Measurement News

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Pete Riegel and Hugh Jones after finishing with the pre-race validation ride of the London Marathon course. Behind them is the support bus for the Flora 1000 Mile Challenge. The Challenge was set up to replicate the noted Captain Robert Barclay's 1809 feat of running 1000 miles in 1000 hours, each mile done in its own hour.

MEASUREMENT NEWS

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ABOUT MEASUREMENT NEWS

Measurement News (MN) is the newsletter of the Road Running Technical Council (RRTC) of USA Track & Field (USATF). MN is our way to talk to one another, so that we all know what's going on.

MN is also sent to many foreign measurers associated with AIMS and IAAF, who are also invited to participate in the dialogue.

MN is published bimonthly beginning in January (six issues per year). MN is sent free to RRTC officers and certifiers, and AIMS/IAAF measurers. Others may obtain MN by sending $20 (for a one year subscription - six issues) to the editor.

If you wish to reproduce or report on anything in MN, go ahead, but an attribution would be appreciated.

MN wants to make road course measurement as good as it can be. All opinions and grievances are solicited. No cows are sacred. If you have a new measurement technique, or if you think things should be done differently, send in your contribution to MN. Your opinion will be given space. Nothing changes until somebody tries!

Electronic copy or clean typed material is most welcome, but send what you can.

Deadlines: Material intended to be included in the July 2003 issue must be in the Editor's hands by June 24. Next issue will be mailed in early May.

ROAD RUNNING TECHNICAL COUNCIL

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Visit the RRTC website at:

http://www.rrtc.net

A complete list of certified courses may be downloaded from this site.

A complete USATF measurement book can be downloaded from this site.

ONLINE MEASUREMENT FORUM

All it takes to become a subscriber is access to email. Simply send to **mnforum-request@rrtc.net** with “subscribe” as the subject (to unsubscribe, use “unsubscribe” as the subject).

To post messages to the list, send email to **mnforum@rrtc.net**. Please keep your comments in the body of the email (no attachments please). Also, please send only plain text; i.e., avoid formatted (HTML) messages (If you use HTML formatting, the formatting will be removed).

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Chairman's Clatter - From Mike Wickiser

Spring is in the air. Course measurements are picking up. Karen wrote the check for the IRS taxes. It must be time to get going with Chairman's Clatter.

The course map digitizing project had a setback this last month. I installed some software that interfered with the scanner and spent about a week getting it straightened out. The upside is that after reconfiguring things the scanner works a lot faster and maps from the most recent back to 1995 have been scanned and sent to Indianapolis for web posting. I had hoped to have all ten years worth of active course maps done by now. Even though there still remain about 2000 course maps to scan, about 80% of all active courses are completed and available for viewing form the USATF website.

Going through that many maps has meant a few errors. I have named some courses with wrong numbers, usually missing a zero and shortening a course from OH95009MW to OH9509MW. Fortunately Keith Lively finds the mistakes and either fixes them or returns them for review and correction. From time to time two courses have been certified with the same number. If either of the race courses have been replaced, it is easy to drop the replaced map file and move on. On a few occasions when duplicate numbers have been issued it has been necessary to reissue one of the courses with a new number. Reissuing a certificate is really no problem. We all make mistakes from time to time and the issue is accuracy not pointing out mistakes.

Keep the certificates coming. I will continue to work on the course list and making every active USATF certified course map available from the USATF website.

http://www.usatf.org/events/courses/search/

Editor's Note - From Jim Gerweck

For several years, Hugh Jones, UK measurer and secretary of AIMS, has urged me to come to London to experience that city's marathon, which he is responsible for measuring. Pete Riegel, who goes over to the race each year to assist in whatever pre-race measurement is necessary has seconded that motion. However, since London usually falls the day before the Boston Marathon, I've always had to beg off, as my *Running Times* duties require that I be in the Hub for the expo and press conferences for that race.

This year, however, Patriot's Day was as late in April as it can be, meaning there was an eight rather than one day separation between the two events. "You've got no excuse not to come now," Hugh wrote back in December, and so, with the promise of two coveted guaranteed entry slots for my wife Karen and I, and some cheap air fares, it was decided that 2003 would be the year I went to London.

The wisdom of that decision began to seem questionable as New England was beset with one of the

coldest, snowiest winters in many years, making any sort of consistent training a real struggle. After a President's Day blizzard dumped nearly two feet of snow that seemed in no hurry to melt, it looked like I'd be relegated to watching the race from the press room, no great hardship but hardly the best way to get the full feel of the course and crowds.

Fortunately the weather broke in March and we were able to cram some decent training into the good conditions, and on April 9 we boarded a British Airways jet from JFK to Heathrow. When we landed in London snow flurries were falling, but the weather soon warmed to a level we had yet to see in New England. The reception we got during our time there was equally warm.

After collecting our stuff from the race expo, we went to the press room at the race HQ hotel, and then met Pete for dinner. We were joined by Paul Hodgson, a measurer from the north of England who has also lived and measured several courses in the Middle East. Hugh, meanwhile was tied up with myriad duties, including the 1,000 Mile Challenge which is detailed elsewhere in this issue, and supervising the painting of the blue line on the course on Friday night.

Race day dawned sunny and warm, and with limited training under our belts we decided to run easily and savor the experience, and what a great one it was. We took more than twice as long to cover the 42,195m than Paula Radcliffe did in her world best run, but the extra time just gave us more time to soak in the atmosphere.

The crowds along the route were fantastic, generating such noise you began to wish for a respite to hear yourself think. The route, too, was brilliant, perhaps the best big city marathon I've seen. Mostly flat but with plenty of scenic variety, showcasing a wide range of London neighborhoods (we could have done without the 400m stretch of cobblestones by the Tower of London at mile 23, however). The finish, in St. James Park by Buckingham Palace, was spectacular as well. The "800 To Go" sign that I believe was Hugh's idea was a welcome sight to tiring bodies.

We were finally able to meet up with Hugh on Tuesday morning before our return flight, and went for a stiff-legged run over the final miles of the course. Things certainly looked different than they did on race day, with weekday London traffic taking the place of barriers and signs and thousands of runners. The only evidence that anything significant had occurred there two days prior was a bit of blue paint on the curb (or is it "kerb"?) marking the finish line.

After being part of such a tremendous event, Boston the following week seemed almost ho-hum (although perhaps there was some lingering jet lag contributing to that feeling). All in all my week in London was one of the most unforgettable experiences of my life, and I can't wait to return the next time I'm able, whether to run or measure.

Jim Gerweck points to the finish line of the London Marathon on the Mall, while Hugh Jones keeps an eye out for approaching bikes and taxicabs. Buckingham Palace is in the background at the end of the road.

YEAR 2002 MEASUREMENT ACTIVITY

This summary is based on the course list as it existed on March 17, 2003. It was assumed that all of the year 2002 courses had been received, and indeed few have been received since then. Here is how we did last year:

Most active certifier: Tom McBrayer – 136 (136 in 2001)
Most active measurer: Chuck Hinde, with 63 (62 in 2001)
Most active state: Texas, with 154 courses certified (159 in 2001)
Measurers active in 2000: 296 (298 in 2001)
State with most active measurers: Texas, with 22 (25 in 2001)
Courses certified in 2002: 1189 (1242 in 2001)
New measurers in 2001: 57 (59 in 2001)

LENGTHS OF COURSES CERTIFIED IN 2002

Length	Number	Percent
5 km	595	49.8
10 km	162	13.6
Mar	79	6.6
Hmar	69	5.8
Cal	65	5.4
8 km	39	3.3
5 mi	35	2.9
10 mi	21	1.8
4 mi	21	1.8
1 mi	17	1.4
15 km	13	1.1
Other	79	6.6

2002 CERTIFICATION STATISTICS

Courses Certified in State in 2002	
TX	154
IL	92
NY	72
NC	66
FL	61
CA	57
NJ	46
MI	44
MN	37
TN	36
VA	33
SC	32
CO	30
KS	28
MO	27
OH	26
MA	25
OK	24
CT	22
MD	22
PA	22
AL	20
IN	17
WA	17
WI	17
AZ	16
IA	16
DC	15
NH	15
GA	12
AR	10
RI	9
ME	8
VT	8
MS	6
UT	6
MT	5
OR	5
WV	5
KY	4
ND	4
DE	3
LA	3
NM	3
SD	3
AK	2
HI	2
NV	2
ID	0
NE	0
WY	0
Total	1189

Measurers Active In State in 2002	
TX	22
NY	20
FL	16
CA	12
CO	11
CT	11
OH	11
KS	10
NC	10
SC	10
TN	10
VA	10
MO	9
WI	9
IL	8
NJ	8
GA	7
PA	7
WA	7
IN	6
MN	6
IA	5
MA	5
MD	5
ME	5
AL	4
AR	4
AZ	4
KY	4
OK	4
MI	3
NH	3
NM	3
SD	3
AK	2
DC	2
DE	2
LA	2
MS	2
MT	2
ND	2
NV	2
OR	2
WV	2
HI	1
RI	1
UT	1
VT	1
ID	0
NE	0
WY	0
Total	296

Courses Certified by Certifiers in 2002	
ETM	134
JW	108
AM	68
PH	67
BG	56
DL	56
RH	45
RT	45
SH	45
RS	42
GAN	37
RN	37
RR	37
DP	36
PR	34
BS	32
JF	31
WN	30
JS	26
BB	24
WB	23
DR	21
JD	17
BL	16
MW	15
LMB	14
MF	12
WC	12
TK	11
DLP	10
JG	8
KU	6
LB	6
GT	5
DB	4
KY	4
DK	3
DL	3
DS	3
BC	2
FW	2
BDC	1
EM	1
Total	1189

Measurers with 10 or more	
Hinde	63
Hess	35
Thurston	32
Hronjak	31
Ashby	29
Ferguson	28
Dewey	26
McBrayer	25
Clines	22
Nelson	22
Recker	22
Scardera	22
Sissala	21
Joline	18
Knoedel	18
Hubbard	17
Morgan	14
White	13
Lafarlette	12
Fitzpatrick	11
Knight	11
Melanson	11
Rhodes	11
Vaitones	11
Wood	11
Lorenz	10
Smith	10
Witkowski	10
Total	566

This column contains surnames only. Note that several measurers may share the same surname.

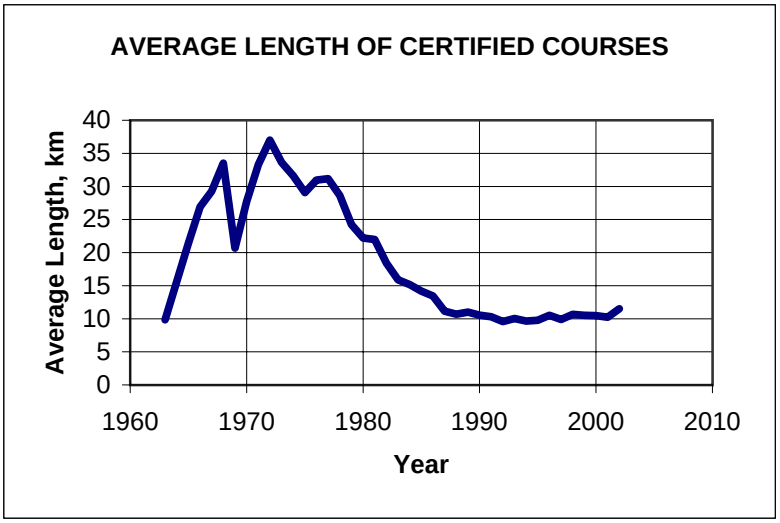
This data was taken from the course list as it existed on March 17, 2003.

