

# Development of an online metric rugby analysis tool



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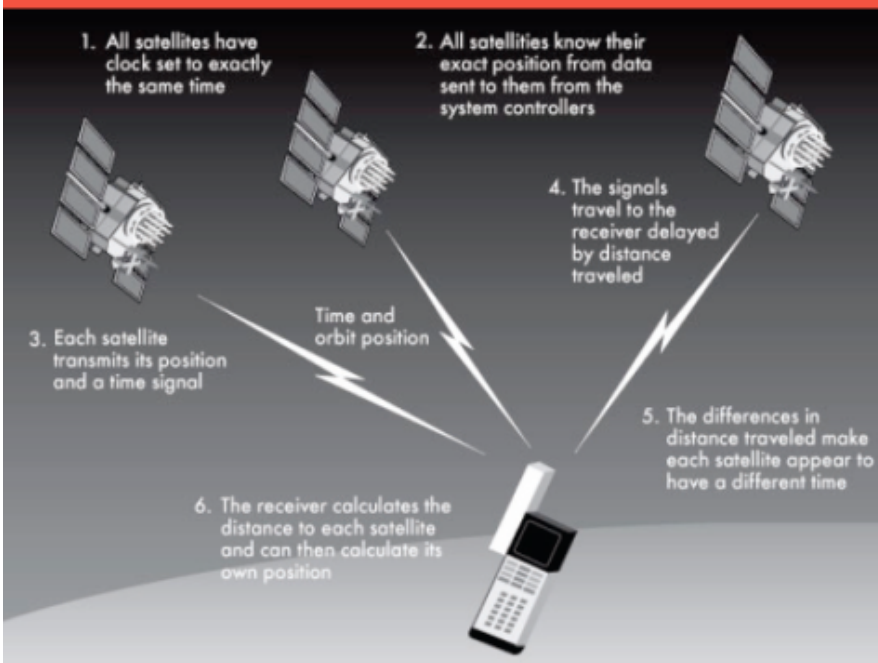
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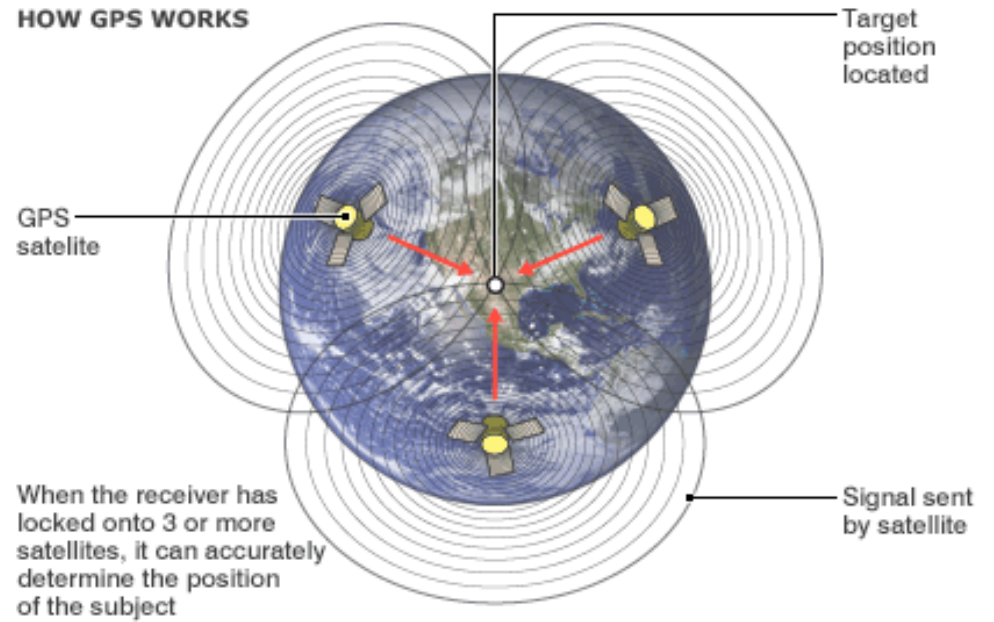




