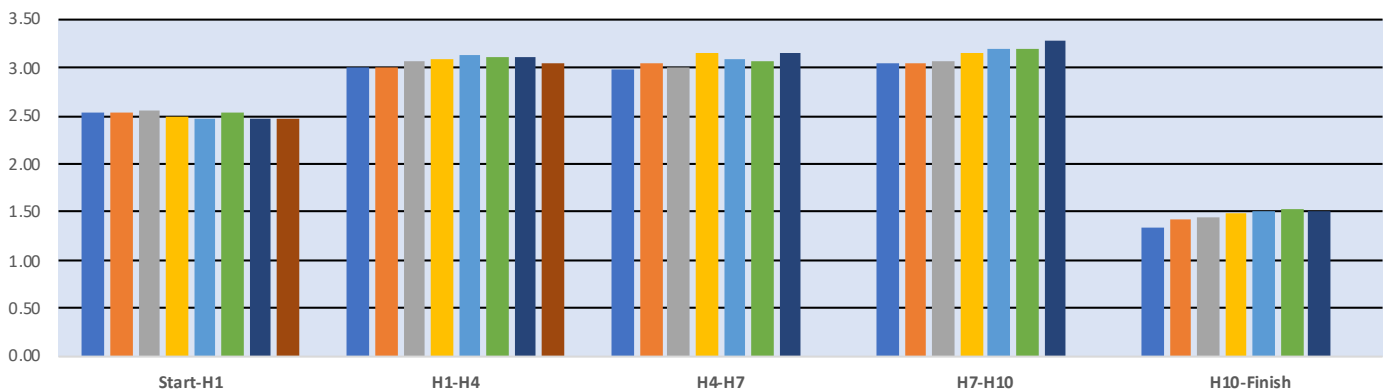
Semi-Final 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.54	3.55	4.55	5.54	6.53	7.52	8.53	9.53	10.55	11.57	12.92		6 / 1			
	reaction time	0.143													3.00	2.99	3.04
	interval	7 steps	1.01	1.00	0.99	0.99	0.99	0.99	1.01	1.00	1.02	1.02	1.35	PB	9.14	9.17	9.02
<b>Richardson, Jason (USA) (1986)</b>	time	2.54	3.54	4.54	5.54	6.56	7.58	8.58	9.58	10.58	11.62		13.04	4 / 2			
	reaction time	0.194													3.00	3.04	3.04
	interval	7 steps	1.00	1.00	1.00	1.00	1.02	1.02	1.00	1.00	1.04	1.42			9.14	9.02	9.02
<b>Parchment, Hansle (JAM) (1990)</b>	time	2.56	3.62	4.62	5.62	6.62	7.62	8.62	9.62	10.64	11.68		13.12	7 / 3			
	reaction time	0.172													3.06	3.00	3.06
	interval	7 steps	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.04	1.44	NR		8.96	9.14	8.96
<b>Clarke, Lawrence (GBR) (1990)</b>	time	2.50	3.54	4.56	5.58	6.62	7.66	8.74	9.78	10.82	11.90		13.39	2 / 4			
	reaction time	0.169													3.08	3.16	3.16
	interval		1.04	1.02	1.02	1.04	1.04	1.04	1.04	1.04	1.04	1.49			8.90	8.68	8.68
<b>Brathwaite, Ryan (BAR) (1988)</b>	time	2.48	3.56	4.60	5.62	6.62	7.66	8.70	9.78	10.82	11.90		13.40	8 / 5			
	reaction time	0.163													3.14	3.08	3.20
	interval		1.08	1.04	1.02	1.00	1.04	1.04	1.08	1.04	1.08	1.50			8.73	8.90	8.57
<b>Ortega, Orlando (CUB) (1991)</b>	time	2.54	3.62	4.64	5.64	6.66	7.68	8.70	9.74	10.80	11.90		13.43	9 / 6			
	reaction time	0.135													3.10	3.06	3.20
	interval	7 steps	1.08	1.02	1.00	1.02	1.02	1.02	1.04	1.06	1.10	1.53			8.85	8.96	8.57
<b>Fourie, Lehann (RSA) (1987)</b>	time	2.48	3.56	4.58	5.58	6.62	7.66	8.74	9.78	10.90	12.02		13.53	3 / 7			
	reaction time	0.136													3.10	3.16	3.28
	interval	7 steps	1.08	1.02	1.00	1.04	1.04	1.08	1.04	1.12	1.12	1.51			8.85	8.68	8.36
<b>Robles, Dayron (CUB) (1986)</b>	time	2.46	3.48	4.50	5.50	6.50	7.72						42.86	5 / --			
	reaction time	0.159													3.04		
	interval	7 steps	1.02	1.02	1.00	1.00	1.22								9.02		
	velocity	5.40	8.46	8.96	9.14	8.79	8.79	8.46	8.79	8.16	8.16	9.28	8.13				
	velocity	5.40	8.46	8.96	9.14	8.79	8.79	8.46	8.79	8.16	8.16	9.28	8.13				
	velocity	5.40	8.46	8.96	9.14	8.79	8.79	8.46	8.79	8.16	8.16	9.28	8.13				



Time Intervals (s)

Hurdle Phases



Aries Merritt

Source: Graubner, R. (2012) Retrieved from <http://www.fgs.uni-halle.de> (TV Analysis) (in German)

2nd - 8th Places (TV Analysis)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=2snLA3iSis>

2012 Olympic Games (London, GBR)

110m Hurdles

Date: 2012.08.08

Wind: 0.1 m/s

Semi-Final 2

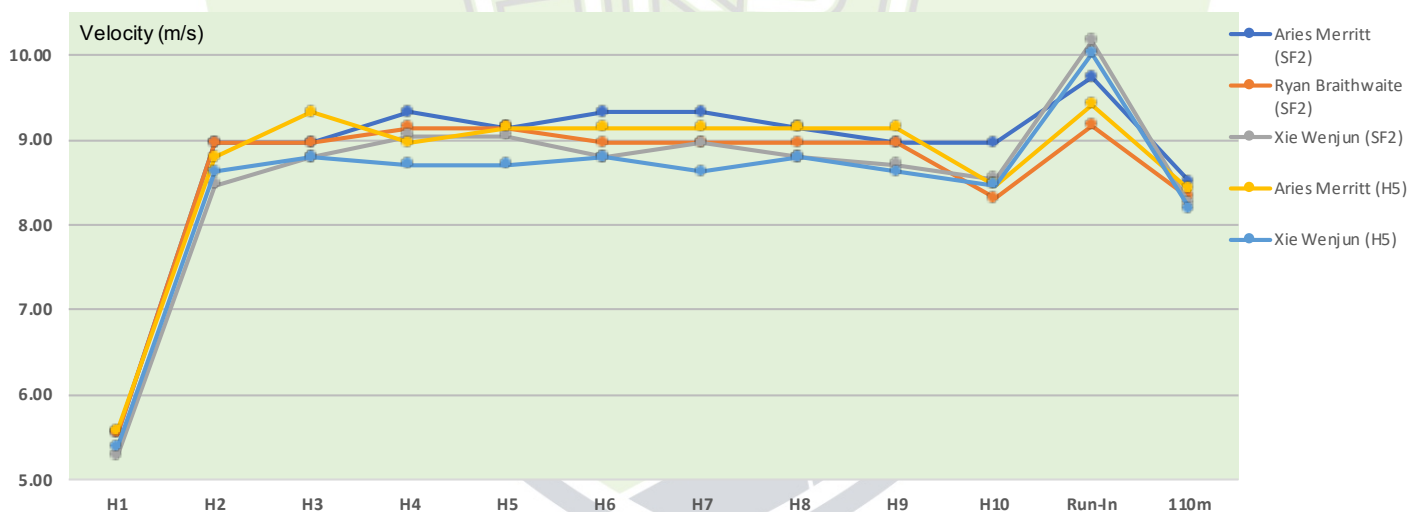
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time	2.48	3.50	4.52	5.50	6.50	7.48	8.46	9.46	10.48	11.50		12.94	7 / 1			
	reaction time	0.147													3.02	2.96	3.04
	interval	7 steps	1.02	1.02	0.98	1.00	0.98	0.98	1.00	1.02	1.02	1.44			9.08	9.26	9.02
	velocity	5.53	8.96	8.96	9.33	9.14	9.33	9.33	9.14	8.96	8.96	9.74	8.50				
Braithwaite, Ryan (BAR) (1988)	time	2.48	3.50	4.52	5.52	6.52	7.54	8.56	9.58	10.60	11.70		13.23	4 / 2			
	reaction time	0.159													3.04	3.04	3.14
	interval		1.02	1.02	1.00	1.00	1.02	1.02	1.02	1.02	1.10	1.53			9.02	9.02	8.73
	velocity	5.53	8.96	8.96	9.14	9.14	8.96	8.96	8.96	8.96	8.31	9.16	8.31				
Xie Wenjun (CHN) (1990)	time	2.60	3.68	4.72	5.73	6.74	7.78	8.80	9.84	10.89	11.96		13.34	9 / 3			
	reaction time	0.158													3.13	3.07	3.16
	interval		1.08	1.04	1.01	1.01	1.04	1.02	1.04	1.05	1.07	1.38	PB		8.76	8.93	8.68
	velocity	5.28	8.46	8.79	9.05	9.05	8.79	8.96	8.79	8.70	8.54	10.16	8.25				