US CERTIFIED COURSES BY YEAR

Year	Courses
1963	2
1965	25
1966	31
1967	24
1968	20
1969	12
1970	23
1971	31
1972	34
1973	60
1974	62
1975	59
1976	58
1977	52
1978	202
1979	334
1980	400
1981	464
1982	521
1983	633
1984	830
1985	1246
1986	1238
1987	1162
1988	1108
1989	1086
1990	1149
1991	1220
1992	1205
1993	1165
1994	1053
1995	1148
1996	1116
1997	1217
1998	1168
1999	1190
2000	1107
2001	1247
2002	1189

In these graphs, the data was taken from the historical list generated by Malcolm Heyworth, and combined with data from the modern list. Malcolm's data was used from 1963-1983, while 1984-2002 used the modern list

All courses certified before 1982-1984 which did not contain the 1.001 short course prevention factor were decertified, and the currently-used listing was begun.



Year	Avg km
1963	9.9
1965	21.4
1966	26.9
1967	29.3
1968	33.5
1969	20.7
1970	27.7
1971	33.3
1972	37.0
1973	33.6
1974	31.6
1975	29.1
1976	31.0
1977	31.2
1978	28.6
1979	24.2
1980	22.2
1981	22.0
1982	18.4
1983	15.9
1984	15.2
1985	14.2
1986	13.5
1987	11.1
1988	10.7
1989	11.0
1990	10.5
1991	10.3
1992	9.6
1993	10.0
1994	9.7
1995	9.8
1996	10.5
1997	9.9
1998	10.7
1999	10.5
2000	10.5
2001	10.2
2002	11.5

PERFORMANCE OF USATF MEASURERS SINCE 1982

Top Measurers Since 1982

Measurer	Courses
Lafarlette	692
Scardera	586
Nicoll	551
Linnerud	537
Hinde	489
Thurston	478
White	434
Brannen	408
McBrayer	400
Courtney	323
Hubbard	316
Recker	311
Beach	283
Knoedel	279
Riegel	278
Nelson	248
Smith	242
Knight	234
Witkowski	229
Sissala	228
Wight	204
Dewey	202
Newman	189
Ashby	165
Hronjak	164
Ferguson	162
Standish	158
Connolly	153
Hess	153
Ensz	152
Wisser	152
Hickey	143
Belleville	140
Melanson	137
Berglund	129
Letson	129
Wickiser	127
Lucas	120
Polansky	116
GuidoBros	114
Rhodes	111
Katz	110
LeBlanc	107
Grass	106
Pierce	105

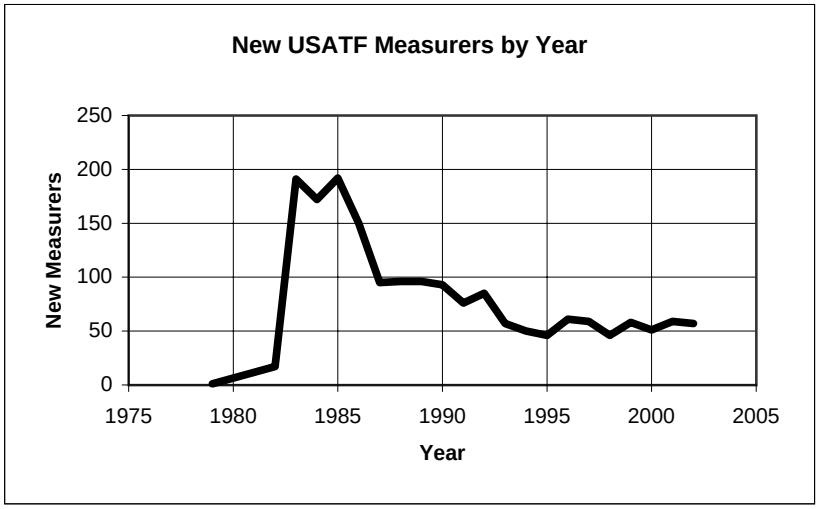
Courses Measured by Other Measurers

Courses Measured	Number of Measurers
50 to 99	40
20 to 49	94
10 to 19	145
5 to 9	212
2 to 4	581
1 only	695

Note: These listings are based on sorted surnames only, thus some inaccuracy exists.

New Measurers by Year

Year	New Measurers
1979	1
1982	17
1983	191
1984	172
1985	192
1986	150
1987	95
1988	96
1989	96
1990	93
1991	76
1992	85
1993	57
1994	50
1995	46
1996	61
1997	59
1998	46
1999	58
2000	51
2001	59
2002	57



NUMBER OF CERTIFIED COURSES BY CERTIFIER AND YEAR

This data was taken from the course list as it existed on March 17, 2003

Only those certifiers active in 2002 are shown in this listing.

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
AM								28	31	50	35	45	41	40	35	54	36	71	52	57	68	643
BB		35	72	81	73	66	60	55	52	74	79	49	56	60	35	50	39	33	34	37	24	1064
BC							1	1	3	2	2	4	1	3	3	2	4	6	1	3	2	38
BDC													5				4	2			1	12
BG			1	14	37	22	31	31	28	36	38	37	50	48	49	33	71	61	52	52	56	747
BL																					16	16
BS					19	43	34	31	51	27	43	27	36	32	41	27	26	30	34	38	32	571
DB					6	50	71	38	39	45	43	41	39	31	26	43	3	3	2	2	4	486
DK		1	10	7	2	3		2					21		21	19	7	3	1	2	3	102
DL						23	18	16	41	77	68	51	53	66	53	72	53	66	51	53	56	817
DL																			13	1	3	17
DLP							4	8	12	4	5	9	10	5	3	9	13	17	11	5	10	125
DP							10	23	27	35	36	29	29	14	10	11	12	20	19	22	36	333
DR		1	10	15	20	19	19	29	17	19	19	21	20	18	17	42	24	26	32	23	21	412
DS													2	1	3	3	2	2	9	9	3	34
EM															2		1				1	4
ETM				10	26	36	65	71	87	71	87	103	101	112	131	115	143	139	104	136	134	1671
FW						2	4	5	6	9	9	1	7	2	1	5	10	1	6	1	2	71
GAN											15	31	24	25	16	42	48	42	48	46	37	374
GT								1	1	3	7	10		3			2				5	32
JD					6	11	6	26	25	28	21	16	13	17	20	28	25	19	22	27	17	327
JF																			14	31	31	76
JG																				4	8	12
JS								5	14	6	19	15	19	34	22	26	30	28	27	23	26	294
JW							41	50	67	65	72	69	70	82	79	64	80	66	85	116	108	1114
KU								1	5	15	11	14	7	4	7	8	8	15	17	6	6	124
KY						5	3		6	3	4	3	3	2		9					4	42
LB							3	13	15	12	9	11	8	14	13	6	15	16	14	2	6	157
LMB																					14	14
MF								11	7	10	7	8	6	8	10	8	6	9	4	10	12	116
MW							10	21	23	15	7	18	16	25	19	19	21	33	21	21	15	284
PH															42	65	41	47	72	73	67	407
PR	1	66	110	154	143	97	85	58	66	62	112	75	51	52	62	52	59	53	49	57	34	1498
RH									4	14	10	33	22	27	25	25	48	23	24	44	45	344
RN											5	36	18	22	21	39	38	36	36	43	37	331
RR		2	9	27	46	34	12	18	25	16	14	7	14	18	20	32	26	17	18	21	37	413
RS		2	24	48	51	55	76	68	52	83	61	43	38	60	44	61	52	74	54	74	42	1062
RT		9	41	66	55	61	51	23	22	31	22	30	23	42	39	34	39	28	39	42	45	742
SH					22	36	31	19	33	17	25	39	32	58	37	33	20	31	37	34	45	549
TK		11	33	32	43	37	29	8	7	19	11	13	9	15	11	20	18	16	13	28	11	384
WB														12	39	41	27	31	16	33	23	222
WC											4	27	21	15	25	18	17	22	25	27	12	213
WN		4	32	125	125	112	106	117	138	148	140	93	81	74	67	36	49	41	31	31	30	1580

NUMBER OF CERTIFIED COURSES BY STATE AND YEAR

This data was taken from the course list as it existed on March 17, 2003

	1979	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
AK		1				1	4	4	5	6	9	9	1	7	2	1	5	10	3	6	4	2	80
AL		2	14	8	17	12	11	5	26	27	39	25	28	17	20	24	37	31	25	27	32	20	447
AR			4	5	9	4	4	8	8	13	4	5	9	10	5	3	10	13	17	11	5	10	157
AZ			13	14	23	20	20	7	10	10	16	9	6	3	8	12	9	6	15		4	16	221
CA	1	4	68	103	146	129	94	133	129	88	139	103	87	81	112	77	103	75	95	68	102	57	1994
CO			29	17	15	30	14	20	23	26	35	36	29	29	14	10	11	12	20	19	22	30	441
CT			1	10	17	23	19	21	31	20	20	19	21	22	20	18	43	24	27	33	23	22	434
DC			3	23	25	17	9	11	4	9	7	6	16	11	19	17	11	21	21	10	13	15	268
DE				12	25	18	18	13	13	23	23	18	10	11	4	11	11	8	8	3	6	3	238
FL			17	21	60	52	71	70	64	72	84	74	56	59	75	54	75	54	67	65	52	61	1203
GA			7	20	50	42	28	32	29	30	35	37	30	24	15	31	18	17	22	25	27	12	531
HI			7	6	9	9	10	6	1	3		5		3	3		9	5			2	2	80
IA		1	7	5	12	4	16	5	21	11	14	8	11	10	11	13	13	8	13	10	10	16	219
ID			1	1	4		1		1	1	2			1	2				1	2	2		19
IL			6	17	11	48	53	45	50	68	70	75	72	69	82	79	64	83	67	78	100	92	1229
IN			11	23	36	21	17	8	8	15	10	4	16	16	16	12	25	21	27	15	8	17	326
KS			7	7	12	31	14	21	20	24	23	29	30	33	23	40	24	49	40	29	20	28	504
KY			1	9	19	13	8	16	6	15	7	12	7	1	4	4	11	6	3	9	8	4	163
LA			2	2	11	2		1	5	5	2	6	6	4	8	9	4	7	11	14	2	3	104
MA		2	4	4	17	29	22	17	34	36	36	26	37	17	21	19	33	35	30	27	33	25	504
MD			4	8	16	17	28	14	7	17	5	17	14	19	21	19	20	19	14	26	18	22	325
ME			4	3	26	15	6	9	12	11	17	26	17	16	11	7	9	12	7	7	8	8	231
MI			21	27	37	22	36	31	19	33	17	25	40	37	58	37	33	24	31	37	34	44	643
MN			5	11	27	46	32	12	18	25	15	14	7	14	17	20	33	26	17	18	21	37	415
MO			13	14	10	6	8	10	11	4	14	9	7	17	25	9	9	23	20	21	31	27	288
MS			1	3	18	6		2	7	2	1	3	5	1		6	1	5		1	3	6	71
MT			1	8	5	8	1	4	1	1	3	7	10		3			2				5	59
NC		1	16	41	88	70	72	56	52	61	57	58	34	25	27	42	64	44	48	71	73	66	1066
ND			1	3		2	1			1	2									2	1	4	17
NE			4	22	20	25	17	3	5		6	7	7	1	1	5	3	3	9	9	4		151
NH			11	11	21	17	16	9	11	12	12	21	34	13	26	28	15	33	25	22	15	15	367
NJ		2	15	13	21	38	46	51	33	35	39	50	62	56	48	36	67	41	35	44	37	46	815
NM			1		3	3	5	3	11	11	15	4	4	4	4	4	8	2	4	9	9	3	107
NV				6	4	5		4	1	4	2	2	4	1	3	3	2	4	7	1	2	2	57
NY		3	28	60	57	48	44	41	45	41	65	43	62	76	52	70	79	44	76	56	61	72	1123
OH		1	43	51	46	52	56	64	64	62	60	91	69	52	53	55	32	48	53	38	63	26	1079
OK			34	69	72	65	51	54	50	51	74	78	47	56	60	34	48	39	34	34	37	24	1011
OR			23	32	32	14	11	11	9	12	13	8	11	8	12	13	6	14	14	14	2	5	264
PA		1	23	24	28	29	38	57	50	48	34	26	50	26	32	44	41	28	33	18	37	22	689
RI			2	1	4	5	1	2	9	1	5	4	10	6	5	5	10	5	9	9	10	9	112
SC				15	32	41	52	37	35	51	25	36	22	29	29	42	27	23	29	34	38	32	629
SD			1	6	6	2			4	1	1	1	2			1	2	1	1			3	32
TN			3	10	13	10	16	19	9	14	26	24	18	15	21	14	15	38	17	18	36	36	372
TX			10	22	37	97	105	94	71	83	70	85	101	98	105	124	111	136	128	110	159	154	1900
UT				3	6	6	14	11	6	15	4	10	10	6	7		8	3	13			6	128
VA		1	12	17	21	23	26	24	19	14	26	15	17	12	31	24	24	26	24	27	26	33	442
VT				1	5	3	5	1	4	3	7	9	4	5	1	4	8	1	6	2	8	8	85
WA		1	25	37	53	34	18	20	28	20	14	18	18	15	17	19	7	15	20	16	11	17	423
WI			7		13	22	20	17	4	14	12	5	6	16	11	15	14	21		8	19	17	241
WV			8	4	7	2	4	3	3		4	3	1	1	4	2	5	3	4	4	7	5	74
WY				1				2													2		5
Total	1	20	518	830	1246	1238	1162	1108	1086	1149	1220	1205	1165	1053	1148	1116	1217	1168	1190	1107	1247	1189	22383