**Figure 1: Schematic representation of the global positioning system (GPS) system\***

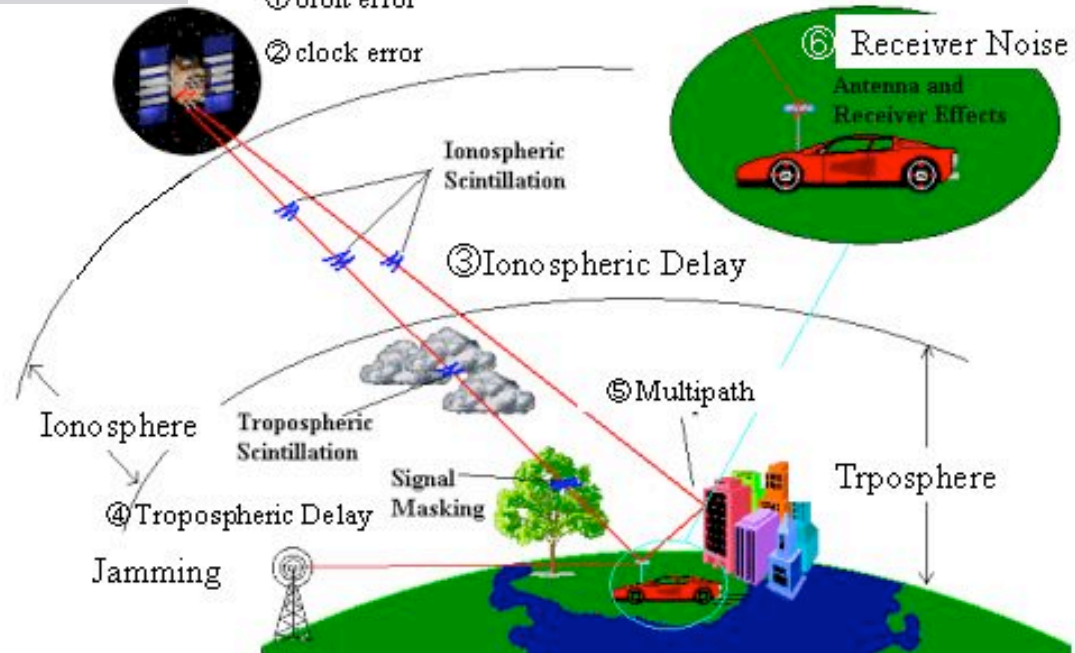
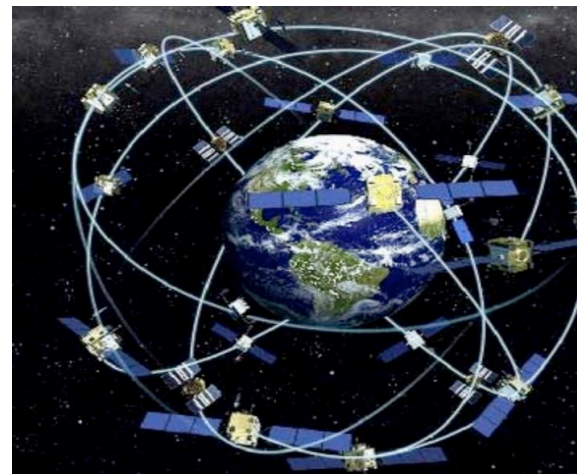