Date: 2012.08.07

Wind: 0.7 m/s

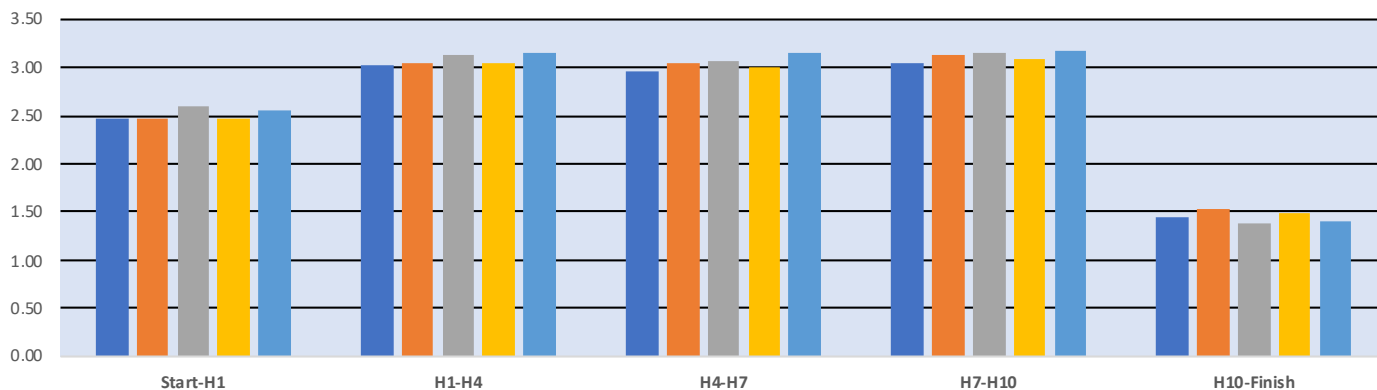
Heat 5

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time	2.46	3.50	4.48	5.50	6.50	7.50	8.50	9.50	10.50	11.58		13.07	7 / 1			
	reaction time	0.142													3.04	3.00	3.08
	interval	7 steps	1.04	0.98	1.02	1.00	1.00	1.00	1.00	1.00	1.08	1.49			9.02	9.14	8.90
	velocity	5.58	8.79	9.33	8.96	9.14	9.14	9.14	9.14	9.14	8.46	9.41	8.42				
Xie Wenjun (CHN) (1990)	time	2.55	3.61	4.65	5.70	6.75	7.79	8.85	9.89	10.95	12.03		13.43	2 / 3			
	reaction time	0.143													3.15	3.15	3.18
	interval		1.06	1.04	1.05	1.05	1.04	1.06	1.04	1.06	1.08	1.40			8.70	8.70	8.62
	velocity	5.38	8.62	8.79	8.70	8.70	8.79	8.62	8.79	8.62	8.46	10.01	8.19				



Time Intervals (s)

Hurdle Phases



Semi-Final 2 (TV Analysis)

Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 25fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=7sxvjJ51WA>

Heat 5 (TV Analysis)

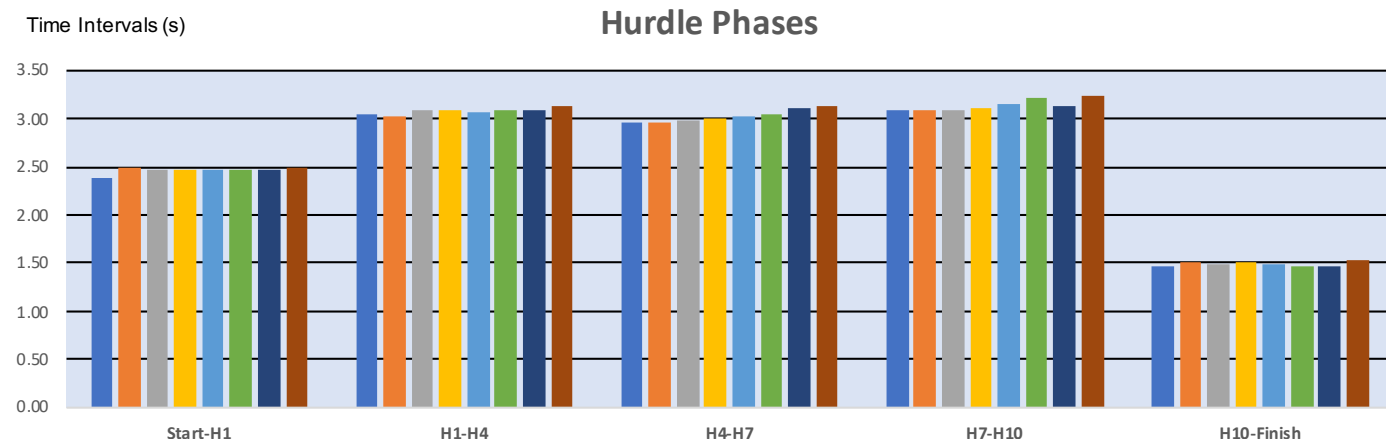
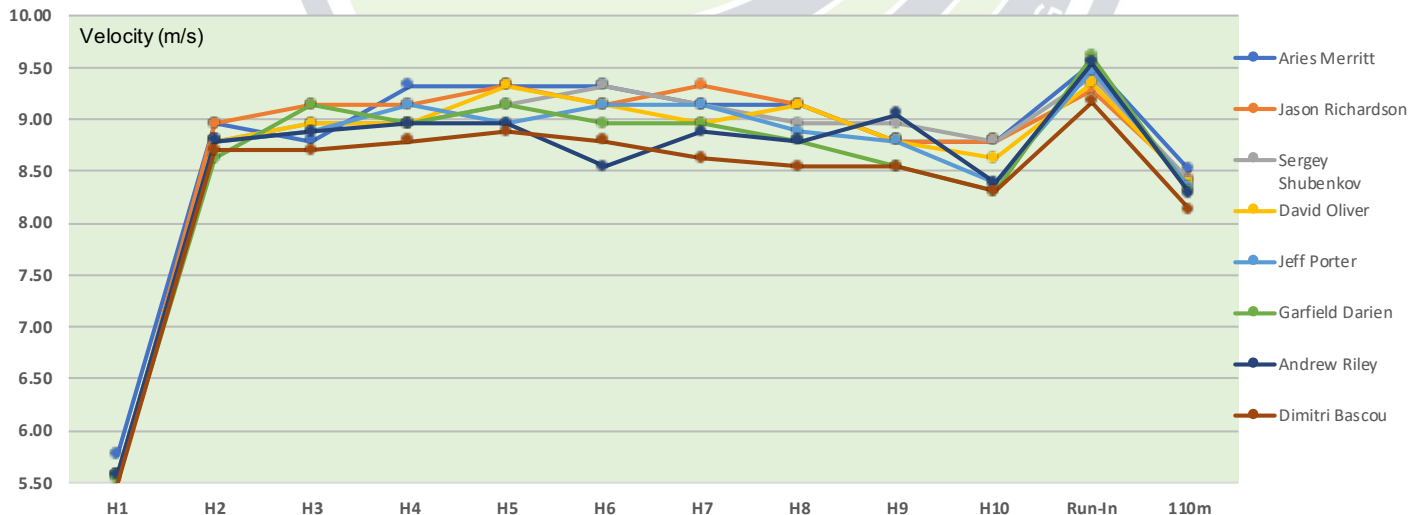
Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 25fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=3O7-YmJy5ag>

Xie Wenjun - Semi-Final 2 & Heat 5

Source: Wang L., Yin J., Xu Y., Gong M., & Li R. (2016) Comparative analysis of the grey relational grade of the segment time and final results of the 110m hurdle race of Xie Wenjun and Liu Xiang. Sport Science Research, 37 (5), p. 4. (in Chinese)

2012 Herculis Meeting International D'Athlétisme (Monaco, MON) (TV Analysis)

110m Hurdles		Date: 2012.07.20	Wind: 0.0 m/s										FINAL						
			H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
<b>Merritt, Aries (USA) (1985)</b>	time	2.38	3.40	4.44	5.42	6.40	7.38	8.38	9.38	10.42	11.46	12.93		12.93	5 / 1				
	reaction time	0.112																	
	interval	7 steps	1.02	1.04	0.98	0.98	0.98	0.98	1.00	1.00	1.04	1.04	1.47	=PB		3.04	2.96	3.08	
	velocity	5.76	8.96	8.79	9.33	9.33	9.33	9.14	9.14	8.79	8.79	9.54	8.51			9.02	9.26	8.90	
<b>Richardson, Jason (USA) (1986)</b>	time	2.50	3.52	4.52	5.52	6.50	7.50	8.48	9.48	10.52	11.56		13.07		4 / 2				
	reaction time	0.162																	
	interval	7 steps	1.02	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.04	1.51			3.02	2.96	3.08	
	velocity	5.49	8.96	9.14	9.14	9.33	9.14	9.33	9.14	9.33	9.14	8.79	8.79	9.28	8.42		9.08	9.26	8.90
<b>Shubenkov, Sergey (RUS) (1982)</b>	time	2.46	3.50	4.52	5.54	6.54	7.52	8.52	9.54	10.56	11.60		13.09		7 / 3				
	reaction time	0.143																	
	interval		1.04	1.02	1.02	1.00	0.98	1.00	1.02	1.02	1.04	1.04	1.49	NR		3.08	2.98	3.08	
	velocity	5.58	8.79	8.96	8.96	9.14	9.33	9.14	8.96	8.96	8.79	9.41	8.40			8.90	9.20	8.90	
<b>Oliver, David (USA) (1990)</b>	time	2.46	3.50	4.52	5.54	6.52	7.52	8.54	9.54	10.58	11.64		13.14		6 / 4				
	reaction time	0.154																	
	interval	7 steps	1.04	1.02	1.02	0.98	1.00	1.02	1.00	1.04	1.06	1.50				3.08	3.00	3.10	
	velocity	5.58	8.79	8.96	8.96	9.33	9.14	8.96	9.14	8.87	8.79	8.62	9.35	8.37		8.90	9.14	8.85	
<b>Porter, Jeff (USA) (1985)</b>	time	2.46	3.50	4.53	5.53	6.55	7.55	8.55	9.58	10.62	11.71		13.19		3 / 5				
	reaction time	0.153																	
	interval		1.04	1.03	1.00	1.02	1.00	1.00	1.03	1.04	1.09	1.48				3.07	3.02	3.16	
	velocity	5.58	8.79	8.87	9.14	8.96	9.14	9.14	8.87	8.79	8.39	9.47	8.34			8.93	9.08	8.68	
<b>Darien, Garfield (FRA) (1987)</b>	time	2.48	3.54	4.54	5.56	6.56	7.58	8.60	9.64	10.71	11.81		13.27		2 / 6				
	reaction time	0.161																	
	interval		1.06	1.00	1.02	1.00	1.02	1.02	1.04	1.07	1.10	1.46				3.08	3.04	3.21	
	velocity	5.53	8.62	9.14	8.96	9.14	8.96	8.96	8.79	8.54	8.31	9.60	8.29			8.90	9.02	8.54	
<b>Riley, Andrew (JAM) (1988)</b>	time	2.46	3.50	4.53	5.55	6.57	7.64	8.67	9.71	10.72	11.81		13.28		8 / 7				
	reaction time	0.138																	
	interval		1.04	1.03	1.02	1.02	1.07	1.03	1.04	1.04	1.01	1.09	1.47			3.09	3.12	3.14	
	velocity	5.58	8.79	8.87	8.96	8.96	8.54	8.87	8.79	9.05	8.39	9.54	8.28			8.87	8.79	8.73	
<b>Bascou, Dimitri (FRA) (1987)</b>	time	2.50	3.55	4.60	5.64	6.67	7.71	8.77	9.84	10.91	12.01		13.54		1 / 8				
	reaction time	0.159																	
	interval	7 steps	1.05	1.05	1.04	1.03	1.04	1.06	1.07	1.07	1.10	1.53				3.14	3.13	3.24	
	velocity	5.49	8.70	8.70	8.79	8.87	8.79	8.62	8.54	8.54	8.31	9.16	8.12			8.73	8.76	8.46	