The 1000 Mile Challenge

This "challenge" was made as a bet in 1809: that Captain Robert Allardyce Barclay could walk one mile (and only one mile) in every hour for one thousand consecutive hours. That's six weeks in which, if the miles are covered back-to-back either side of the turn of the hour (a pattern subsequently known as "the Barclay Plan"), then the maximum unbroken sleep possible is about 75 minutes.

It was this challenge, written up in a book by Professor Peter Radford, that caught the eye of London Marathon race director Dave Bedford back in 2001. Plans were laid to re-enact this challenge in an updated format. Barclay had walked his miles out-and-back between two posts fixed 880 yards apart on Newmarket Heath. The new plan, calling for maximum exposure to the public eye in order to generate sponsorship, was to cover the miles up and down the Flora London Marathon course — 38.5 times.

There would be six challengers — the maximum number that could be comfortably accommodated on a bus (in normal life used for the roadies accompanying touring bands) which would park up at two mile intervals along the route. This would require the identification of 13 parking spaces for the bus, at the odd miles along the marathon course. The event was timed to finish at the start of the London Marathon an hour before the 2003 race started.

That was the challenge, but to get a result the challengers were then committed to running the marathon, and the first across the line would be declared the winner. Officially there were two winners, male and female, but Shona Crombie-Hicks's convincing win in 3:08 (her PB is 2:40) over the first male (Paul Selby in 3:44) won her the acclamation.

In a 100-mile trial during the summer of 2002 it became obvious that relying on the marathon mile markers mean that many miles would be over-distance. Challengers had to use sidewalks, as "prudent pedestrians", and could not follow the SPR in anything other than a highly prescribed way. They would have to stick to a particular side of the road, crossing at identified places.

The measurement challenge

This was to create two-mile sections which would fit as exactly as possible between the parking spaces. Moreover, some of the parking spaces were absolutely fixed not just to the physical space adjacent to the road, but to such vital staging-houses as fire stations, pub forecourts and sports clubs, where the bus could be powered up and water tanks replenished as the challengers rested.

John Disley, London Marathon co-founder (with the late Chris Brasher), Hugh Jones, and David Selby, male winner of the Challenge, who finished the London Marathon in 3:44, enjoy a cup of tea outside the support bus.

Where the distance was less than two miles between parking spots, extra was added in by designing slightly longer routes. This could mean going the long way around roundabouts, or taking a lap around a block. Conversely there were some sections where the interval was too great. In these cases the official mile terminated at a point different to where the next official mile started. Participants had to cover the intervening distance, but only once and not as part of their officially timed miles. If they had been required to start the next mile from the same point then they would have had to cover this extra distance three times (the "extra distance" in these locations amounted to about 200m, and in the challenge soon became a bone of contention).

There were other subtleties. Because Tower Wharf closes at night we had to devise a night route which stuck to the main road in addition to the slightly longer "scenic" route that the marathon follows on race day. The night route and the day route therefore had different starting points, and remembering which was which could be a challenge in itself at three in the morning.

The miles were marked on the pavement (sidewalk) as a red line. Challengers had to cross these lines at the start and finish of each official mile. At the mid-point of the two-mile sections they had to step back over the line between finishing the first mile of their couplet, and starting the second after "time" (the turning of the hour) had been called.

A thousand miles is 38 truncated 26-mile marathons plus 12 miles. From the start on 2 March we devised a 12-mile route from the race finish at Buckingham Palace back down the course to arrive at the start. The first three miles were in reverse of the official course. The two-mile section back from Mile 23 cut directly south over Tower Bridge to omit the 10-mile Dockland loop and arrive at Mile 12 of the course after only 5 miles. We then continued back down the course to reach the 6 mile point after 11 miles, before going directly up Maze Hill (made infamous in Joseph Conrad's book "The Secret Agent") to the marathon start.

The unique route for the first 12 miles required special one-off parking spots, but thereafter we had to tailor the miles to fit the parking places. Some of these were negotiated very late in the day. The alacrity with which the well-appointed Blackheath Rugby Club received news of the project meant that we had to shift the 1-mile stop 250m away from the start (and hence also "mile zero" at which the challengers turned around). Potentially this shortened the second mile, but distance was added in by inserting an out/back section along the driveway of the Rugby Club.

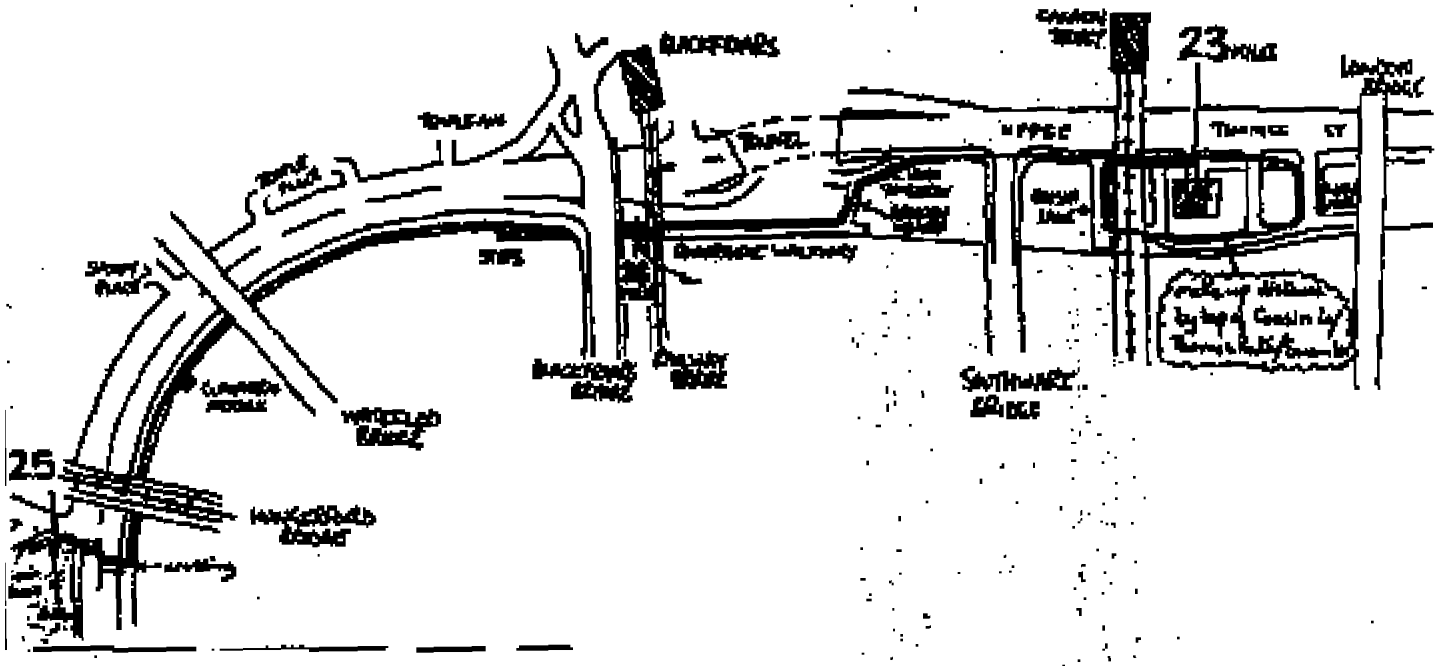
Elsewhere we met with less of a welcome. The Mile 19 parking space was on a private road, and permission to park was denied. This resulted in us abandoning pretensions to replicating a continuous marathon route, and we introduced an out/back mile from mile 17 instead. This gave us a second advantage, whereby we could adjust a second out/back in the first part of the 20th mile to change the finishing position at Mile 21. This allowed us, a few days into the challenge, to eliminate some of the "unofficial" extra distance referred to above.

During the second 100-mile trial event, a month before the challenge itself started, we used the Timex/Garmin GPS system to track one Challenger's miles (the other person on this trial run was a Times journalist). The results were at first gratifying, never deviating by more than 0.01 (the minimum gradation in that mode) from the mile. Later, some really serious discrepancies were noticed. This brought to our attention that some of the project overseers were simply not familiar enough with the course, and unable or unwilling to read the detailed maps supplied for each two-mile section. This problem was made more serious because at this stage no mile markings or waymarking had been put