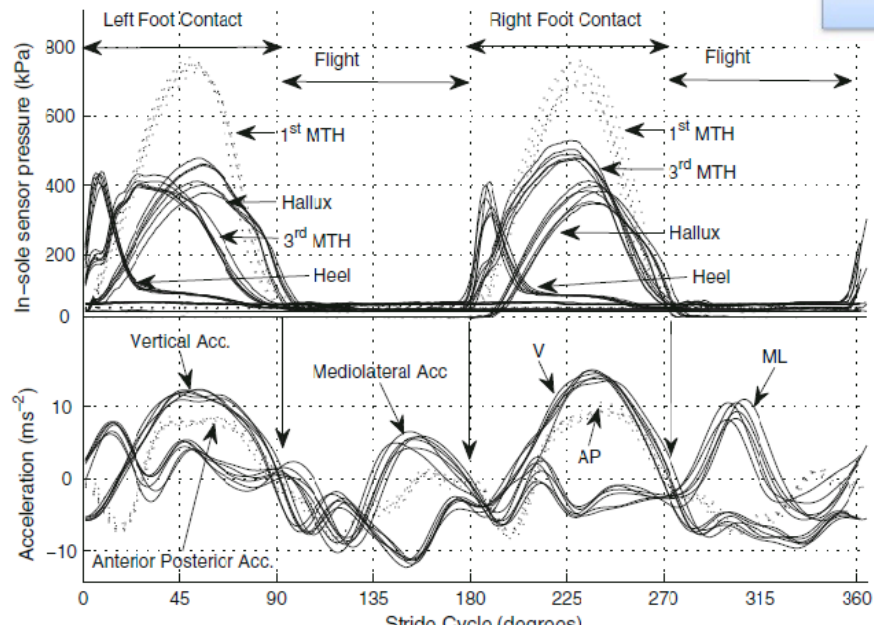
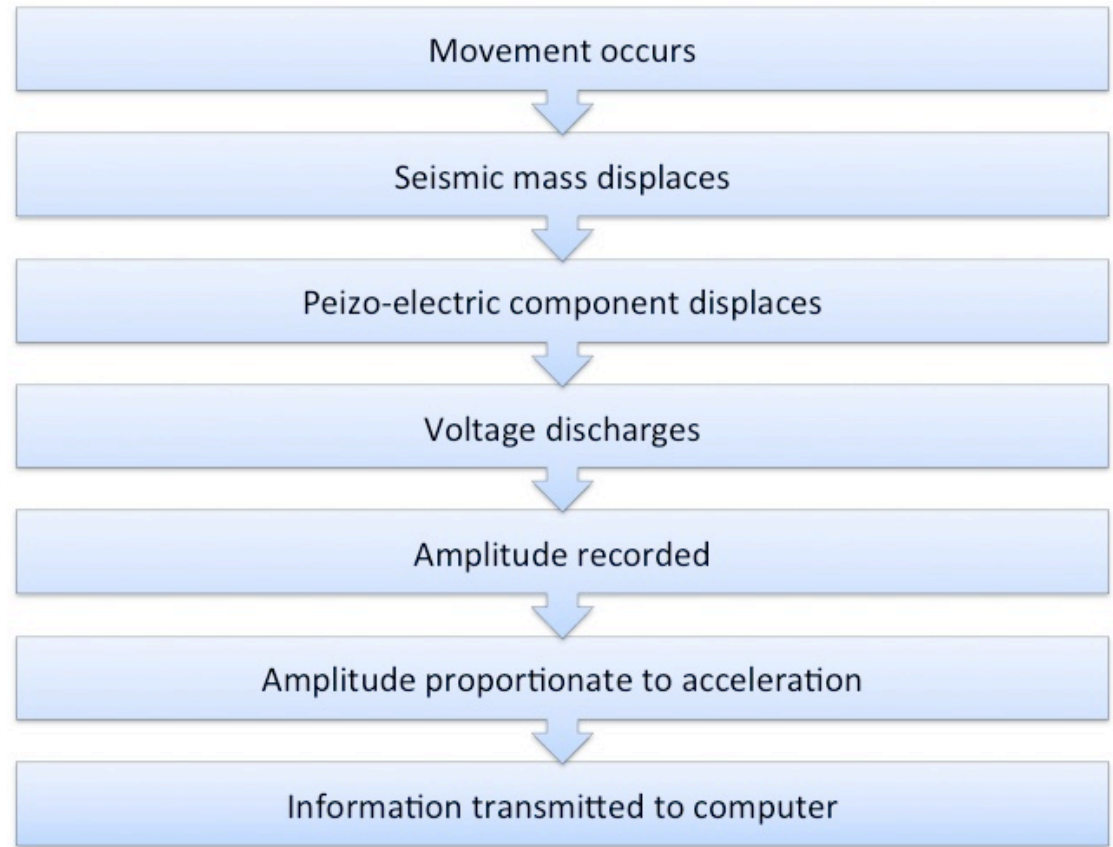
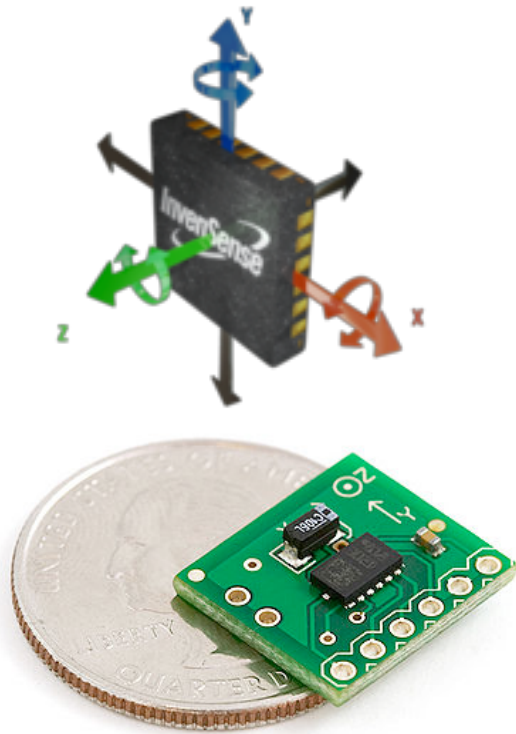
**HOW GPS WORKS**



