



Measurement News

November 2004 • Number 128



South Africa's Hendrik Ramaala crosses the finish line to win the 35th annual ING New York City Marathon on November 7 in 2:09:28. Ramaala went through the left hand gate (as seen by the runners), failing to run through the finish tape being held by New York mayor Michael Bloomberg and New York Road Runners president and ING-NYCM race director Allan Steinfeld. Ramaala, wh apologized afterward for his gaffe, may just have been following the SPR, something Steinfeld, an RRTC veteran, might have anticipated.

MEASUREMENT NEWS

#128 – NOVEMBER 2004

Editor: Jim Gerweck
156 Fillow Street, Norwalk, CT 06850-2315.

Telephone: 203-838-2748 (home, not after 10 PM Eastern time)
FAX: 203-838-2748 (home - call before faxing)
Email: zgerweck@optonline.net

RRTC Chairman: Mike Wickiser
2939 Vincent Road, Silver Lake, OH 44224.

Phone/fax: 330-929-1605
Email: MikeWickiser@neo.rr.com

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 January 2005 issue must be in the Editor's hands by December 20. Next issue will be mailed in early January 2005.

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

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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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Editor's Note - From Jim Gerweck

Mike's computer is on the fritz, so I'll pinch hit this issue with some notes and observations

RRTC Session at USATF Annual Meeting: The RRTC session at the USATF Annual Meeting will be chaired by Carol McLatchie, veteran of many Olympic Trials validation rides and recent resident of the host state of Oregon. The session is schedule for Friday, December 3 at noon. Since most of our annual business was covered at the RRTC Meeting in Stamford in August, this session should be brief.

New Measurement Bulletin Board: Pete Riegel has set up an online measurement bulletin board. It can be accessed at

<http://measure.infopop.cc/eve/ubb.x>

Anyone can read what is posted, but to send your own messages you must register via a quick and painless process. This board is Pete's creation and is not officially affiliated with USATF/RRTC or any other organization. It is not meant to replace Measurement News Forum, but merely serve as a different means of communication among measurers. Excerpts from the board's first month of operation are published in this issue.

Measurement News Material Needed: Measurement News, MN Forum, and even the newly established message board, suffer from lack of material. A handful of the same people contribute the vast majority of the material. In order for these mediums of communication to continue and prosper, more material must come from a wider range of contributors.

Bernie Conway is Ill: Bernie was on his way to India when he fell ill at the Toronto airport and was rushed to the hospital. A note from his daughter, with contact information for get well wishes, appears below.

I am writing on behalf of my father Bernie to let you know what is going on with him. My dad was on his way to India, as you know when he became very ill. He was waiting in line to get his ticket when an ambulance had to be called and he was rushed to Etiboke Hospital. He stayed their for nine days where he was in and out of ICU. My dad has pancreatitis which is an inflammation of the pancreas. He is now in London at Old Victoria Hospital on South St. where he will be for a few more weeks. They are certain that the pancreatitis was caused by all the vaccinations and the malaria pill. There is only one other case in the world that this happened, so he is going to be written up in the medical books. He is still not allowed to eat and won't be for a week or so. If you could send this email on to those who know Bernie or want to know how he is doing I would appreciate that.

His home address is:

67 Southwood Crescent
London, Ontario, Canada
N6J 1S8

I'm sure he would be happy to hear from us all.

Planning Underway for World Championships Marathon Course

Hugh Jones

This was one question of several put to me by organisers of the 2005 World Championships in Helsinki, which may be of some more general interest:

<<

We plan to cover the cobble-stone sections of the course by Mondo mats. That is not fully decided yet, but we will soon make experiments with the mats. We also plan to use Mondo mats to cover some of the "street-railway lines" (don't know the word in English, but I guess you understand) on the course. Should we have these mats on when making the official measurement of is it ok to just ride on the cobble-stone surface? Also, we plan to have a thin layer of extra asphalt on some places where we have little "car speed reducing up and down sections" made of cobble-stones (only in the first 4,5 km, not in the main loop). Should that asphalt be there when doing the official measurement?

>>

I answered:

<<

I appreciate your detailed concern with the race surface. Before you continue with the plans for mats to cover cobblestones, you should make sure if it is really worthwhile to do this. From my experience in London the cobbles are just as bad with a covering as without. As for tramlines, it may be possible to fill the gaps with rope rather than covering them with mats. In any case, none of these special coverings need to be in place for the measurement. It is probably more accurate to measure directly on the cobbles than on the mats. The mats make up a different kind of surface altogether (so we would not measure the track using the calibrated bicycle). The cobbles are a different surface to smooth asphalt, but not so much that we need to be concerned for the short sections you seem to be talking about, which sound like they are "speed cushions". If this was of concern it would be less trouble to measure over them by using a steel-tape rather than involving road crews in laying asphalt for us.