FLORA 1000 Mile Challenge

UPPER THAMES STREET – NORTHUMBERLAND AVENUE
24th & 25th miles of marathon course

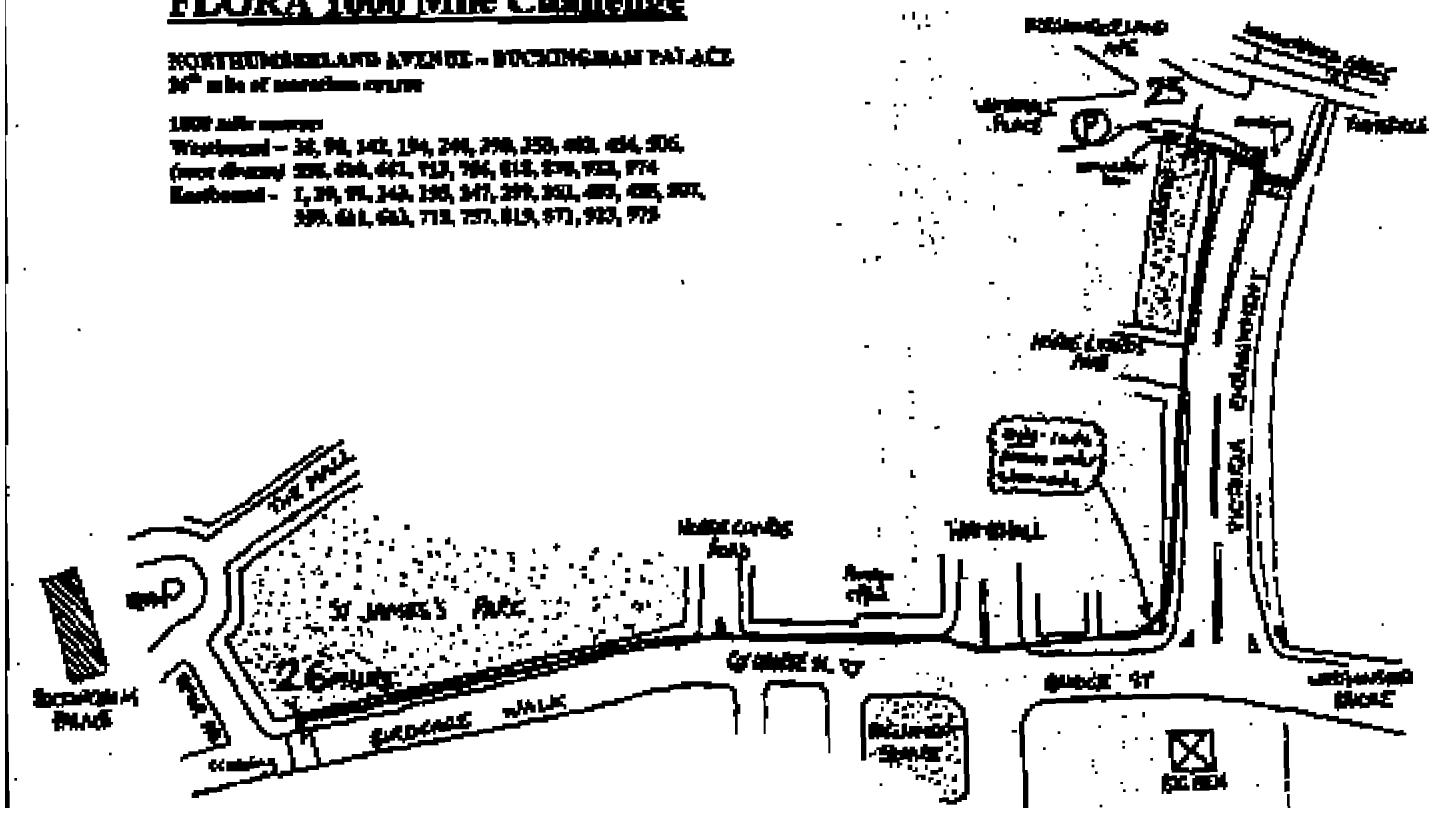
1000 mile course
Westbound – [illegible]
(once dirtwood) [illegible]
Eastbound – [illegible]



FLORA 1000 Mile Challenge

NORTHUMBERLAND AVENUE – BUCKINGHAM PALACE
26th mile of marathon course

1000 mile course
Westbound – [illegible]
(once dirtwood) [illegible]
Eastbound – [illegible]



down. Subsequently, lamp-posts were ringed with masking tape painted fluorescent yellow to act as a guide both to which roads to use and where to cross them.

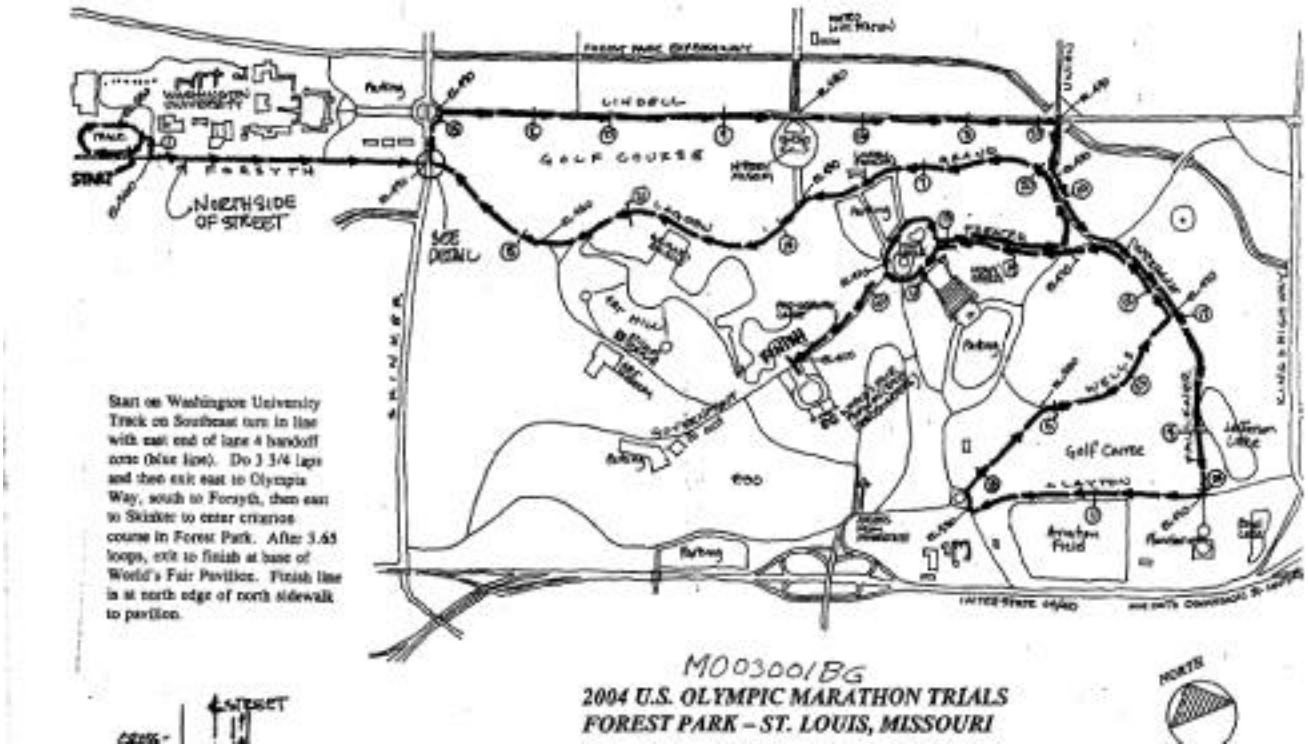
Through the large office development of Canary Wharf the miles continued to register wrongly. I even re-measured some of these, although I was absolutely convinced they were correct. Within a metre or two (sidewalk measurement is not quite so exacting as that on the road itself) they were. It was the signals which were wrong, suffering unknown interference in this localised area, and providing a salutary warning to placing undue trust in black box technology.

We didn't place undue trust in the challengers' conscience, either. We timed them out, and we timed them in, the crucial moment in each stage being the calling of "time" at the mid-point of the section. If they hadn't been over the line at the call, they would have been out. We also had to check the few turnarounds during miles, and one of these in particular involved sprinting furiously from back to front of the straggling line of challengers. Five of the six completed, the one who did not, Lloyd Scott of deep-sea diver suit fame, retired for genuine family reasons.

WOMEN'S OLYMPIC MARATHON TRIALS COURSE MEASUREMENT

A group is being formed to perform a pre-race validation measurement of the Women's Olympic Marathon Trials course in St. Louis, MA. The measurement will be led by Amy Morss and will tentatively take place in September 2003. All or part of hotel and meal expenses will be covered by USATF, depending on the number of participants. Individuals who are interested in participating should contact Amy Morss at:

248 Spring Hill Rd.
Sharon, NH 03458
e-mail: Amorss@koko.mv.com



ANOTHER LOOK AT SEPARATION

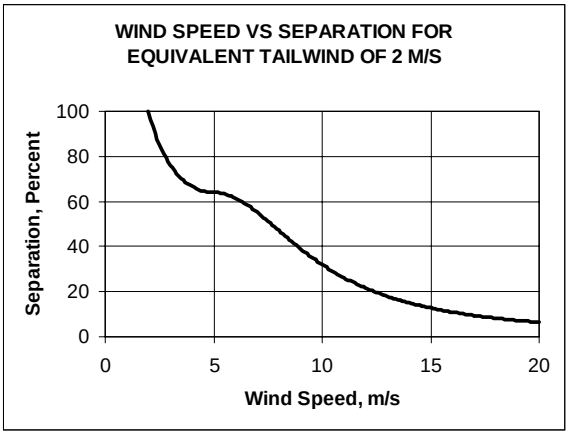
By Pete Riegel

IAAF is presently in the process of defining a "standard" road course. Drop has been fixed at 1 m/km, and separation seems likely to be set at 50 percent. Years ago USATF, after considerable technical and political discussion, settled on 30 percent. The technical rationale for the choice was based on how much a runner's time might be affected by various degrees of separation. A rule change has been proposed for action at this year's USATF Annual Meeting, which proposes to change the US limit to 50 percent. Here I wish to present another viewpoint. It may or may not be a better viewpoint, but I think it is worth considering.

In track races, the inclination of the track may not exceed 1/1000, identical to road running's 1 m/km. To avoid wind-aided sprint records, wind is gauged in certain events, and the limit of 2 m/s is used. To be sure, the effect of a 2 m/s tailwind is much greater than a 1/1000 elevation change, but that's what is presently accepted.

Bob Baumel described a "u-shaped" course as being most susceptible to wind aid in his article "Physiological Model of Distance Running Performance," which appeared in *Measurement News #38*, November 1989.

I did some calculating to see what combinations of separation and wind will produce an effect equal to a 2 m/s tailwind. It is a purely mechanical analysis, relying only on the well-established Bernoulli's Law, which puts wind force proportional to the square of the speed. Below is what I found:



The graph at left shows a condition where wind aid on a u-shaped course is equal to a 2 m/s tailwind.

Example: A U-shaped course having a separation of 30 percent can have wind aid greater than 2 m/s only when wind speed reaches 10 m/s. At lesser wind speeds, aid never reaches the 2 m/s level.

Thus 30 percent separation keeps aid below 2 m/s for winds up to 10 m/s.

50 percent separation keeps aid below 2 m/s for winds up to 7 m/s. What level of wind should be designed against?

DERIVATION OF THE BASIC FORMULA

The formula used to derive the curve above assumes a runner moving at 5 m/s, which is close to long-distance running speed. It also assumes that a 2 m/s tailwind is an acceptable level of aid.

Wind force, **F = K*V^2**, where K is a proportionality constant and V is headwind speed relative to the runner.

For a runner moving at 5 m/s in still air, the air exerts a resisting force on the runner of:

F = K*(5^2) = 25*K

If a tailwind exists, it reduces the relative air movement as: **F = K*(5-V)^2**. A tailwind of 2 m/s would result in a resisting force of **K*(5-2)^2** or **9*K**

The net "air work" done by covering a distance is equal to the force times the distance.

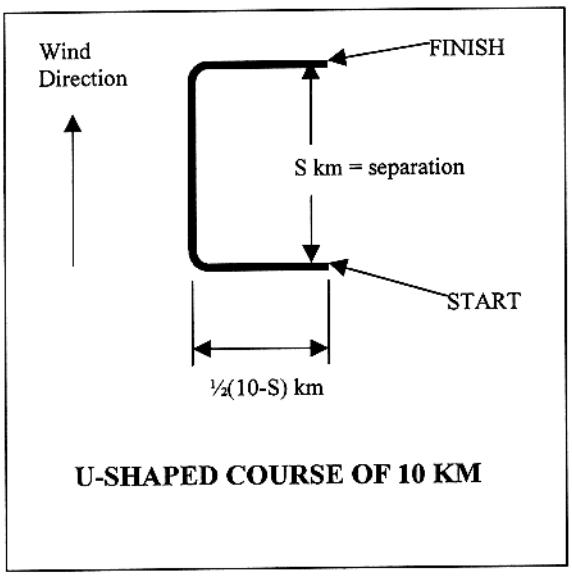
Taking 10 km as a standard, the work done by a runner on a windless day is:

Work, **W = 10*25*K = 250*K**

If the runner has a 2 m/s tailwind, his work reduces to **90*K**.