**Errors on GPS Signal**

- ① orbit error
- ② clock error







Pook, P. (2012) Complete Conditioning for Rugby (pp.4&7) Champaign:Il, Human Kinetics.

**Table 1.2 Total Distance in Metres Travelled in Each Activity Category**

	Speed of movement	Forwards		Backs	
		Tight forwards	Loose forwards	Inside backs	Outside backs
Standing	0.0 to 1.8 km/h (0 to 1.1 mph)	355 m	352 m	317 m	272 m
Walking	1.8 to 6.1 km/h (1.1 to 3.8 mph)	1,840 m	2,045 m	2,161 m	2,517 m
Jogging	6.1 to 13.0 km/h (3.8 to 8 mph)	1,985 m	2,075 m	2,094 m	1,936 m
Medium-intensity running	13.0 to 18.0 km/h (8 to 11 mph)	807 m	819 m	917 m	725 m
High-intensity running	18.0 to 24.1 km/h (11 to 15 mph)	275 m	327 m	439 m	456 m
Sprinting	24.1 km/h (15 mph) and faster	144 m	192 m	124 m	280 m
	Total	5,406 m	5,810 m	6,052 m	6,186 m

data from Roberts et al., 2006.

**Table 1.3 Difference in Frequency and Average Duration of Exertion Between Forwards and Backs**

	Forwards		Backs	
	Tight forwards	Loose forwards	Inside backs	Outside backs
<b>High-intensity running</b>				
Frequency (times per game)	36	48	58	61
Average duration	1.4 sec	1.3 sec	1.6 sec	1.5 sec
<b>Sprinting</b>				
Frequency (times per game)	14	19	15	31
Average duration	1.2 sec	1.3 sec	1.1 sec	1.3 sec
<b>Static exertion</b>				
Frequency (times per game)	91	87	29	18
Average duration	5.3 sec	5 sec	3.3 sec	3.9 sec