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=1vf64w4p0k0>

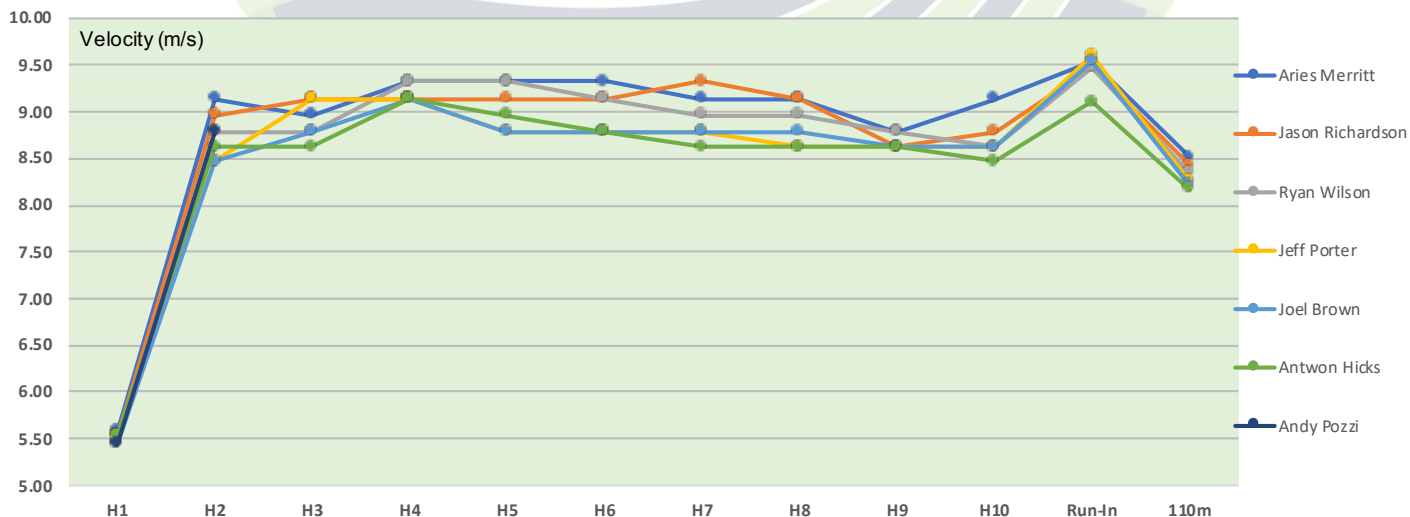
2012 AVIVA London Grand Prix (London, GBR) (TV Analysis)

110m Hurdles

Date: 2012.07.13 Wind: 0.6 m/s

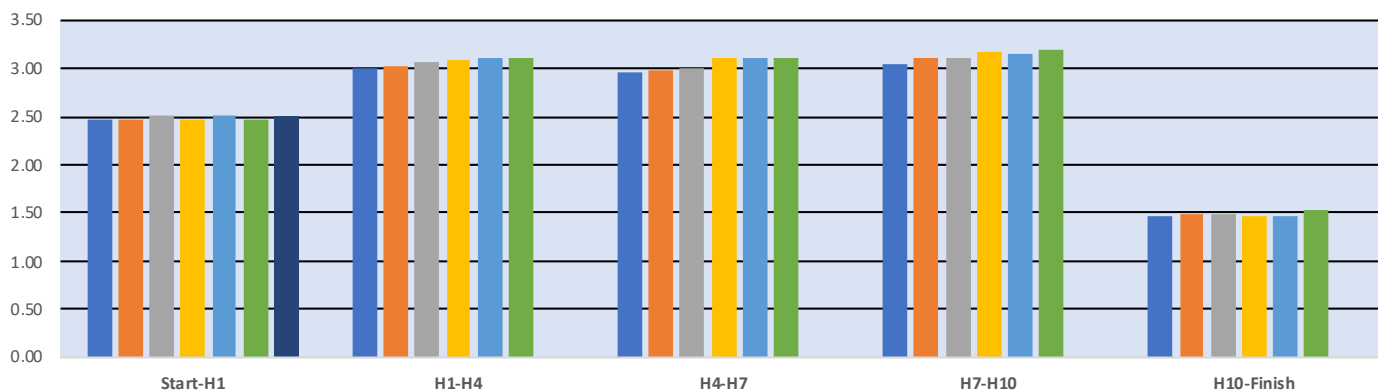
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.46	3.46	4.48	5.46	6.44	7.42	8.42	9.42	10.46	11.46	12.93		4 / 1			
	reaction time	0.137															
	interval	7 steps	1.00	1.02	0.98	0.98	0.98	0.98	1.00	1.00	1.04	1.00	1.47	=PB	3.00	2.96	3.04
	velocity	5.58	9.14	8.96	9.33	9.33	9.33	9.14	9.14	8.79	9.14	9.54	8.51		9.14	9.26	9.02
<b>Richardson, Jason (USA) (1986)</b>	time	2.48	3.50	4.50	5.50	6.50	7.50	8.48	9.48	10.54	11.58		13.06	3 / 2			
	reaction time	0.166															
	interval	7 steps	1.02	1.00	1.00	1.00	1.00	0.98	1.00	1.06	1.04	1.48			3.02	2.98	3.10
	velocity	5.53	8.96	9.14	9.14	9.14	9.14	9.33	9.14	8.62	8.79	9.47	8.42		9.08	9.20	8.85
<b>Wilson, Ryan (USA) (1980)</b>	time	2.52	3.56	4.60	5.58	6.56	7.56	8.58	9.60	10.64	11.70		13.18	7 / 3			
	reaction time	0.153															
	interval	7 steps	1.04	1.04	0.98	0.98	1.00	1.02	1.02	1.04	1.06	1.48			3.06	3.00	3.12
	velocity	5.44	8.79	8.79	9.33	9.33	9.14	8.96	8.96	8.79	8.62	9.47	8.35		8.96	9.14	8.79
<b>Porter, Jeff (USA) (1985)</b>	time	2.48	3.56	4.56	5.56	6.60	7.64	8.68	9.74	10.80	11.86		13.32	5 / 4			
	reaction time	0.154															
	interval		1.08	1.00	1.00	1.04	1.04	1.04	1.06	1.06	1.06	1.46			3.08	3.12	3.18
	velocity	5.53	8.46	9.14	9.14	8.79	8.79	8.79	8.62	8.62	8.62	9.60	8.26		8.90	8.79	8.62
<b>Brown, Joel (USA) (1980)</b>	time	2.52	3.60	4.64	5.64	6.68	7.72	8.76	9.80	10.86	11.92		13.39	6 / 5			
	reaction time	0.149															
	interval		1.08	1.04	1.00	1.04	1.04	1.04	1.04	1.06	1.06	1.47			3.12	3.12	3.16
	velocity	5.44	8.46	8.79	9.14	8.79	8.79	8.79	8.79	8.62	8.62	9.54	8.22		8.79	8.79	8.68
<b>Hicks, Antwon (USA) (1983)</b>	time	2.48	3.54	4.60	5.60	6.62	7.66	8.72	9.78	10.84	11.92		13.46	1 / 6			
	reaction time	0.165															
	interval	7 steps	1.06	1.06	1.00	1.02	1.04	1.06	1.06	1.06	1.08	1.54			3.12	3.12	3.20
	velocity	5.53	8.62	8.62	9.14	8.96	8.79	8.62	8.62	8.62	8.46	9.10	8.17		8.79	8.79	8.57
<b>Pozzi, Andy (GBR) (1992)</b>	time	2.52	3.56											dnf	2 / --		
	reaction time	0.160															
	interval		1.04														
	velocity	5.44	8.79														



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 25fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=iQanySaHsbY>

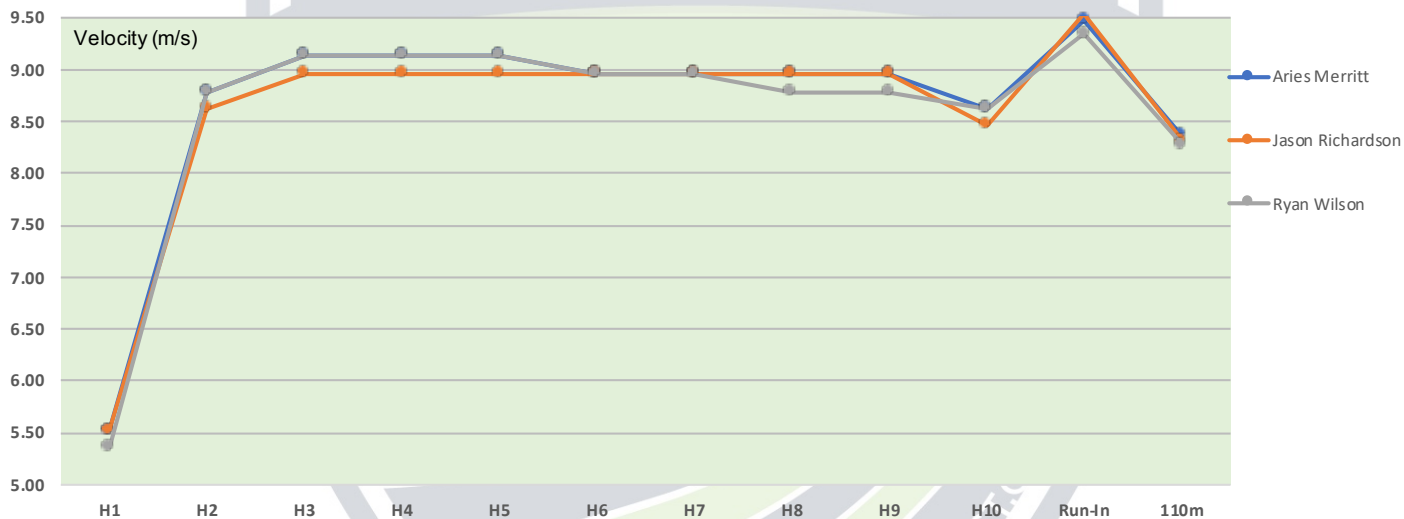
2012 AVIVA London Grand Prix (London, GBR) (TV Analysis)