COURSE GEOMETRY

Although many course geometries exist, a simple u-shaped course permits the greatest amount of wind aid, as the runner may encounter a tailwind with no corresponding headwind at another part of the course. This geometry is shown below:



Work Done on a 10 km U-shaped Course

On the legs normal to the wind:

W = (10 - S)*5^2*K = W1

On the leg parallel to the wind:

W = S*(5 - V)^2*K = W2

For "wind work" equivalent to a 2 m/s tailwind,

W1 + W2 = 90*K

250 – 25*S + (25 - 10*V + V^2)*S = 90 or,

S = 160/(10*V – V^2) for V<5 (equation 1) and,

250 – 25*S – (25 – 10*V + V^2)*S = 90 or, **S = 160/(V^2 – 10*V + 50** for V>5 (equation 2)

Equations (1) and (2) were used to generate the curve shown in the graph above.

COMMENTARY

The analysis is purely theoretical. Whether the work done in overcoming wind is the most appropriate measure of aidedness may be questioned, but it is one way to look at things.

1) In the U-shaped example used as the most susceptible to wind aid, it must be pointed out that while the runner may enjoy a tailwind in part, and never a headwind, he will experience crosswinds. While these crosswinds provide no theoretical impedance to his progress, it is generally accepted that running is hampered by strong crosswinds.

2) Hugh Jones has pointed out that sprinters are moving at close to 10 m/s, while road runners move closer to 5 m/s, thus the effect of the 2 m/s tailwind may be different.

3) The analysis makes no recommendation. It is simply an effort to compare various conditions of wind aid to that enjoyed by a sprinter with a 2 m/s tailwind.

Measurement of the Month

Jim Gerweck

MINUTE MAN 5K

WESTPORT, CT **24 APRIL 2003**

Early this year I was contacted by organizers of the Minute Man race in Westport, CT. Several years ago I had measured a five mile course for them, but now they were thinking of "downsizing" their event to 5 km in hopes of increasing participation. Although I advised against this, as there are far more 5 km courses than 5 milers, they decided to make the change, and asked me to measure the course. In addition, since the race had begun using ChampionChip technology last year, I was asked to adjust the start and finish lines so they would be coincident, so runners could be given net times.

The Minute Man race starts and finishes at Compo Beach, a town park that happens to be near the midpoint of the 3.07 mile race of the Westport Roadrunners Summer Series (CT97031DR), which starts and finishes at the nearby municipal golf course, Longshore Country Club. A map of this route can be accessed online at **http://www.geocities.com/jfalberg/westport/wpt35.htm.** That course does not make a complete loop, the start and finish being approximately 100 meters apart. I calculated that adding that distance, plus the in and out sections in the Compo parking lot, would make the route more than 5 km. However, there is a cut through road in Longshore that would actually avoid golfer traffic and would eliminate distance. The question was, would it be the proper amount?

Arriving at Longshore (where I also have a 300 meter calibration course on the long straight driveway) I did a pre-cal, then began measuring from an arbitrary point outside the loop. The first ride revealed the Longshore loop, using the cut through road, to be 2313 meters long.

I then rode to the beach and down the driveway to a pavement joint near the previous finish line. This distance was 1132 meters. If the runners ran out and back on this stretch and did the loop, the total distance would be 4577 meters. Realizing an out-loop-and back layout would be too short, I would have to utilize the rest of the Roadrunners course, which went back to Longshore via a slightly longer route. This distance to the point was 1550 meters, which added to the loop and the short way back to the beach gave a distance of 4995 meters, almost perfect. I then rode the course from start to finish, laying out the mile and km splits, and being sure to take readings at the off-loop point each time I rode past it. After totalling the sum of shortest splits for each segment, the final distance came out to 4996.587 meters. After moving the start/finish back 1.7 meters, I marked the location with a MagNail and paint.

As an interesting sidelight, I was hired to do data entry by the timing service for the race the following Sunday. Thus, in the space of five days, I used two of Alan Jones' inventions — the Jones/Oerth Counter to measure the course, and RunScore to score it.

Westport Minute Man 5 km

Bicycle Calibration Data

Cal Course Length (m) 300

Pre Calibration Time: 8:25 Temp: 40

	Start	Finish	Counts
Ride 1	31915	35578.5	3663.5
Ride 2	35578.5	39240	3661.5
Ride 3	39240	42904	3664
Ride 4	42904	46565	3661

Avg. Counts	3662.5
Cts/meter	12.20833333
Cts/km	12220.54167
Cts/mi.	19667.05541

Post Calibration Time: 10:20 Temp: 41

	Start	Finish	Counts
Ride 1	31120	34781	3661
Ride 2	34781	38442	3661
Ride 3	38442	42101.5	3659.5
Ride 4	42101.5	45764	3662.5

Avg. Counts	3661
Cts/meter	12.20333333
Cts/km	12215.53667
Cts/mi.	19659.00064

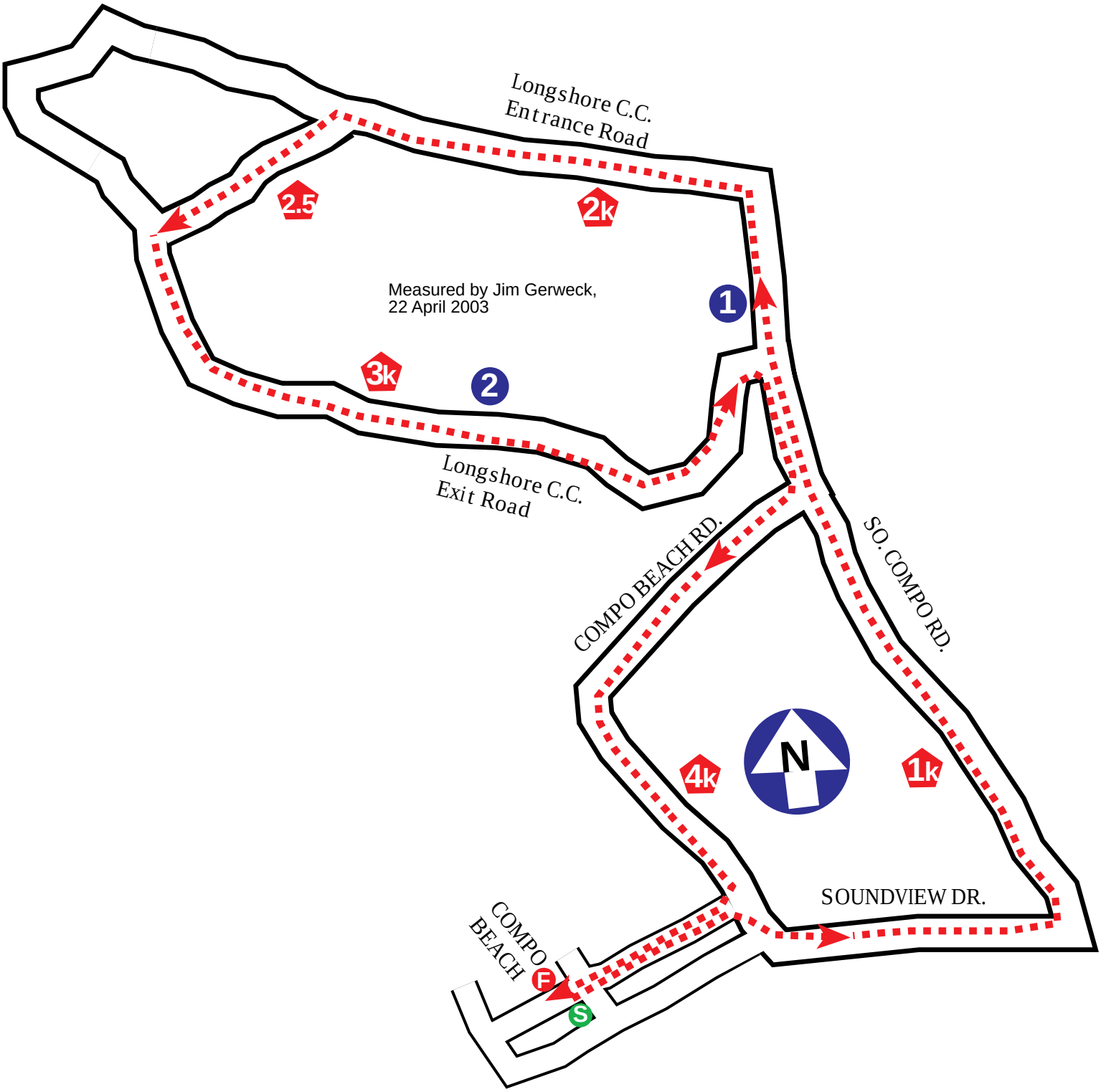
Point A	53436		
Point A	81710	28274	2.313645399
Start/Fin	95584	13874	1.135301559
Point A	114533	18949	1.550585933
Start/Fin	128373	13840	1.132519358
Point A	147321	18948	1.550504103
Point A	175594	28273	2.31356357

SOSS 4.996587031

WESTPORT MINUTE MAN

5 km, Westport, CT

Certified CT0300 DR



From MNFORUM

TRANSPONDER TIMING SYSTEM

The RRIC web site states:

"A system operator or producer will submit to The Road Running Information Center, results from three races, along with a listing of select times. The results submitted must indicate that the system captured codes successfully during periods when the rate of runners crossing the finish line is comparable with what occurs across high density finish lines. A reasonable match between select times and transponder times will indicate that the system and its operators are capable of performing appropriately."

For the past several months my group, Smartbib, has been developing a new transponder timing system. We have successfully timed two races and plan to time our third this coming weekend. The subject transponder is incorporated in a regular bib number and its low cost, ~$1, permits it to be disposable.

No collecting and stringing chips after a race. The system meets all of the USATF requirements listed below. Its time resolution is one thousands of a second (0.001). Competitors run through a gate 14ft in width at present. This gate can be expanded to 30ft using the current electronics. Antennas are mounts on an overhead structure. We have timing data with select times recorded via Time Machine. RunScore has been modified to accept the Smartbib data. How and to whom do I submit this data to obtain USATF approval?

a) the system requires no action by the runner during the competition, at the finish line, or during any finish line or results related system or process;
(b) the resolution is 0.1 second (I.e., it can separate runners finishing 0.1 second apart);
(c) the weight of the transponder and its housing carried on the runners' uniform, race number or shoe is not significant;
(d) none of the equipment used at the start, along the course or at the finish line constitutes a significant obstacle or barrier to the progress of the runner;
(e) the system, including the implementation of its components and its technical specifications, is approved by the finish line subcommittee of the Road Running Technical Council;
(f) the system is started in accordance with Rule 136.2;
(g) the determination of the official winning time is in accordance with Rule 37; and,
(h) times for other competitors will be adjusted, based on the official winning time.

For the Smartbib Team

Phil Quinn
pwq@ost.cdrh.fda.gov

Congratulations, Phil. It is always of interest when someone has a new timing system - especially one that can be incorporated into the bib.

The USATF Road Running Technical Council is in charge of reviewing and approving new systems. The chair, Mike Wickiser, is the person you should start with. I will add him to the copied parties for this email.

Good luck and we look forward to receiving the results when you have the official approval.

Linda Honikman, USATF RRIC
USATFRRIC/honikman <rric@runningusa.org

The latest MNF posting claimed:

<< Competitors run through a gate 14ft in width at present. This gate can be expanded to 30ft using the current electronics..>>

Yet:

<< (d) none of the equipment used at the start, along the course or at the finish line constitutes a significant obstacle or barrier to the progress of the runner; >>

Many large marathons require a wider unobstructed start line than 9m. How hopeful is the "Smartbib" developer of expanding this system to handle wider start lines?