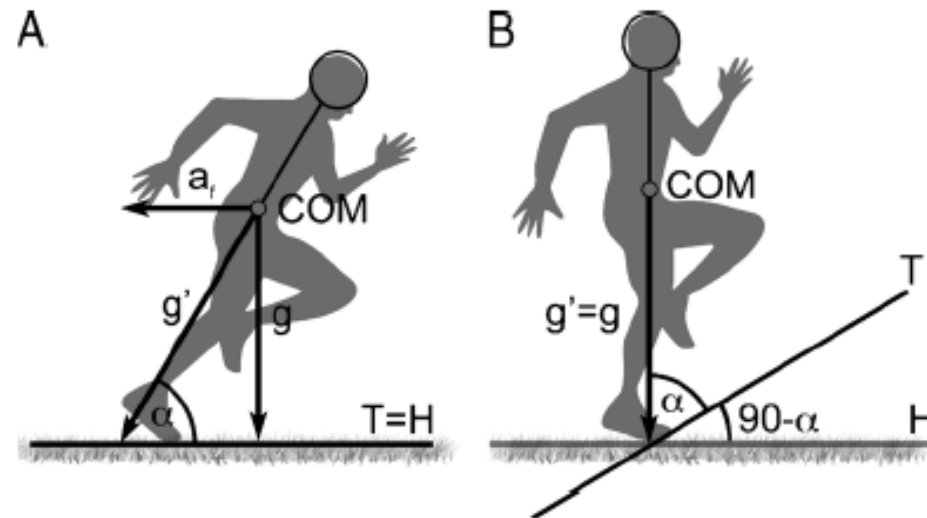
**Table 1.4 Match Distance, Maximal Speed and Work-to-Rest Ratios**

	Forward	Back
Interval (hr:min:sec)	1:34:57 (0:44:06/0:50:51)	1:34:57 (0:44:06/0:50:51)
Total distance (m)	6427 (3169/3258)	7002 (3352/3650)
Average distance (m per min)	68.0 (71.9/64.1)	73.9 (76/71.8)
Maximum speed (km/h)	26.1	30.8
Work-to-rest ratio	1:2.9 (1:2.6/1:3.2)	1:3.1 (1:2.9/1:3.2)



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**FIGURE 1**—Simplified view of the forces acting on a subject during accelerated running (modified from di Prampero et al. (12), with permission). The runner’s body is represented by a segment of straight line. COM, center of mass; T, terrain; H, horizontal;  $g$ , acceleration of gravity;  $a_f$ , forward acceleration;  $g'$ , vectorial sum of  $a_f$  and  $g$ . Accelerated running on flat terrain (A) is equivalent to constant speed uphill running (B) wherein the angle of the terrain  $T$  with the horizontal  $H$  ( $90 - \alpha$ ) is such that the angle of the subject’s body with the terrain ( $\alpha$ ) is unchanged (see text for further details).



# Chiefs Analysis Tool

Developed by Dr Brett Smith, David Blackwell, Scott Sutherland - University of Waikato 2013.

ADMIN MENU\* ABOUT **SESSION REPORT\*** LONGITUDINAL REPORT\* IMPORT SESSION\* PLAYER POSITIONS\* SESSION DETAILS\*

Choose Session:

Positions

First Name	Surname	Time (min)	Distance						Metab measures				Heart Rate Exertion				Max speed	Surname					
			Dist(M)	Z3 Dist	Z4-Z6 Dist	Z5-Z6 Dist	Sprints	Dist @ Hi Mets	Avg W/kg	HR Exert	Z4+Z5	Z6HR											
84		5232	7 82%	637	11 51%	1045	8 65%	479	3 71%	55	9 58%	934	8 76%	5.68	7 86%	286	3 82%	01:09:23	1 100%	00:12:24	5 31%	9.4	
75		4887	9 77%	952	4 76%	1033	9 64%	301	7 45%	65	6 68%	947	5 77%	6.11	3 93%	236	5 67%	00:58:31	2 84%	00:11:38	6 29%	7.5	
84		5496	6 86%	766	7 61%	1136	5 70%	375	4 55%	63	7 66%	945	6 77%	5.86	5 89%	199	7 57%	00:56:48	3 82%	00:06:52	7 17%	8.2	
84		4203	11 66%	716	9 57%	1005	10 62%	245	10 36%	54	10 57%	847	10 69%	4.65	11 71%	253	4 72%	00:46:47	4 67%	00:21:18	3 54%	7.1	
84		5704	4 89%	1157	3 92%	1132	7 70%	185	14 27%	71	3 75%	912	9 74%	6.1	4 93%	209	6 59%	00:43:40	5 63%	00:14:58	4 38%	7.3	
84		5576	5 87%	1261	1 100%	1612	1 100%	246	9 36%	95	1 100%	1225	1 100%	6.15	2 93%	348	2 99%	00:42:15	6 61%	00:37:31	2 94%	7.3	
96		5889	2 92%	1246	2 99%	1293	4 80%	250	8 37%	67	4 71%	962	4 79%	5.53	9 84%	351	1 100%	00:42:14	7 61%	00:39:48	1 100%	7.6	
82		1813	16 28%	310	16 25%	398	18 25%	155	15 23%	17	17 18%	294	17 24%	1.95	16 30%	93	8 26%	00:23:52	8 34%	00:02:20	9 6%	7.8	
84		5885	3 92%	873	5 69%	1419	2 88%	676	1 100%	75	2 79%	1196	2 98%	6.58	1 100%	58	10 16%	00:23:45	9 34%	00:00:00	16 0%	9.3	
85		1722	17 27%	302	17 24%	422	17 26%	152	16 22%	22	16 23%	301	16 25%	1.84	17 28%	76	9 22%	00:14:42	10 21%	00:00:00	17 0%	7.2	
80		1247	19 20%	280	18 22%	241	19 15%	26	19 4%	16	18 17%	175	19 14%	1.39	19 21%	58	11 16%	00:09:46	11 14%	00:03:02	8 8%	6.3	
86		1555	18 24%	257	19 20%	423	16 26%	127	17 19%	16	19 17%	281	18 23%	1.57	18 24%	47	12 13%	00:09:31	12 14%	00:00:00	18 0%	6.5	
84		4024	12 63%	693	10 55%	481	15 30%	45	18 7%	32	13 34%	374	15 31%	4.14	12 63%	13	14 4%	00:03:37	13 5%	00:00:22	13 1%	6.4	
83		4971	8 78%	582	12 46%	1135	6 70%	554	2 82%	56	8 59%	989	3 81%	5.68	8 86%	16	13 4%	00:03:05	14 4%	00:00:56	10 2%	9.6	
84		4781	10 75%	757	8 60%	913	11 57%	368	5 54%	52	11 55%	816	11 67%	5.17	10 79%	10	16 3%	00:02:38	15 4%	00:00:00	19 0%	9	
99		6386	1 100%	853	6 68%	1307	3 81%	341	6 50%	66	5 69%	943	7 77%	5.73	6 87%	12	15 3%	00:01:36	16 2%	00:00:26	12 1%	8.5	
85		2871	13 45%	460	15 37%	584	12 36%	232	12 34%	34	12 36%	494	12 40%	3.09	13 47%	6	17 2%	00:00:19	17 0%	00:00:30	11 1%	8.1	
101		2624	14 41%	497	14 39%	577	13 36%	233	11 34%	28	14 29%	465	13 38%	2.33	15 35%	2	18 1%	00:00:10	18 0%	00:00:00	14 0%	7	
86		2507	15 39%	527	13 42%	526	14 33%	203	13 30%	25	15 26%	427	14 35%	2.64	14 40%	0	19 0%	00:00:00	19 0%	00:00:00	15 0%	7.4	



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