110m Hurdles

Date: 2012.07.13 Wind: -0.9 m/s

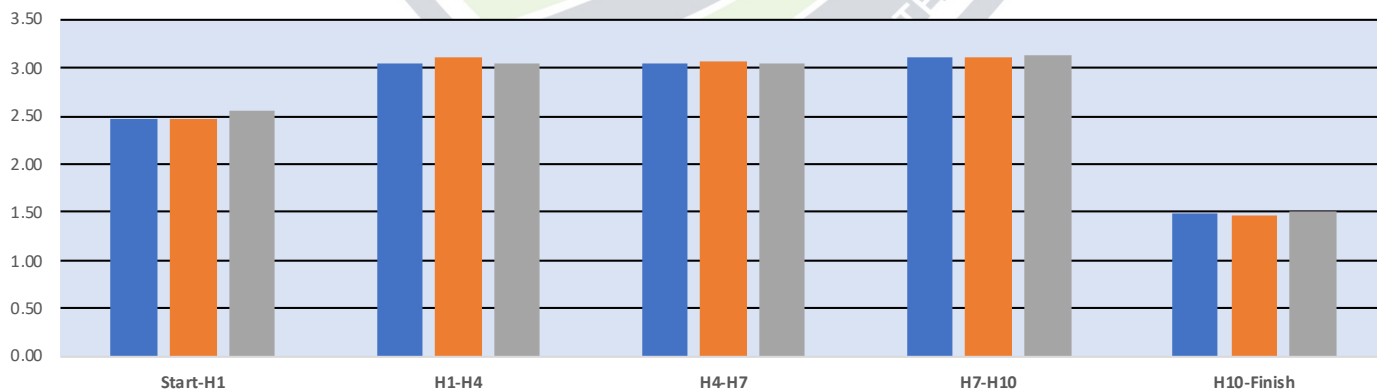
Heat 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.48	3.52	4.52	5.52	6.52	7.54	8.56	9.58	10.60	11.66	13.14	13.14	4 / 1			
	reaction time	0.139													3.04	3.04	3.10
	interval	7 steps	1.04	1.00	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.06	1.48		9.02	9.02	8.85
	velocity	5.53	8.79	9.14	9.14	9.14	8.96	8.96	8.96	8.96	8.62	9.47	8.37				
<b>Richardson, Jason (USA) (1986)</b>	time	2.48	3.54	4.56	5.58	6.60	7.62	8.64	9.66	10.68	11.76	13.23	13.23	3 / 2			
	reaction time	0.161													3.10	3.06	3.12
	interval	7 steps	1.06	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.08	1.47			8.85	8.96	8.79
	velocity	5.53	8.62	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.46	9.54	8.31				
<b>Wilson, Ryan (USA) (1980)</b>	time	2.56	3.60	4.60	5.60	6.60	7.62	8.64	9.68	10.72	11.78	13.28	13.28	5 / 3			
	reaction time	0.157													3.04	3.04	3.14
	interval	7 steps	1.04	1.00	1.00	1.00	1.02	1.02	1.04	1.04	1.06	1.50			9.02	9.02	8.73
	velocity	5.36	8.79	9.14	9.14	9.14	8.96	8.96	8.79	8.79	8.62	9.35	8.28				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 640 x 480 @ 25fps  
 Timing From: First Movement  
 Source: [https://www.youtube.com/watch?v=0MKgaU6I\\_cA](https://www.youtube.com/watch?v=0MKgaU6I_cA)



2012 USA Olympic Trials (Eugene, OR)

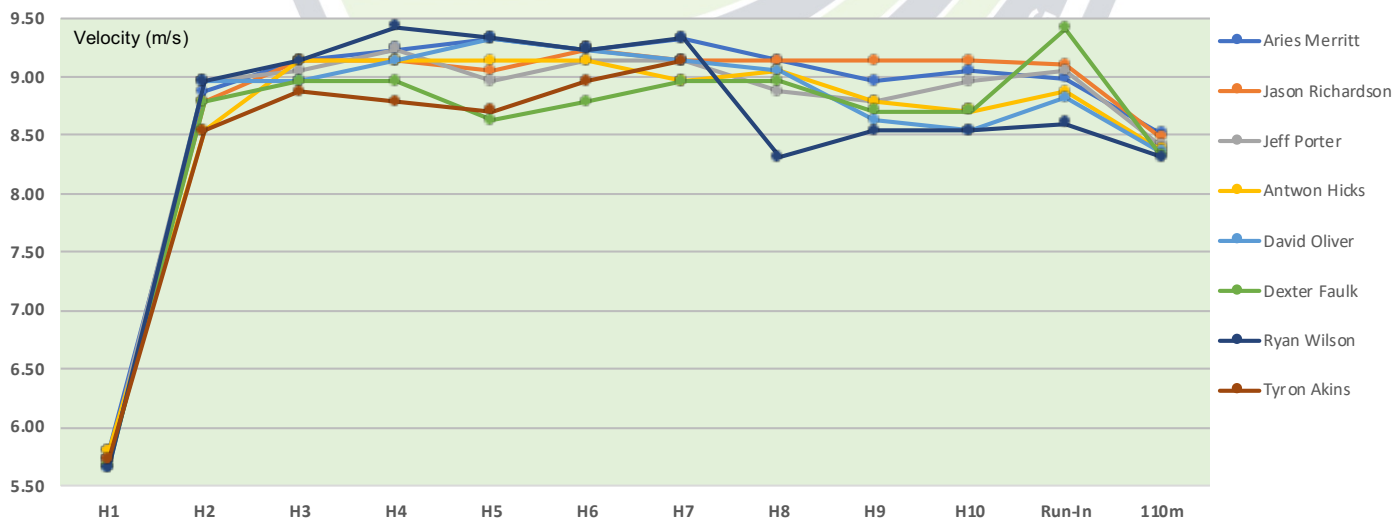
110m Hurdles

Date: 2012.06.30

Wind: 1.2 m/s

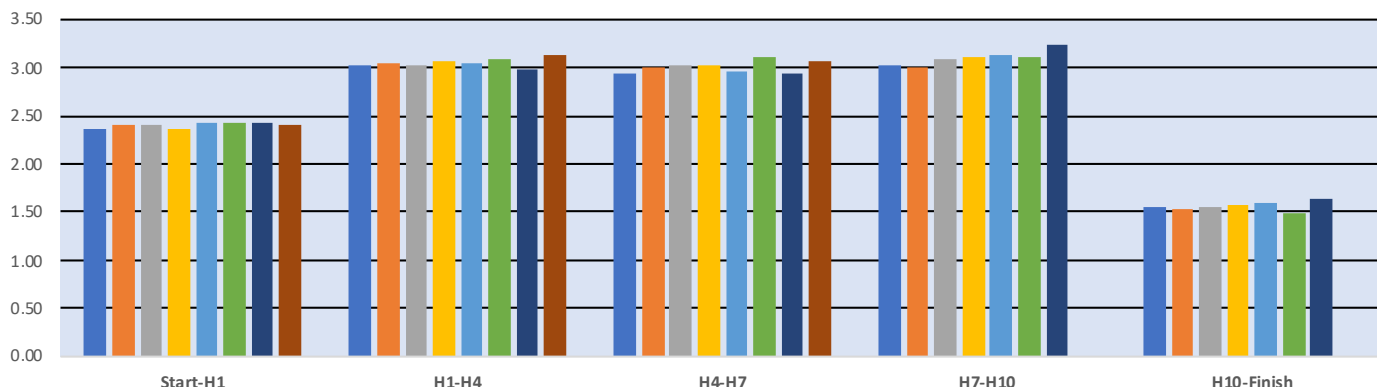
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10	
<b>Merritt, Aries (USA) (1985)</b>	time	2.37	3.40	4.40	5.39	6.37	7.36	8.34	9.34	10.36	11.37		12.93	5 / 1				
	reaction time	0.138																
	interval	7 steps	1.03	1.00	0.99	0.98	0.99	0.98	1.00	1.02	1.01	1.56	PB		3.02	2.95	3.03	
	velocity	5.79	8.87	9.14	9.23	9.33	9.23	9.33	9.14	8.96	9.05	8.99	8.51		9.08	9.29	9.05	
<b>Richardson, Jason (USA) (1986)</b>	time	2.40	3.44	4.44	5.44	6.45	7.44	8.44	9.44	10.44	11.44		12.98	6 / 2				
	reaction time	0.185																
	interval	7 steps	1.04	1.00	1.00	1.01	0.99	1.00	1.00	1.00	1.00	1.54	=PB		3.04	3.00	3.00	
	velocity	5.72	8.79	9.14	9.14	9.05	9.23	9.14	9.14	9.14	9.14	9.10	8.47		9.02	9.14	9.14	
<b>Porter, Jeff (USA) (1985)</b>	time	2.40	3.42	4.43	5.42	6.44	7.44	8.44	9.47	10.51	11.53		13.08	4 / 3				
	reaction time	0.157																
	interval	7 steps	1.02	1.01	0.99	1.02	1.00	1.00	1.03	1.04	1.02	1.55	PB		3.02	3.02	3.09	
	velocity	5.72	8.96	9.05	9.23	8.96	9.14	9.14	8.87	8.79	8.96	9.05	8.41		9.08	9.08	8.87	
<b>Hicks, Antwon (USA) (1983)</b>	time	2.37	3.44	4.44	5.44	6.44	7.44	8.46	9.47	10.51	11.56		13.14	2 / 4				
	reaction time	0.158																
	interval	7 steps	1.07	1.00	1.00	1.00	1.00	1.02	1.01	1.04	1.05	1.58			3.07	3.02	3.10	
	velocity	5.79	8.54	9.14	9.14	9.14	9.14	8.96	9.05	8.79	8.70	8.87	8.37		8.93	9.08	8.85	
<b>Oliver, David (USA) (1982)</b>	time	2.43	3.45	4.47	5.47	6.45	7.44	8.44	9.45	10.51	11.58		13.17	3 / 5				
	reaction time	0.165																
	interval	7 steps	1.02	1.02	1.00	0.98	0.99	1.00	1.01	1.06	1.07	1.59			3.04	2.97	3.14	
	velocity	5.65	8.96	8.96	9.14	9.33	9.23	9.14	9.05	8.62	8.54	8.82	8.35		9.02	9.23	8.73	
<b>Faulk, Dexter (USA) (1984)</b>	time	2.42	3.46	4.48	5.50	6.56	7.60	8.62	9.64	10.69	11.74		13.23	8 / 6				
	reaction time	0.142																
	interval	7 steps	1.04	1.02	1.02	1.06	1.04	1.02	1.02	1.05	1.05	1.49			3.08	3.12	3.12	
	velocity	5.67	8.79	8.96	8.96	8.62	8.79	8.96	8.96	8.70	8.70	9.41	8.31		8.90	8.79	8.79	
<b>Wilson, Ryan (USA) (1980)</b>	time	2.43	3.45	4.45	5.42	6.40	7.39	8.37	9.47	10.54	11.61		13.24	7 / 7				
	reaction time	0.179																
	interval	7 steps	1.02	1.00	0.97	0.98	0.99	0.98	1.10	1.07	1.07	1.63			2.99	2.95	3.24	
	velocity	5.65	8.96	9.14	9.42	9.33	9.23	9.33	8.31	8.54	8.54	8.60	8.31		9.17	9.29	8.46	
<b>Akins, Tyron (USA) (1986)</b>	time	2.40	3.47	4.50	5.54	6.59	7.61	8.61						dnf	1 / --			
	reaction time	0.179																
	interval	7 steps	1.07	1.03	1.04	1.05	1.02	1.00								3.14	3.07	
	velocity	5.72	8.54	8.87	8.79	8.70	8.96	9.14							8.73	8.93		