Hugh Jones
Aimssec@aol.com

I'm currently looking at the Rock-n-Roll San Diego entry form. In the picture of the start line, a large area is blocked off for the ChampionChip system (must be placed in the middle to accommodate the large starting line). It certainly seems like that could constitute as significant of an obstacle as the smartbib setup.

Sean Roland
seanr@speedchip.com

I recall reading (possibly in these very pages) that narrowing the start actually INCREASES the ability of runners to get up to speed after crossing the line. While it may delay their actually crossing the line, that doesn't matter if net times are used. The effect is kind of like water coming out of a narrow nozzle of a hose under pressure.

Jim Gerweck
zgerweck@optonline.net

SMARTBIB

I have been following the talks about Smart-Bib on this forum and have a simple question about the 900MHz technology. Doesn't a human body block the signal at this frequency? For example you have a dense finishline or a start-

ing line. Bodies in front will be blocking those closely packed in from behind. Guaranteed that people will be missed using this frequency for a system. Antenna up above will catch some of those blocked but will not get them all.

The human body will block the reading capabilities of a 900MHz system. If you have questions you can call the technicians or sales people at a company called Matrics. Their web site is **www.matrics.com**

Mike Burns
Burns Computer
Mike_sportsworld@msn.com

TIMING SYSTEMS

I haven't seen any of the data regarding the Smart Bib system so it would be unfair to comment on the system performance. The general criteria for 'chip' type timing has been determined with the input of Basil Honikman, Pete Riegel and myself. To be approved any timing system must be able to accurately measure the time from start to finish and be able to handle large numbers of participants without appreciable loss of times. Any timing system must also show it performs well with several sets of finish results. Checking the accuracy is easy enough by comparing "chip" times to select secondary timing. Ability to handle large numbers of participants has been done with checking the start times for larger races.

Mike Wickiser
mikewickiser@neo.rr.com

There are several examples of just that on the web page previously mentioned (**www.matrics.com**). Nothing on what happens when several runners cross the line en masse/ possible interference with signal.

Jim Gerweck
zgerweck@optonline.net

It's a great story. If you've got five minutes, go to the site and read it.

TWO CHIP TIMING

At the NYRR 8000, the U.S. Men's 8-K Championships, we are going to try an experiment to improve race scoring accuracy with chip timing. I'm going to ask all the men in the championship division to wear two chips, one on each foot. My fear is that separating the top finishers at both the finish line and at the 5-K mark (where there is a $500 prime) may be difficult considering how closely packed they may be at both those points anywhere within the top-15 runners. The final 400m is downhill and in last year's event Broe went sub-60 seconds to the line.

We don't have FAT available (FinishLynx) with video timing, and are using ChampionChip.

Each chip will have a separate code, so there will actually be two very slightly different times for each runner. The first chip to register will be the runner's official time as it will be the first to break the plane of the finish line. We will also use select times to back this up. The order of finish will have a column for the runner's official time then a second column for the extended times showing tenths of seconds. This should help the media see how close the finishers actually were to each other. The finish report will also have the 5-k split of each finisher.

The so-called middle loop of Central Park is 5.15 miles, so the race starting line will be 0.180 miles ahead of the finish line, a start finish separation of 3.6%. I'm pretty sure there is no elevation gain or loss.

David Monti
dmonti@dellepro.com

DOUBLE CHIPS

The chip does not record when it breaks the plane of the finish line. It records a bit later when the chip is close to the mat. I don't know about NYRR software but in RunScore, only the first time is recorded. All others are discarded even if it is from a different chip. The NCAA Div. I cross-country championship races now are decided by the chip, not the torso breaking the plane of the finish line. I believe this change was made last fall before the championships. They also use a chip on each foot. It seem strange to tie the official order of finish to a technology since some groups are working on chips in the bib which should record the passing of the torso.

Alan Jones
AlanJones@stny.rr.com

I use FinishLynx to validate results of the NCAA DIII Cross Country Championships. Runners in these races use two chips, and there is the usual backup mat beyond the finish line.

The crucial fact about chip timing for XC (Winning Time or ChampionChip) is that the resolution of the chip is about a tenth of a second. Visual examination of the finish shows that typically some 3-5% of the finishers are recorded out of order by the chip system in these races. In most of these cases the difference in finish time between the runners whose finishes has to be reversed was 0-0.2 seconds. In some cases the difference is greater, which I attribute to neither of the chips being recorded at the primary mat.

For one race I examined the pictures to see what would happen if the rule were changed so that a finish would be recorded when any part of the runner's body (including the foot) reaches the finish line. In one race seven of 12 reversals would still have been necessary; in the other all but one of 14 reversals would still have been made. The high school rules have in fact been changed to accommodate what people think is the capability of a chip system (i.e., defining the

finish by the arrival of the feet or any other part of the body at the finish line). It won't do any good. You still need visual verification of the order of finish when the order of finish is important (cross country and prize money races, e.g.).

Two chips certainly improves the reliability of the system. Although I don't own a chip setup myself, I have simulated the effect of using just one chip per runner by assuming that the runners wore either the first of the two chip numbers assigned or the second. The number of switches in finish order doubles if only one chip is used, and about 1% of the finishers are missed completely. This is much higher than what I believe to be the error rate in road races, but remember these college cross country runners are coming in much faster than does the typical road racer.

Jack Moran
jack@raceberryjam.com

The issue of 2 chips confuses me a bit. Although one foot is obviously in front of the other, so to speak, I thought it is the torso that determines the winner. Therefore, which foot crosses, before another's, makes no difference. If the race is that close, a photo finish would be necessary and the chip would have no bearing at all.

Thomas Kulhawik
hitekrace@aol.com

Bernie Conway Appointed as IAAF Administrator for Americas

Fellow Measurers,

As you may already know, Pete Riegel has retired as International Measurement Administrator for the Americas. I have recently been appointed to take over this position. I would like to thank Pete for his recommendation on my behalf to AIMS/IAAF. Pete is still active measuring and giving Measurement Workshops and he has agreed to mentor me as I take over as Administrator for the Americas.

If any of you have changed your address or phone number in the last year or two, please let me know so that I can update my files. If your email address changes please let me know. I have a few names of Grade B Measurers for whom I do not have an e-mail address or a telephone number. I have written to some of the following as well and have not heard anything from them. If you know how I can get in touch with the following I would appreciate it: Alberto Cabaleiro (Argentina), Rolando Czerwiak (Argentina),Wietse Margo Jurgen Hoornweg van Rij (Brazil), and Paulo Silva (Brazil). I also need the new e-mail address of Glen Lafarlette of Tulsa Oklahoma, and Gene Newman of New Jersey.

I have been measuring road races since 1982. I was introduced to measuring by Bob Baumel when he was living in London, Ontario, Canada while working on his PhD at the University of Western Ontario. Bob was, and still is, instrumental in the development of measuring in the USA. In 1999 I was appointed Chief Certifier for Canada. We now have in excess of 50 measurers across Canada and our number of measurers and number of certified courses is going well.

My email address is measurer@ican.net and I can be reached by phone at (519)641-6889 (Home) and my address is 67 Southwood Crescent, London, Ontario, Canada, N6J 1S8. My FAX is (519)633-4887 (Work) or I also have a FAX at home which uses the same number as my voice mail. To contact me this way you may have to call and then indicate you are going to send a FAX.

Bernie Conway
measurer@ican.net

USATF/RRTC CERTIFIED COURSE LIST
New Entries, March - April 2003

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	m/km DROP	pct SEP	MEASURER	REPLACES
10km	AL 03003 JD	A	Auburn	Love Your Heart 10k - Course II	0	0	D Underwood	
42.195km	AL 03004 JD	A	Birmingham	Mercedes Marathon	-0.1	1.4	R Melanson	AL 01011 JD
21.0975km	AL 03005 JD	A	Birmingham	Mercedes Half Marathon	-0.2	2.9	R Melanson	AL 01012 JD
5km	AL 03006 JD	A	Birmingham	High Country 5k	0.6	1.7	R Melanson	
5km	AL 03007 JD	A	Anniston	Anniston Lions Downtown Run	0	1.6	R Melanson	
10km	AL 03008 JD	A	Auburn	Love Your Heart 10k - Course III	0	0	D Underwood	
10km	AL 03009 JD	A	Hanceville	Wallace State Alumni 10k	0	1.2	R Melanson	
10mi	AL 03010 JD	A	Pelham	Adam's Heart Run	0	0.2	R Melanson	
10mi	AL 03011 JD	A	Mooresville	HTC Rocket Run 10-Mile	0	0.2	V Connaughton	
3mi	AZ 03007 GAN	A	Mesa	Valley of the Sun 3 Miler	1.24	73.3	T Lablonde	
10km	AZ 03008 GAN	A	Cave Creek	Foothills 10k	15.2	32.2	R Strachan	
5km	AZ 03009 GAN	A	Cave Creek	Foothills 5k	24.2	48.3	R Strachan	
5km	AZ 03010 GAN	A	Tucson	Race for the Cure 5km	0	1.2	H Kruse	AZ02004 GAN
42.195km	AZ 03011 GAN	A	Mesa	Valley of the Sun Marathon	2.6	14.9	G Newman	AZ02006 GAN
5km	AZ 03012 GAN	A	Scottsdale	Hawk Trot 5k	0	0	T Lablonde	
10km	AZ 03013 GAN	A	Scottsdale	Hawk Trot 10k	0	0	T Lablonde	
8km	CA 03001 TK	A	Palo Alto	The Juana Run 8k	-0.38	5.75	T Knight	CA97001 TK
21.0975km	CA 03001 DP	A	Denver	Platte River Trail 1/2 Marathon	2.3	1	A Lind	
8km	CA 03002 TK	A	Stanford	Fifty Plus 8km At Stanford	0.75	1.84	T Knight	CA02017 RS
5km	CA 03003 TK	A	Stanford	Stanford Community Day Fun Run	-2.42	19.2	T Knight	
12km	CA 03004 TK	A	San Francisco	Across the Bay 12k - alternate	5.92	37.2	T Knight	
5km	CA 03005 TK	A	Berkeley	Run For Life 5k	1.68	11	T Knight	
10km	CA 03006 TK	A	Berkeley	Run For Life 10k	1.68	5.5	T Knight	
5km	CA 03010 RS	A	Santa Fe Springs	Run for the Red Cross 5km	0	5.3	R Scardera	
Cal	CA 03011 RS	A	Carmichael	Harrington Way 1000 ft. Calibration	0	100	D Thurston	
5km	CA 03012 RS	A	Rancho Cordova	Armed Forces Day 5km	0	0.9	D Thurston	
5km	CA 03013 RS	A	Sacramento	California State University 5km	0	3.2	D Iwamiya	
Cal	CA 03014 RS	A	Mountain View	Trailblazer 500 meter Calibration	0	100	J Jones	
10km	CA 03015 RS	A	Mountain View	Trailblazer 10km	0	0	A Grossman	
42.195km	CA 03016 RS	A	Los Angeles	2003 Jimmy Stewart Relay MAR	0.2	0.57	R Scardera	CA92020 RS
10km	CA 03020 RS	A	Agoura Hills	2003 Great Race of Agoura 10km	2.5	4	R Scardera	CA00051 RS
5mi	CT 03001 DR	A	Bristol	Shamrock Run 5 Mile Road Race	0	0	W Graustein	
5km	FL 03001 DL	A	Boca Raton	Town Center Classic	0	0.7	D Loeffler	
5km	FL 03002 DL	A	Miami	Super Sunday 5k	0	1.2	D Matuszak	
5km	FL 03003 DL	A	Hallandale	Valentine's at the Track 5k	0	0	G Witkowski	
Cal	FL 03004 DL	A	Cocoa Beach	Minuteman Causeway 2640 ft.	0	100	B Dillard	
10km	FL 03005 DL	A	Orlando	Runners Classic 10k 2002	0	0.4	T Ward	
5km	FL 03006 DL	A	Orlando	Runners Classic 5k 2002	0	0.8	T Ward	
5km	FL 03007 DL	A	Ft. Meyers	Edison Festival of Light 5k	0	8.3	J Patterson	
21.0975km	FL 03008 DL	A	St. Petersburg	Max Bayne Half Marathon	0	0.5	E McDowell	
Cal	FL 03009 DL	A	Seagrove	Seagrove 30-A 1000 ft.	0	100	B McGuire	
21.0975km	FL 03010 DL	A	Seaside	Seaside Half Marathon	0	0	B McGuire	
5km	FL 03011 DL	A	Seaside	Seaside 5k	0	0	B McGuire	
42.195km	FL 03012 DL	A	Clearwater	Florida Gulf Beaches Marathon	0	0	C Lauber	FL 01054 DL
42.195km	FL 03013 DL	A	Tallahassee	Tallahassee Marathon	0.02	0	B McGuire	
21.0975km	FL 03014 DL	A	Tallahassee	Tallahassee Half Marathon	0.04	0	B McGuire	
5km	FL 03015 DL	A	Sunrise	MOS Corporate 5k Run	0	3.4	G Witkowski	FL 2004 DL
5km	FL 03016 DL	A	Tarpon Springs	Beach to Bayou 0	12.2	E	McDowell	
10km	GA03005 WC	A	Rome	Viking 10k - 2003 Course	0	0.4	L Roberts	
5km	IA 03001 KU	A	Davenport	St. Patrick's Day 5k	-0.3	5.8	K Ungurean	IA 92001 KU
5km	IA 03005 MF	A	Ottumwa	SE Iowa Race for the Cure	0	0	B Barnhill	IA 97001 MF
Cal	IA 03006 MF	A	Ottumwa	Ottumwa Gateway dr. 100 ft. #2	0	100	B Barnhill	