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 30fps  
 Timing From: First Movement  
 Source: Behm - Coach Video

2012 Prefontaine Classic (Eugene, OR) (TV Analysis)

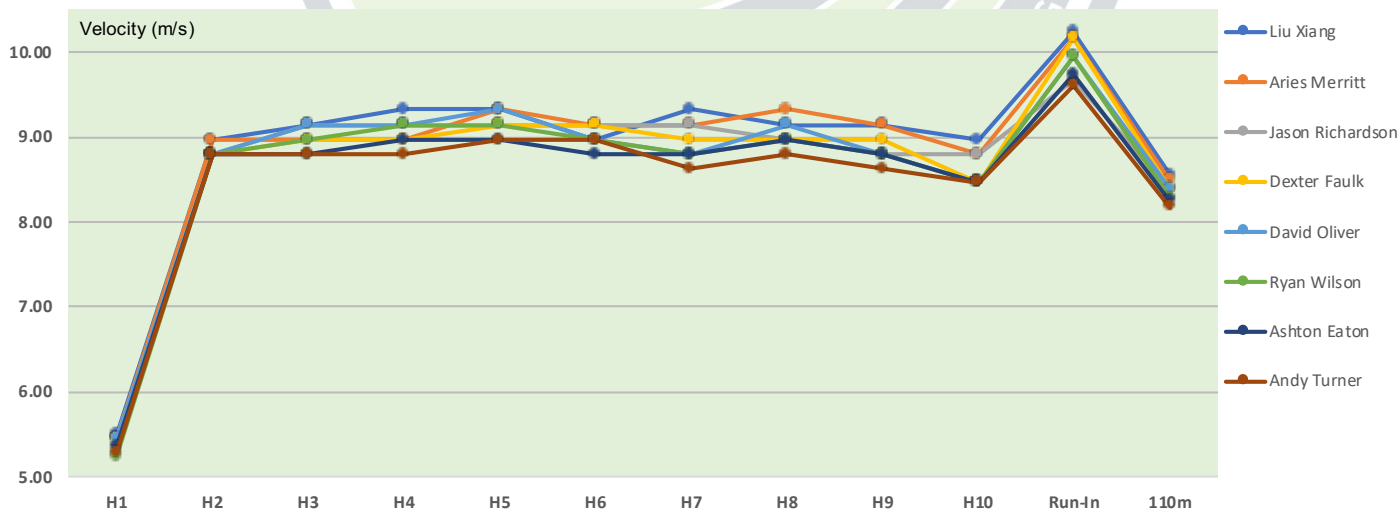
110m Hurdles

Date: 2012.06.02

Wind: 2.4 m/s

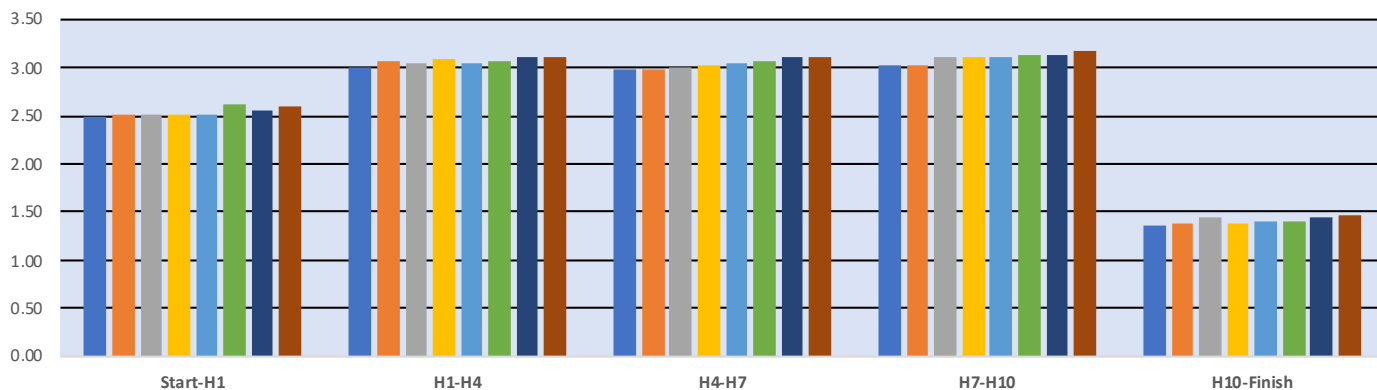
Semi-Final 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Liu Xiang (CHN) (1983)</b>	time	2.50	3.52	4.52	5.50	6.48	7.50	8.48	9.48	10.48	11.50		12.87	5 / 1			
	reaction time	0.131													3.00	2.98	3.02
	interval	7 steps	1.02	1.00	0.98	0.98	1.02	0.98	1.00	1.00	1.02	1.37			9.14	9.20	9.08
	velocity	5.49	8.96	9.14	9.33	9.33	8.96	9.33	9.14	9.14	8.96	10.23	8.55				
<b>Merritt, Aries (USA) (1985)</b>	time	2.52	3.54	4.56	5.58	6.56	7.56	8.56	9.54	10.54	11.58		12.96	3 / 2			
	reaction time	0.151													3.06	2.98	3.02
	interval	7 steps	1.02	1.02	1.02	0.98	1.00	1.00	0.98	1.00	1.04	1.38			8.96	9.20	9.08
	velocity	5.44	8.96	8.96	8.96	9.33	9.14	9.14	9.33	9.14	8.79	10.16	8.49				
<b>Richardson, Jason (USA) (1986)</b>	time	2.52	3.56	4.56	5.56	6.56	7.56	8.56	9.58	10.62	11.66		13.11	4 / 3			
	reaction time	0.159													3.04	3.00	3.10
	interval	7 steps	1.04	1.00	1.00	1.00	1.00	1.00	1.02	1.04	1.04	1.45			9.02	9.14	8.85
	velocity	5.44	8.79	9.14	9.14	9.14	9.14	9.14	8.96	8.79	8.79	9.67	8.39				
<b>Faulk, Dexter (USA) (1984)</b>	time	2.52	3.56	4.58	5.60	6.60	7.60	8.62	9.64	10.66	11.74		13.12	7 / 4			
	reaction time	0.143													3.08	3.02	3.12
	interval	7 steps	1.04	1.02	1.02	1.00	1.00	1.02	1.02	1.02	1.08	1.38			8.90	9.08	8.79
	velocity	5.44	8.79	8.96	8.96	9.14	9.14	8.96	8.96	8.96	8.46	10.16	8.38				
<b>Oliver, David (USA) (1982)</b>	time	2.52	3.56	4.56	5.56	6.54	7.56	8.60	9.60	10.64	11.72		13.13	6 / 5			
	reaction time	0.171													3.04	3.04	3.12
	interval	7 steps	1.04	1.00	1.00	0.98	1.02	1.04	1.00	1.04	1.08	1.41			9.02	9.02	8.79
	velocity	5.44	8.79	9.14	9.14	9.33	8.96	8.79	9.14	8.79	8.46	9.94	8.38				
<b>Wilson, Ryan (USA) (1980)</b>	time	2.62	3.66	4.68	5.68	6.68	7.70	8.74	9.76	10.80	11.88		13.29	8 / 6			
	reaction time	0.194													3.06	3.06	3.14
	interval	7 steps	1.04	1.02	1.00	1.00	1.02	1.04	1.02	1.04	1.08	1.41			8.96	8.96	8.73
	velocity	5.24	8.79	8.96	9.14	9.14	8.96	8.79	8.96	8.79	8.46	9.94	8.28				
<b>Eaton, Ashton (USA) (1988)</b>	time	2.56	3.60	4.64	5.66	6.68	7.72	8.76	9.78	10.82	11.90		13.34	1 / 7			
	reaction time	0.168													3.10	3.10	3.14
	interval	7 steps	1.04	1.04	1.02	1.02	1.04	1.04	1.02	1.04	1.08	1.44			8.85	8.85	8.73
	velocity	5.36	8.79	8.79	8.96	8.96	8.79	8.79	8.96	8.79	8.46	9.74	8.25				
<b>Turner, Andy (GBR) (1980)</b>	time	2.60	3.64	4.68	5.72	6.74	7.76	8.82	9.86	10.92	12.00		13.46	2 / 8			
	reaction time	0.149													3.12	3.10	3.18
	interval	7 steps	1.04	1.04	1.04	1.02	1.02	1.06	1.04	1.06	1.08	1.46			8.79	8.85	8.62
	velocity	5.28	8.79	8.79	8.79	8.96	8.96	8.62	8.79	8.62	8.46	9.60	8.17				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 25fps  
 Timing From: Gun Flash  
 Source: <https://www.youtube.com/watch?v=vXf-iTi7IAk>