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	DROP	SEP	MEASURER	REPLACES
10km	IL 03001 JW	A	Clarendon	Clarendon Hills 10k	0	1.85	C Hinde	
5km	IL 03002 JW	A	Lisle	Run For Education	0	4.6	C Hinde	IL 02020 JW
5km	IL 03003 JW	A	Chicago	Spring Into Action 5k	0	1.3	J Wight	
5km	IL 03005 JW	A	Crystal Lake	5k Raue Run	0	5.4	C Hinde	
5km	IL 03006 JW	A	Chicago	Voices For Illinois Children 5k	0	0.5	J Wight	IL 00004 JW
10km	IL 03008 JW	A	Chicago	Voices For Illinois Children 10k	0	0.25	J Wight	IL 00005 JW
5km	IL 03009 JW	A	Glen Ellyn	Chase to the Taste 5k	0	1	C Hinde	
10km	IL 03010 JW	A	Glen Ellyn	Chase to the Taste 10k	0	0.4	C Hinde	
5km	IN 03001 MW	A	Indianapolis	Race for the Cure 5km	0	13.6	J Sauer	
50km	KS 03005 BG	A	Wichita	KUS 50 Kilometer	0	1.5	L Richardson	
100km	KS 03006 BG	A	Wichita	KUS 100 Kilometer	0	1.5	L Richardson	
50mi	KS 03007 BG	A	Wichita	KUS 50 Mile	0	1	L Richardson	
10km	KS 03008 BG	A	Manhattan	St. Pat's	0	0.63	D Fisher	KS00002 BG
4mi	KS 03009 BG	A	Leawood	St. Pat's	0	0	L Joline	KS98011 BG
42.202km	LA 03001 JF	A	New Orleans	Mardi Gras Marathon	0	0.36	C George	LA 00003 PR
10km	MA03001 RN	A	Boston	Tufts 10k for Women	0.3	1	S Vaitones	MA87003 BT
5km	MA03002 RN	A	Andover	Larry Robinson Cancer 5k	-1.16	7.32	S Vaitones	
21.0975km	MA03003 RN	A	Wakefield	MA Law Enforcement H-Marathon	0.05	1.7	J Kuo	MA02006 RN
42.195km	MD02019 JS	A	Frederick	Frederick Marathon	-0.07	0.6	J Sissala	
5mi	MD03001 JS	A	Germantown	Germantown 5 Miler	0	0	J Sissala	
10mi	ME03001 RF	A	Cape Elizabeth	Maine Track Club Mid-Winter	0.758	1.9	R Shevenell	ME95001 WN
5km	MI 03001 SH	A	E. Grand Rapids	Spectrum Health Irish Jig	1.8	10	R Deweymi	00036 SH
5km	MI 03002 SH	A	Belmont	Splish-N-Dash	0	0	R Dewey	
5km	MI 03003 SH	A	Grand Rapids	Lake Michigan Credit Union	-0.4	3	R Dewey	
42.195km	NC03002 PH	A	Charlotte	Charlotte Observer Run for Peace	0.87	75	T Rhodes	NC99002 PH
10km	NC03003 PH	A	Charlotte	Charlotte Observer Run for Peace	1.04	8	T Rhodes	
5km	NC03006 PH	A	Southern Pines	Moore Buddies 5k	-0.2	0.4	P Hronjak	
10km	NC03007 PH	A	Southern Pines	Moore Buddies 10k	-0.1	0.2	P Hronjak	
5km	NC03008 PH	A	Cary	Western Wake Med Cent Festival	0.73	4	P Hronjak	
5km	NC03009 PH	A	Chapel Hill	KD Shamrock 'N Run 5k	0	0	D Forbis	
5km	NC03010 PH	A	Durham	Therapeutic Riding Center 5k	0	2	D Forbis	
21.0975km	NC03011 PH	A	Charlotte	Corporate Cup Half Marathon	0	0.3	T Rhodes	
5km	NC03012 PH	A	Charlotte	Reedy Creek Park 5k	0	7	D Joffe	
4mi	NC03013 PH	A	Charlotte	Shamrock Four Miler	0	1	T Rhodes	
5km	NC03014 PH	A	Raleigh	Run For Respect	0.85	7	P Hronjak	
5km	NC03015 PH	A	RTP	March of Dimes 5k	0	3	P Hronjak	
5km	NC03016 PH	A	Chapel Hill	Girls On The Run	0	8	D Forbis	
5km	NC03017 PH	A	Raleigh	George Williams Relay	-0.55	6	P Hronjak	
5km	NC03018 PH	A	Raleigh	House Your Neighbor 5k	0	0	P Hronjak	
8km	NH02013 WN	A	Newington	Fox Point Sunset 5	0	2.3	M Leighton	
15km	NH03001 RF	A	Strafford	Hannaford 15k Bow Lake Run	0.1	0.6	R Fitzpatrick	
5km	NH03002 RF	A	Stafford	Hannaford 5k Bow Lake Run	0.914	18.3	R Fitzpatrick	
5km	NJ 03001 LMB	A	Ewing	The College of New Jersey 5k	0	0	L Baldasari	
5km	NJ 03003 LMB	A	Atlantic City	RNS Mothers Day 5k Run	0	0	G Hoopes	
2mi	NY 03001 AM	A	New York	NYRRC 97th St. 2 Mile	0	0	P Hess	
5km	NY 03002 AM	A	Dolgeville	Run for the Violets 5k	0.9	3.4	D Oja	
7mi	NY 03003 AM	A	New York	Reversible 7	0	0.6	P Hess	
5km	NY 03004 AM	A	Big Flats	Big Flats Community Days 5k	0	2.8	R Nichols	
5km	NY 03005 AM	A	Elmira	Komen Race For the Cure -Elmira	0	4	R Nichols	
10km	OH03003 MW	A	Cleveland	Cleveland Rite Aid 10k	0	2.6	MWickiser	
42.195km	OH03004 MW	A	Cleveland	Cleveland Rite Aid Marathon	0	0.6	MWickiser	

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	DROP	SEP	MEASURER	REPLACES
5km	OH03005 PR	A	Akron	Canal Park Home Run Trot 5k	0	1.1	J Wilhelm	
42.195km	OH03006 PR	A	Dublin	Last Chance Marathon	0	0.8	J Glaze	OH02002 PR
5km	OH03007 PR	A	Powell	Powell Spring 5k	-0.61	1.1	P Riegel	
5km	OH03008 PR	A	Columbus	Race for the Cure 5km	0.61	14.6	P Riegel	OH02005 PR
42.195km	OH03009 PR	A	Cincinnati	Flying Pig Marathon	0.51	1.8	J Glaze	OH03002 PR
5km	OH03010 PR	A	Cincinnati	Race For the Cure -0.5	4.9	S	Prescott	
5km	PA 03002 WB	A	Secane	Ridley 5km Run - 0	0	B	Belleville	
5km	PA 03003 WB	A	Philadelphia	Vietnam Veterans Memorial Run	0	0	B Belleville	
5km	PA 03004 WB	A	Swarthmore	Habitat for Humanity -5km	0.37	4.39	B Belleville	
5km	SC 03005 BS	A	Mt. Pleasant	Catch the Leprechaun	0	0.54	M Chodnicki	
8km	SC 03006 BS	A	Fort Mill	Paw Print 8k	0	0.06	E Guettler	SC97024 BS
10km	SC 03007 BS	A	Columbia	Carolina 10k	0	4	T Rhodes	SC01004 BS
5km	SC 03008 BS	A	Clover	Clover YMCA 5k	0	0	D Jaffe	
5km	SC 03009 BS	A	Clemson	Clemson Presidential Cup 5k	-0.6	4.8	D White	SC01016 BS
5km	SC 03010 BS	A	Greenville	Run For Hope	0	0.9	D White	
5km	SC 03011 BS	A	Gilbert	Shelter The Children 5k	0	1.2	E Prytherch	SC98004 BS
10km	SC 03012 BS	A	Charleston	Cooper River Bridge Run	0	57.3	M Desrosiers	SC00003 BS
42.195km	TN 02035 RH	A	Memphis	St. Jude Memphis Marathon	0.2	0.66	R McCrarey	TN02029 RH
21.0975km	TN 03002 RH	D	Germantown	Germantown Half Marathon	-0.4	0.65	R McCrarey	TN00001 RH
5km	TN 03003 RH	A	Hendersonville	Running of the Fools	0	0	J Zeigler	
10mi	TN 03004 RH	A	Surgoinsville	Surgoinsville 10 Miler	0	0	D Rogers	
21.0975km	TN 03005 RH	A	Jackson	Andrew Jackson Half Marathon	0	0	B Saffel	
15km	TN 03006 RH	A	Pikeville	Fall Creek Thaw	-0.8	0.61	T DePaulis	
21.0975km	TN 03007 RH	A	Germantown	Germantown Half Marathon	0.39	0.7	R Hunter	TN03002 RH
5km	TN 03008 RH	A	Townsend	Smoky Mountain 5k	0	0	A Morgan	
10km	TX 02023 ETM	A	Dallas	Bagel Run	0	0	C Clines	
10km	TX 03001 ETM	A	Houston	Bayou City Classic	0	1.9	E McBrayer	TX99101 ETM
3.25mi	TX 03004 JF	A	Sunset Valley	Texas Dog Walk	0	0	J Ferguson	
8km	TX 03005 JF	A	Austin	News 8 8k	0	0	J Ferguson	
5km	TX 03006 JF	A	Austin	Sunrise Stampede 5k	0	0	J Ferguson	
5km	TX 03007 ETM	A	Houston	Run Wild Sports V.4	0	2.2	E McBrayer	TX02053 ETM
5km	TX 03007 JF	A	Austin	Chuy's 5k	0	8	J Ferguson	TX02004 JF
5km	TX 03008 JF	A	Austin	Bun Run 5k	0	0	J Ferguson	TX02005 JF
5km	TX 03009 JF	A	Austin	Daisy 5k	0	0	j Ferguson	
5km	TX 03014 ETM	A	Houston	Eeyore's -0.2	2.4	E	McBrayer	TX00004 ETM
10km	TX 03016 ETM	A	Fort Worth	Cowtown 10k	0.8	3.8	M Polansky	TX02010 ETM
5km	TX 03017 ETM	A	Fort Worth	Cowtown 5k	3	24.5	M Polansky	TX01007 ETM
5km	TX 03018 ETM	A	Dallas	White Rock YMCA 5k	-0.2	2	C Clines	
5km	TX 03019 ETM	A	Sugar Land	Dulles High School Booster 5k	0	1.7	R Barnhill	
5km	TX 03020 ETM	A	Fort Worth	Zoo Run Run	-1	6.8	C Clines	TX02028 ETM
3.5mi	TX 03021 ETM	A	Dallas	Chase Corporate Challenge	-0.18	3.2	A Beach	
5km	TX 03022 ETM	A	Houston	Houston Astros Race for Pennant	1.6	7	E McBrayer	
5km	TX 03023 ETM	A	Dallas	Bagel Run	0	0	C Clines	
5km	TX 03024 ETM	A	Galveston	D'Feet Breast Cancer 5k	0	0	R Barnhill	
5km	TX 03025 ETM	A	McKinney	Spring Fling - Shawnee Trail Park	0	0	A Beach	
5km	TX 03026 ETM	A	Houston	Sprint for Life	0	3.2	E McBrayer	TX02034 ETM
42.195km	TX 03027 ETM	A	Dallas	Dallas Trails Marathon	0.2	0.5	K Ashby	TX98056 ETM
5km	TX 03028 ETM	A	McKinney	Run for Cover 5k	1.6	3.7	M Hutcheson	
10km	TX 03029 ETM	A	McKinney	Run for Cover 10k	0.8	1.8	M Hutcheson	
5km	TX 03030 ETM	A	Plano	Plano Komen Race for the Cure	0.4	8.6	C Clines	TX02032 ETM
5mi	TX 03032 ETM	A	Fort Worth	Run on Texas Stampede 5 Miler	0	0.3	M Polansky	
5km	TX 03033 ETM	D	Waco	Waco Komen Race for the Cure	0	2	K Vierzba	TX00055 ETM
5km	TX 03034 ETM	A	Houston	Dad's Day	0	2.4	E McBrayer	
1.5km	TX 03035 ETM	A	Pharr	Nat. Youth Racewalk Champ-ship.	0	34.7	C Mericle	
3km	TX 03036 ETM	A	Pharr	Nat. Youth Racewalk Champ-ship.	0	0.3	C Mericle	
5km	TX 03036 ETM	A	Pharr	Nat. Youth Racewalk Champ-ship.	0	0.2	C Mericle	
5km	TX 03037 ETM	A	Dallas	Run for a Better World	0	0	C Clines	
5km	TX 03038 ETM	A	Waco	The Best Dam Run in Texas	0	2	K Vierzba	
5km	TX 03039 ETM	A	Waco	Waco Race for the Cure II	0	1	K Vierzba	TX03033 ETM