2012 Golden Grand Prix (Shanghai, CHN)

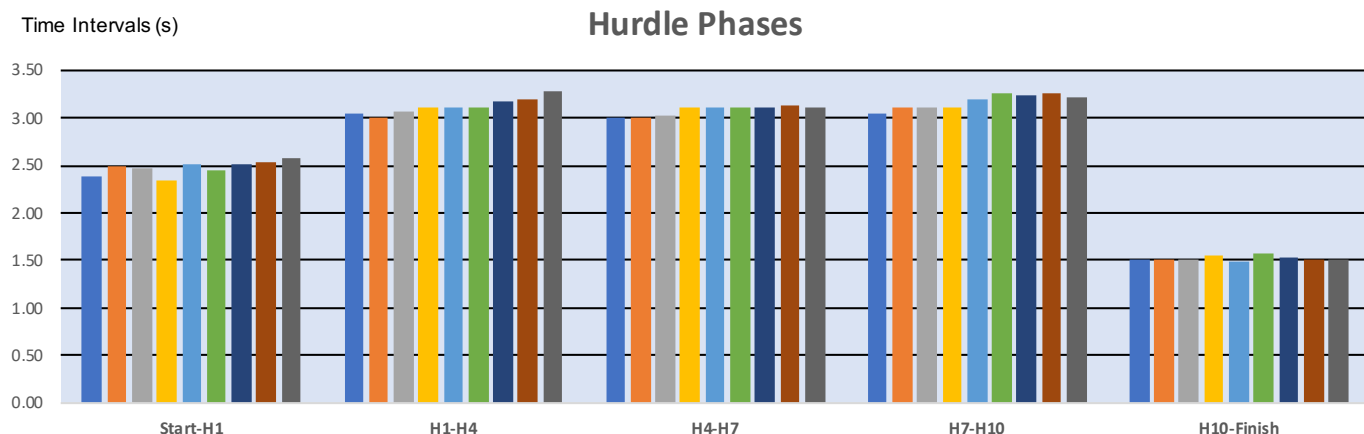
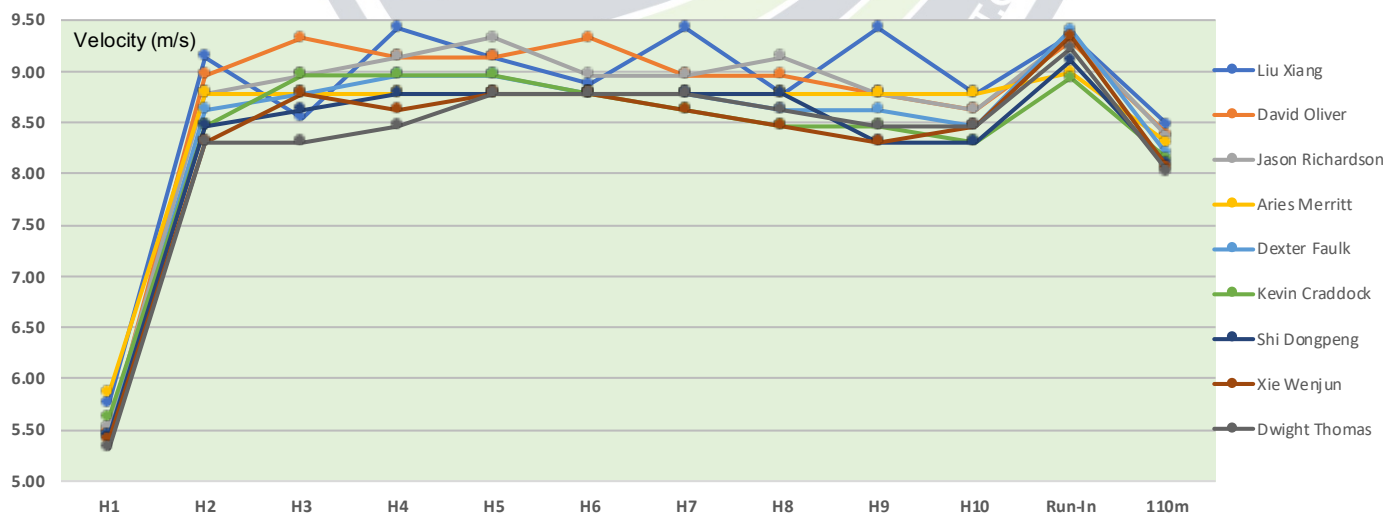
110m Hurdles

Date: 2012.05.19

Wind: 0.4 m/s

FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Liu Xiang (CHN) (1983)</b>	time	2.38	3.38	4.45	5.42	6.42	7.45	8.42	9.46	10.43	11.47		12.97	5 / 1			
	reaction time	0.160															
	interval		1.00	1.07	0.97	1.00	1.03	0.97	1.04	0.97	1.04	1.50			3.04	3.00	3.05
	velocity	5.76	9.14	8.54	9.42	9.14	8.87	9.42	8.79	9.42	8.79	9.35	8.48		9.02	9.14	8.99
<b>Oliver, David (USA) (1982)</b>	time	2.50	3.52	4.50	5.50	6.50	7.48	8.50	9.52	10.56	11.62		13.13	7 / 2			
	reaction time	0.192															
	interval		1.02	0.98	1.00	1.00	0.98	1.02	1.02	1.04	1.06	1.51			3.00	3.00	3.12
	velocity	5.49	8.96	9.33	9.14	9.14	9.33	8.96	8.96	8.79	8.62	9.28	8.38		9.14	9.14	8.79
<b>Richardson, Jason (USA) (1986)</b>	time	2.48	3.52	4.54	5.54	6.52	7.54	8.56	9.56	10.60	11.66		13.16	4 / 3			
	reaction time	0.168															
	interval		1.04	1.02	1.00	0.98	1.02	1.02	1.00	1.04	1.06	1.50			3.06	3.02	3.10
	velocity	5.53	8.79	8.96	9.14	9.33	8.96	8.96	9.14	8.79	8.62	9.35	8.36		8.96	9.08	8.85
<b>Merritt, Aries (USA) (1985)</b>	time	2.34	3.38	4.42	5.46	6.50	7.54	8.58	9.62	10.66	11.70		13.26	6 / 4			
	reaction time	0.142															
	interval		1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.56			3.12	3.12	3.12
	velocity	5.86	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.99	8.30		8.79	8.79	8.79
<b>Faulk, Dexter (USA) (1984)</b>	time	2.52	3.58	4.62	5.64	6.66	7.70	8.74	9.80	10.86	11.94		13.43	2 / 5			
	reaction time	0.177															
	interval		1.06	1.04	1.02	1.02	1.04	1.04	1.06	1.06	1.08	1.49			3.12	3.10	3.20
	velocity	5.44	8.62	8.79	8.96	8.96	8.79	8.79	8.62	8.62	8.46	9.41	8.19		8.79	8.85	8.57
<b>Craddock, Kevin (USA) (1987)</b>	time	2.44	3.52	4.54	5.56	6.58	7.62	8.68	9.76	10.84	11.94		13.51	9 / 6			
	reaction time	0.167															
	interval		1.08	1.02	1.02	1.02	1.04	1.06	1.08	1.08	1.10	1.57			3.12	3.12	3.26
	velocity	5.62	8.46	8.96	8.96	8.96	8.79	8.62	8.46	8.46	8.31	8.93	8.14		8.79	8.79	8.41
<b>Shi Dongpeng (CHN) (1984)</b>	time	2.52	3.60	4.66	5.70	6.74	7.78	8.82	9.86	10.96	12.06		13.60	1 / 7			
	reaction time	0.155															
	interval		1.08	1.06	1.04	1.04	1.04	1.04	1.04	1.10	1.10	1.54			3.18	3.12	3.24
	velocity	5.44	8.46	8.62	8.79	8.79	8.79	8.79	8.79	8.31	8.31	9.10	8.09		8.62	8.79	8.46
<b>Xie Wenjun (CHN) (1990)</b>	time	2.54	3.64	4.68	5.74	6.78	7.82	8.88	9.96	11.06	12.14		13.64	8 / 8			
	reaction time	0.179															
	interval		1.10	1.04	1.06	1.04	1.04	1.06	1.08	1.10	1.08	1.50			3.20	3.14	3.26
	velocity	5.40	8.31	8.79	8.62	8.79	8.79	8.62	8.46	8.31	8.46	9.35	8.06		8.57	8.73	8.41
<b>Thomas, Dwight (JAM) (1980)</b>	time	2.58	3.68	4.78	5.86	6.90	7.94	8.98	10.04	11.12	12.20		13.72	3 / 9			
	reaction time	0.174															
	interval		1.10	1.10	1.08	1.04	1.04	1.04	1.06	1.08	1.08	1.52			3.28	3.12	3.22
	velocity	5.32	8.31	8.31	8.46	8.79	8.79	8.79	8.62	8.46	8.46	9.22	8.02		8.36	8.79	8.52



Liu Xiang & Aries Merritt

Source: Feng L. & Chen T. (2016) Liu Xiang's seven-step starting: A discussion on the key issues of 110m hurdles technical training. Journal of Ningbo Institute of Education, 18 (3). p. 66. (in Chinese)

2nd, 3rd, & 5th - 9th Places (TV Analysis)

Evaluated with: ObjectusVideo  
Quality & Frame Rate: 1280 x 720 @ 25fps  
Timing From: First Movement

Source: <https://www.youtube.com/watch?v=wylom4zstS8>

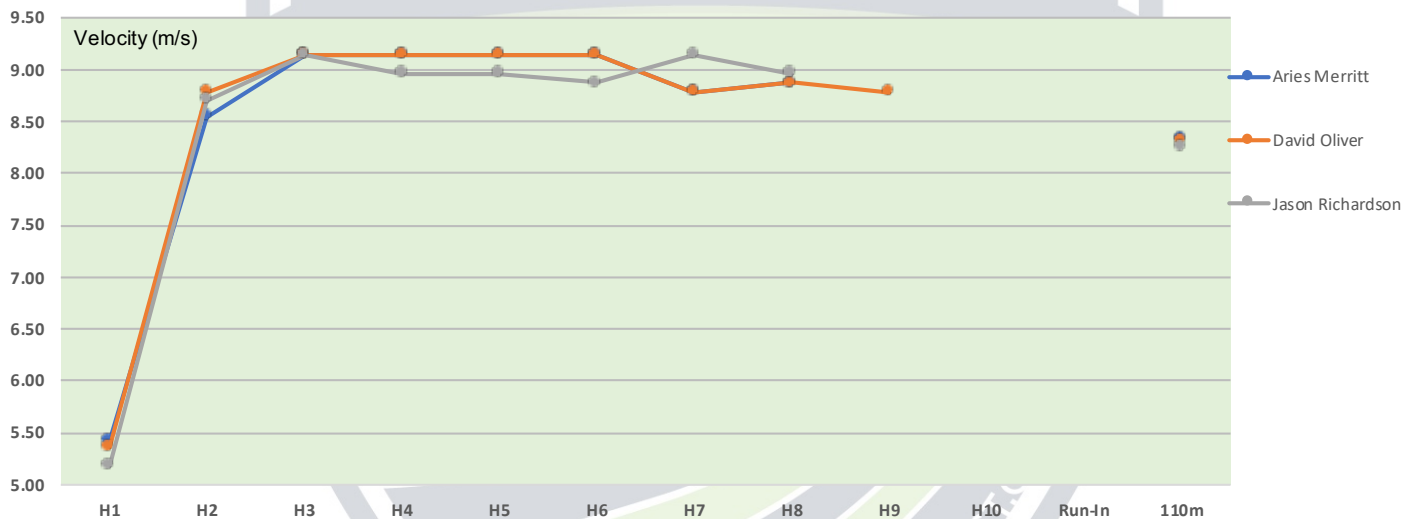
2012 Colorful Daegu Meeting (Daegu, KOR) (TV Analysis)

110m Hurdles

Date: 2012.05.16 Wind: -0.4 m/s

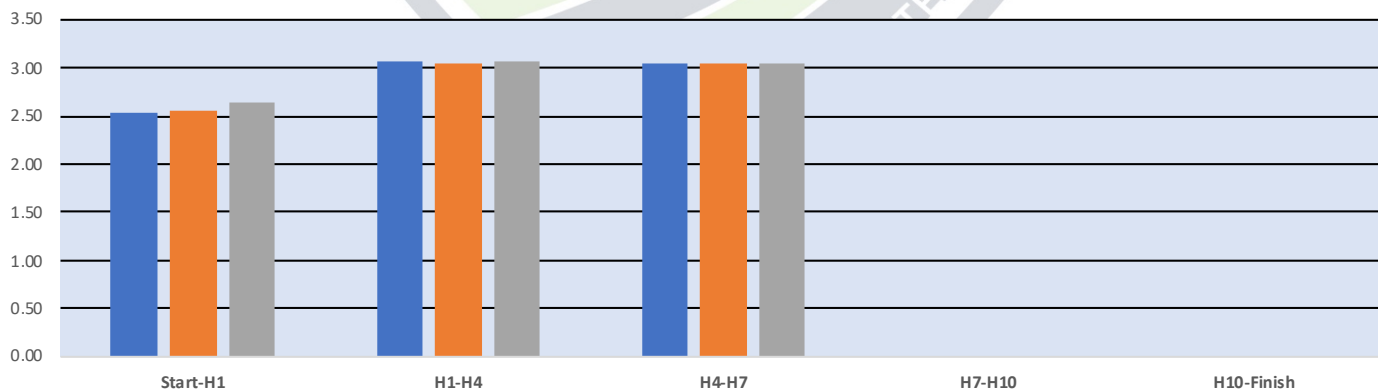
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
<b>Merritt, Aries (USA) (1985)</b>	time	2.53	3.60	4.60	5.60	6.60	7.60	8.64	9.67				13.21	3 / 1			
	reaction time	0.165															
	interval	7 steps	1.07	1.00	1.00	1.00	1.00	1.00	1.04	1.03					3.07	3.04	
	velocity	5.42	8.54	9.14	9.14	9.14	9.14	8.79	8.87				8.33		8.93	9.02	
<b>Oliver, David (USA) (1982)</b>	time	2.56	3.60	4.60	5.60	6.60	7.60	8.64	9.67	10.71			13.22	5 / 2			
	reaction time	0.180															
	interval	7 steps	1.04	1.00	1.00	1.00	1.00	1.00	1.04	1.03	1.04				3.04	3.04	
	velocity	5.36	8.79	9.14	9.14	9.14	9.14	8.79	8.87	8.79			8.32		9.02	9.02	
<b>Richardson, Jason (USA) (1986)</b>	time	2.65	3.70	4.70	5.72	6.74	7.77	8.77	9.79				13.34	4 / 3			
	reaction time	0.234															
	interval	7 steps	1.05	1.00	1.02	1.02	1.03	1.00	1.02						3.07	3.05	
	velocity	5.18	8.70	9.14	8.96	8.96	8.87	9.14	8.96				8.25		8.93	8.99	



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 640 x 480 @ 30fps  
 Timing From: Gun Flash  
 Source: <https://www.youtube.com/watch?v=upK9m0G73SE>

2012 Arkansas Twilight (Fayetteville, AR)

110m Hurdles

Date: 2012.05.04

Wind: 1.0 m/s

FINAL

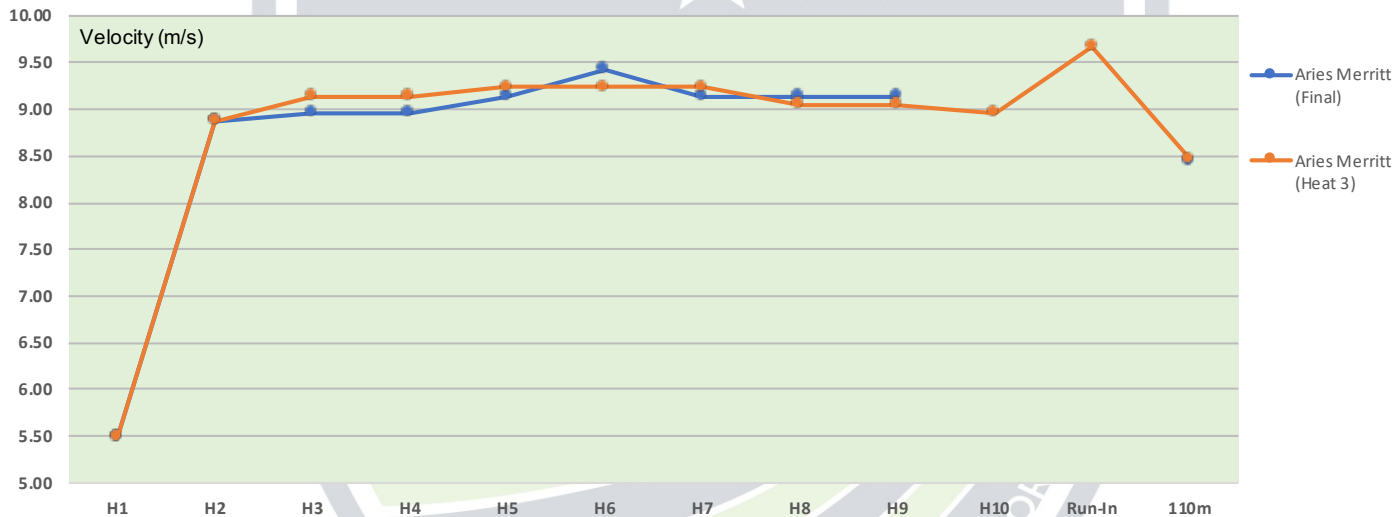
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time	2.50	3.53	4.55	5.57	6.57	7.54	8.54	9.54	10.54	11.54	13.03	13.03	5 / 1	3.07	2.97	
	reaction time																
	interval	7 steps	1.03	1.02	1.02	1.00	0.97	1.00	1.00	1.00					8.93	9.23	
	velocity	5.49	8.87	8.96	8.96	9.14	9.42	9.14	9.14	9.14		8.44					

Date: 2012.05.04

Wind: 2.9 m/s

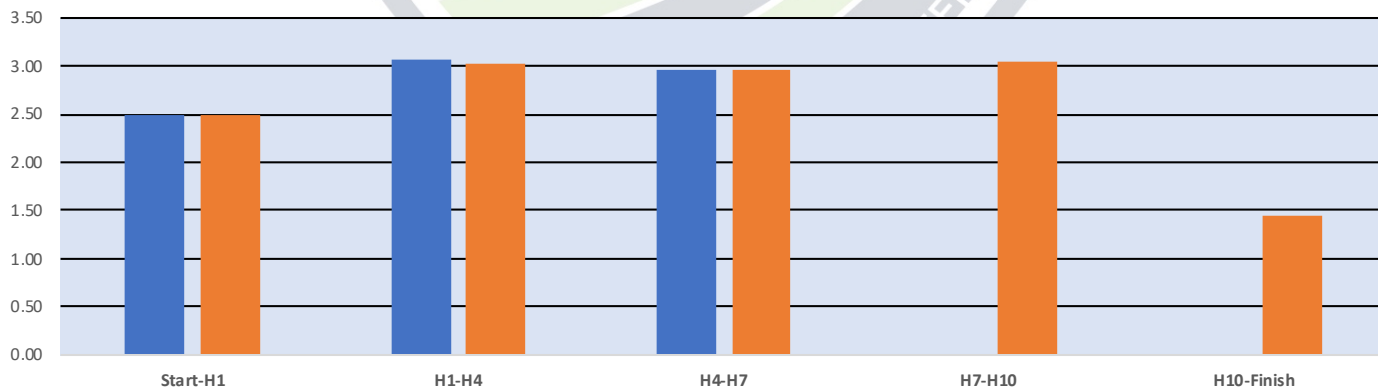
Heat 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	110m	Lane/Place	H1-H4	H4-H7	H7-H10
Merritt, Aries (USA) (1985)	time	2.50	3.53	4.53	5.53	6.52	7.51	8.50	9.51	10.52	11.54	12.99	12.99	5 / 1	3.03	2.97	3.04
	reaction time																
	interval	7 steps	1.03	1.00	1.00	0.99	0.99	0.99	1.01	1.01	1.02	1.45			9.05	9.23	9.02
	velocity	5.49	8.87	9.14	9.14	9.23	9.23	9.23	9.05	9.05	8.96	9.67	8.47				