DISTANCE	COURSE ID	ST	LOCATION	COURSE NAME/RACE	DROP	SEP	MEASURER	REPLACES
5km	UT 03001 DP	A	Sandy	Blessed Sacrament Fall Festival	0	2	L Smithee	
10km	VA 03001 JS	A	Sterling	Cascades Firehouse 10k	0	0	J Sissala	
5km	VA 03002 JS	A	Reston	Plaza America 5k	0	3.5	J Sissala	VA 02001 JS
21.0975km	WI 02108 JW	A	Madison	Mad City Marathon Half Marathon	2002	0.69	11.8	T Aten
Cal	WI 02109 JW	A	Milwaukee	Lincoln Mem. Dr. 1000 ft. Cal.	2002	0	100	D Weyer
6.25mi	WI 03004 JW	A	Madison	Fifty Furlong Run	0	0	E Harmon-Jones	

Renewed

10km	AL 93010 JD	A03	Mobile	Delchamps/Senior Bowl Run	0	2.3	L MatticsAL	92009 JD
Cal	FL 86038 BH	A03	Ft. Myers	T.C. Summerline Rd 1/2 Mile	0	100	W Paxton	
5mi	ME9WN A03		Kennebunkport	Presidential 5 Miler	0	1.1	D Rines	
10km	MI 90007 SH	A03	Ann Arbor	Dexter - Ann Arbor	0	81	S Hubbard	
5mi	NH91003 WN	A03	Dover	Red's Shoe Barn Road Race	0.8	1.2	W Nicoll	
5km	NH92008 WN	A03	Hillsboro	Balloon Fest / Hillsboro 5k	0	1.8	J Angwin	
5km	NJ 90030 DB	A03	Bordertown	Bordertown Cranberry Festival 5k	0	8.7	L Baldasari	
5km	NJ 91013 DB	A03	Hamilton	Mercer County Park 5km	0	2.1	L Baldasari	
4.97827km	NY 88006 AM	A03	Grand Island	Beaver Island Park Loop	0	0.44	D MacPhee	
2km	NY 91047 AM	A03	Niagara Falls	Robert Moses Pkwy. 2k Racewalk	0	0	D MacPhee	
5km	SC 93007 BS	A03	Columbia	Summit Run	0	0.13	E Prytherch	

Copies of these certificates available from:

Karen Wickiser - Course Registrar
2939 Vincent Road
Silver Lake, OH 44224-2916
Phone 330-929-1605 FAX 509-351-5383
mikewickiser@neo.rr.com
(Send course name & ID number and $3.00)

Each certificate includes a course map.
A complete listing of USATF Certified courses is available at:

www.RRTC.net

WHERE DO YOU RIDE WHEN MEASURING THIS CORNER?

This picture is a clip from the broadcast of the recent New York City Marathon. Here we see race winner Joyce Chepchumba motoring toward the finish with just a few hundred metres to go.

The blue line is visible at lower left.

The sloping curb caused me to wonder where to ride. A corner with a vertical curb all the way around is easy, but this one is not clear to me. What is the limit of the legal part of the road on a corner like this?

Pete Riegel

PUBLICATIONS AVAILABLE FROM RRTC

Printed Course Lists - You can obtain a list of certified courses for any state. Send $2.00 for any state list. You will receive a list that is current as of the last published Measurement News. If you wish the courses to be sorted in a special way, let us know. Otherwise it will be sorted by distance as the list appears in MN. You can obtain other specially-sorted lists - for instance, you might want to have all the 5k's in IL, IN, and MO. It can be done. Just say what you want. If you are online, lists can be sent that way. Contact Mike Wickiser at MikeWickiser@neo.rr.com

Attention RRTC certifiers: Your lists are free. Any time you want one let us know. You can mark up any mistakes and we will correct it and send you a new copy.

Web Page Access to Course Lists:The complete list can be downloaded from the RRTC website at **www.rrtc.net/download/** Also, try the new USATF Search Engine linked from **www.rrtc.net** or directly at **www.usatf.org/events/courses/search/**

Individual Certificates - These may be obtained by sending the course number and $2.00 per course desired. **SEND THE COMPLETE ID, INCLUDING PREFIX AND SUFFIX LETTERS**, Thus: CA92057 RS. Send course name, length and location as well. If you are thinking of hiring a measurer, this is an excellent way to see the sort of work you can expect. In addition, you may wish to check out a course you intend to run. Bring the map to the course and see if the race director got it right!

Above material may be obtained from: Mike Wickiser - 2939 Vincent Rd. - Silver Lake, OH 44224-2906

Measurement Calculation Computer Program by Bob Baumel, version 1.2 for Macintosh or IBM PC. This software can be downloaded for free from the RRTC website at **www.rrtc.net/download/** or Bob will distribute it by email attachment (send requests to webmaster@rrtc.net) or on floppy disks (send blank, formatted diskette and stamped return mailer to Bob at: 129 Warwick Road, Ponca City OK 74601-7424). Be sure to specify Mac or PC version.

Electronic Certificate Templates (available to Certifiers only), now in an Adobe Acrobat format which isn't tied to any word processor. Requires Acrobat or Acrobat Reader 4.0 or greater (Current Acrobat Reader may be downloaded for free from **www.adobe.com**). The template allows you to fill in certificates on the computer and print them. Available in both FS and non-FS version. Distributed by Bob Baumel by email or diskette [same addresses as for Measurement software]. Bob can customize the template with certifier's personal info at the bottom (name, address, phone, etc.) so you can avoid re-typing it every time (Be sure to specify exact ID text desired when requesting a template).
Online course measurement book, edited by Bob Baumel. It's a revision of the one you can buy from USATF, but the basic procedures have not changed. Available at: **www.rrtc.net**
Course Measurement Procedures - the Bible of course measurement. Complete instructions for measuring courses for USATF certification. The same procedures are now used for IAAF and AIMS courses. $9.00 postpaid. Available from: USATF - Book Order Dept. - PO Box 120 Indianapolis, IN 46206
Course Measurement Video - a concise 17 minute introduction to course measurement, intended as a supplement to Course Measurement Procedures. See how it's done! Version 2 sells for $10 but there are still a few copies of the original version available for $7.50. Send to: Tom McBrayer - 4021 Montrose - Houston, TX 77006-4956.

OTHER PUBLICATIONS AND EQUIPMENT

Road Race Management is a monthly newsletter providing race organizing ideas and news for race directors. $97 per year from: Road Race Management - 4904 Glen Cove Pkwy - Bethesda, MD 20816 Phone: 301-320-6865 Fax: 301-320-9164
Jones/Oerth Counters - Write to: Paul Oerth - 2455 Union St - Apt 412 - San Francisco, CA94123. Phone: 415-346-4165 Fax 415 346 0621. Email: Poerth@aol.com. US Price is $70 for the 5 digit model, $80 for the 6 digit model, postpaid. Foreign price is $75/$85 plus postage. Foreign orders shipped by airmail. Visa, MasterCard, American Express cards accepted. Note: Payment in advance is required.
RunScore - The flagship of IBM-style finish line programs. For information contact: Alan Jones - 3717 Wildwood Dr - Endwell, NY 13760. Or check it out on the internet at: **www.runscore.com**

Apple Raceberry JaM - Race management software for Macintosh and Windows. Check it out on the Internet at **www.raceberryjam.com** or call Jack Moran at (952) 920-0558.

TOPOGRAPHIC MAPS

USAtopographic maps are available from:

U. S. Geological Survey 303-202-4200
USGS Map Sales
PO Box 25286, Bldg 810
Denver Federal Center
Denver, CO 80225

Delivery will be made in approximately 4 weeks. Ask for latest price.

Maps can be located and ordered online at: **www.usgs.gov**

Maps can be obtained in just a few days from:

Map Express – PO Box 280445 – Lakewood, CO 80228-0445

1-800-MAP-00EX (1-800-627-0039)

Maps can be located and ordered online at: **www.mapexp.com**

Topo Maps on CD-ROM - 3-D TopoQuads includes authentic USGS 7.5-minute quadrangle maps, assembled into one seamless database
See an interactive online demo at **www.delorme.com**
Also - check out Street Atlas USAfrom the above – it's a seamless street map of the whole USAat a decent price.

USGS TOPOGRAPHIC MAPS ONLINE - FREE
Maps.Com has a section where you can click on to all USGS maps, free. This can be very handy for obtaining accurate elevation information.
Check out: **www.maps.com**

ROAD RUNNING TECHNICAL COUNCIL

Chairman: Mike Wickiser – 2939 Vincent Rd – Silver Lake, OH 44224
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CERTIFIERS - Please check this listing to be sure we have your data correct. April 17, 2003