Time Intervals (s)

Hurdle Phases



**Final**  
 Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 30fps  
 Timing From: First Movement  
 Source: Behm - Coach Video

**Heat 3**  
 Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 30fps  
 Timing From: First Movement  
 Source: Behm - Coach Video



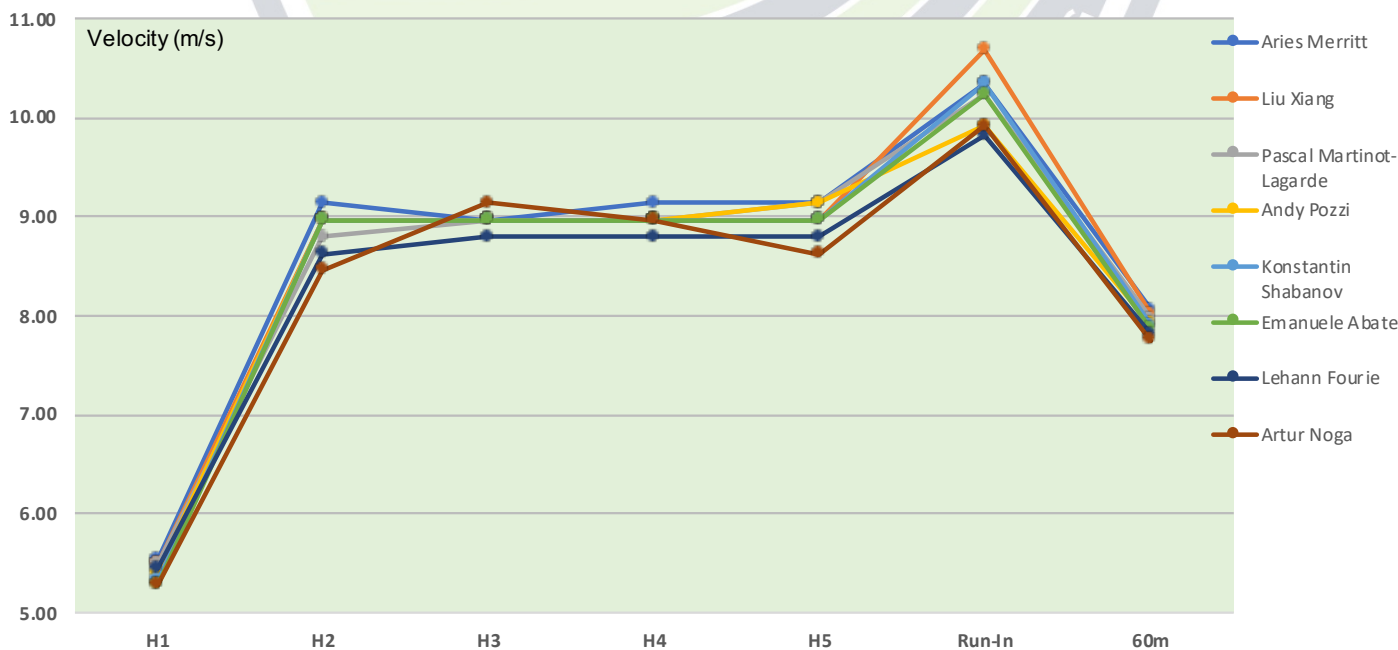
2012 IAAF World Indoor Championships (Istanbul, TUR) (TV Analysis)

60m Hurdles

Date: 2012.03.11

FINAL

			H1	H2	H3	H4	H5	Run-In	60m	Lane/Place
<b>Merritt, Aries (USA) (1985)</b>	time		2.48	3.48	4.50	5.50	6.50		7.44	4 / 1
reaction time	0.135	interval	7 steps	1.00	1.02	1.00	1.00	0.94		
		velocity	5.53	9.14	8.96	9.14	9.14	10.34	8.06	
<b>Liu Xiang (CHN) (1983)</b>	time		2.50	3.52	4.54	5.56	6.58		7.49	3 / 2
reaction time	0.167	interval	7 steps	1.02	1.02	1.02	1.02	0.91		
		velocity	5.49	8.96	8.96	8.96	8.96	10.68	8.01	
<b>Martinot Lagarde, Pascal (FRA) (1991)</b>	time		2.50	3.54	4.56	5.58	6.58		7.53	6 / 3
reaction time	0.141	interval	5.49	1.04	1.02	1.02	1.00	0.95		
		velocity	5.49	8.79	8.96	8.96	9.14	10.23	7.97	
<b>Pozzi, Andy (GBR) (1992)</b>	time		2.54	3.56	4.58	5.60	6.60		7.58	5 / 4
reaction time	0.155	interval	5.40	1.02	1.02	1.02	1.00	0.98		
		velocity	5.40	8.96	8.96	8.96	9.14	9.92	7.92	
<b>Shabanov, Konstantin (RUS) (1989)</b>	time		2.58	3.60	4.62	5.64	6.66		7.60	2 / 5
reaction time	0.202	interval	5.32	1.02	1.02	1.02	1.02	0.94		
		velocity	5.32	8.96	8.96	8.96	8.96	10.34	7.89	
<b>Abate, Emanuele (ITA) (1985)</b>	time		2.60	3.62	4.64	5.66	6.68		7.63	7 / 6
reaction time	0.155	interval	7 steps	1.02	1.02	1.02	1.02	0.95		
		velocity	5.28	8.96	8.96	8.96	8.96	10.23	7.86	
<b>Fourie, Lehann (RSA) (1987)</b>	time		2.52	3.58	4.62	5.66	6.70		7.69	8 / 7
reaction time	0.147	interval	7 steps	1.06	1.04	1.04	1.04	0.99		
		velocity	5.44	8.62	8.79	8.79	8.79	9.82	7.80	
<b>Noga, Artur (POL) (1988)</b>	time		2.60	3.68	4.68	5.70	6.76		7.74	1 / 8
reaction time	0.157	interval	5.28	1.08	1.00	1.02	1.06	0.98		
		velocity	5.28	8.46	9.14	8.96	8.62	9.92	7.75	



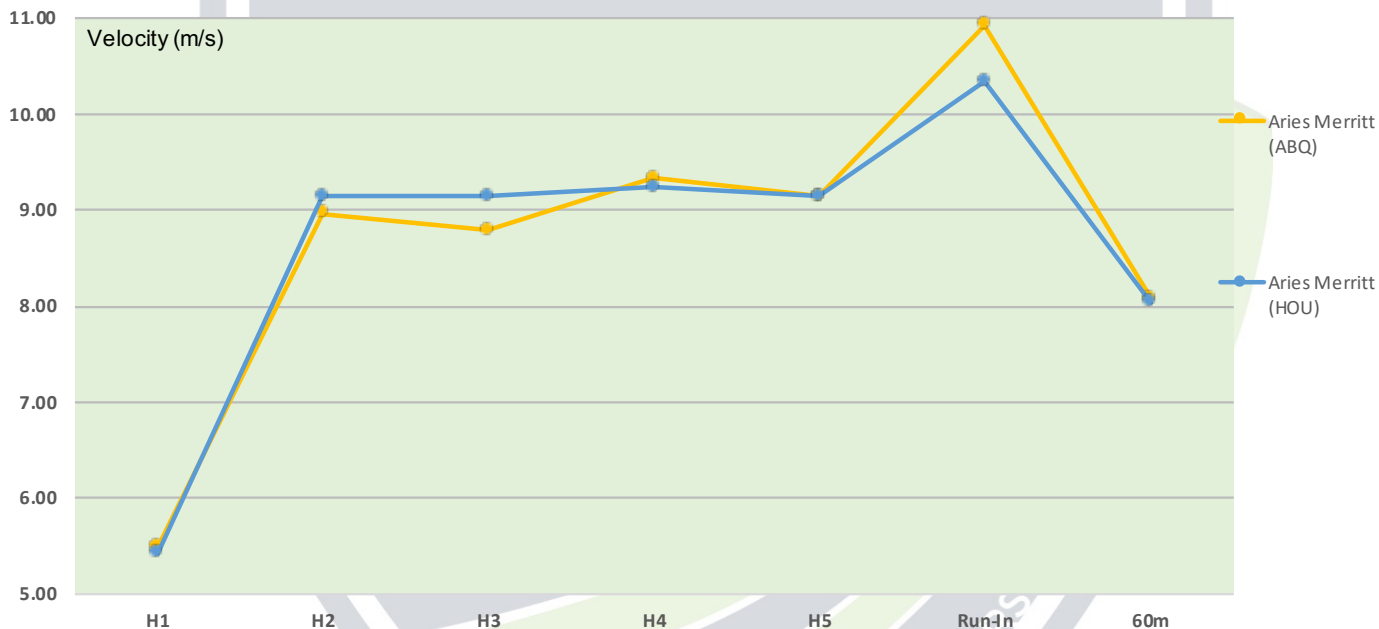
Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 25fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=uEPQJ299tU>

2012 USATF National Indoor Championships (Albuquerque, NM) (Altitude) (TV Analysis)

60m Hurdles		Date: 2012.02.26							FINAL	
		H1	H2	H3	H4	H5	Run-In	60m	Lane/Place	
Merritt, Aries (USA) (1985)	time	2.50	3.52	4.56	5.54	6.54		7.43	6 / 1	
reaction time	0.138	interval	7 steps	1.02	1.04	0.98	1.00	0.89	PB	
	velocity	5.49	8.96	8.79	9.33	9.14	10.92	8.08		

2012 Leonard Hilton Memorial Invitational (Houston, TX)

60m Hurdles		Date: 2012.01.13							FINAL	
		H1	H2	H3	H4	H5	Run-In	60m	Lane/Place	
Merritt, Aries (USA) (1985)	time	2.53	3.53	4.53	5.52	6.52		7.46	5 / 1	
reaction time		interval	7 steps	1.00	0.99	1.00	0.94			
	velocity	5.42	9.14	9.14	9.23	9.14	10.34	8.04		



USATF National Indoor Championships

Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1280 x 720 @ 24fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=anJNzbU0giQ>

Leonard Hilton Memorial

Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 30fps  
 Timing From: First Movement  
 Source: Behm - Coach Video