>>

He responded:

<<

Thanks for your comments about the Mondo mats. I really appreciate your experience in London. We just met with a man from the Mondo company last Saturday as we were doing some detail planning on the course. We planned to have the mats proved in the near future by some of the best road runners from the Helsinki area to see if they really make the difference. There is one 250 metres stretch of cobble stones in the main loop. In addition to that, the start area (a square where the first appr. 130 metres are run) is made of cobble stones (that surface there being quite even or "smooth"; actually we have three different words in Finland for different kinds of "cobble stones" but I only know one word in English) and there is a 200 metres + 50 metres stretch of cobble stones right and soon after that in the starting "tail" part of the course. Anyway, we still have plenty of time to make the right decisions about the surface.

Also, thanks for the idea of using ropes to fill the tramlines!

>>

SOME CHARACTERISTICS OF A JONES/OERTH COUNTER

By Pete Riegel



The Experimental Setup

The emergence of Neville Wood's work with cyclometer measurement has prompted investigation into its accuracy and precision. Is it suited to course measurement? While taking a look at cyclometer measurement it crossed my mind that we have been using the Jones counter for decades, yet, to my knowledge, no look has ever been taken at its operational characteristics. I decided to see what I could find out.

The original Jones counter is a Veeder-Root revolution counter married to the gear drive from a mechanical bicycle speedometer. The counter is internally devised to produce 10 counts for each revolution of its shaft. The gear drive has 20 rectangular holes in the disk that is mounted to the bicycle wheel. These holes engage the ten teeth on a plastic gear which drives the counter shaft. The resulting combination yields 20 counts for each revolution of the bicycle wheel.

and the plastic gear has 11. This, combined with the same counter, produces a theoretical $260/11$, or $23.636363\dots$, counts for each revolution of the bicycle wheel.

The present counter, the Jones/Oerth counter, operates in the same way, except that the gear drive has 26 rectangular holes

Jones Counts vs Distance on Pete Riegel's Bicycle Wheel.

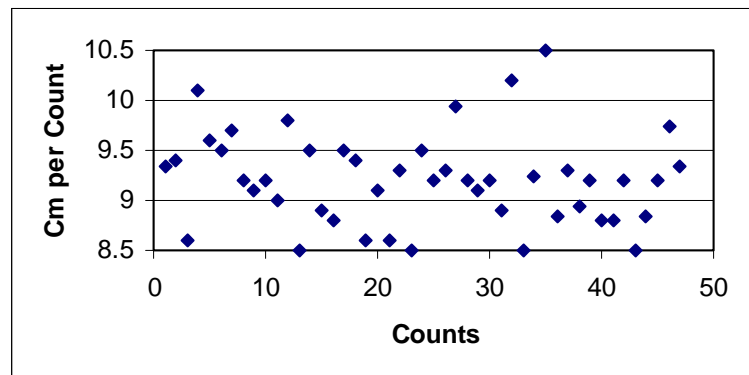
Date of Test: July 18, 2004

A J/O counter with $260/11 = 23.636363\dots$ Counts per revolution was used.

The bike was placed upside down and the wheel rotated carefully by hand.

A yardstick was fixed to a lawn mower, such that it rested on the tire.

The end of the yardstick was used as the marking line.



Each time the counter reached an exact reading, judged by eye, a mark was made on the tire.

After marking, the distances between adjacent marks were measured. Markings were rechecked.

What does this show? Because of the crudity of the hub-mounted gearing, there is considerable variation in the distance traveled for a single count. The engagement of any single tooth on the large gear with a mating tooth on the small gear will occur every 26 revolutions of the bicycle wheel. Thus the pattern seen over the span of my experiment is incomplete. Because I did not have a means to keep track of 26 sets of marks on the tire I quit after two revolutions of the wheel.

Analysis of the data shows that for a 20 count span, wheel travel varies from 184.85 cm to 182.70 cm, a 2.15 cm span. Similarly, travel over 40 counts varied from 369.15 to 366.65 counts, a 2.5 cm span. I expect that as distances approach the many hundreds of revolutions used in course measurement these variations will be inconsequential.

I have the data in an Excel file, and will be happy to supply them to anyone who asks.

What's Inside the Counter?

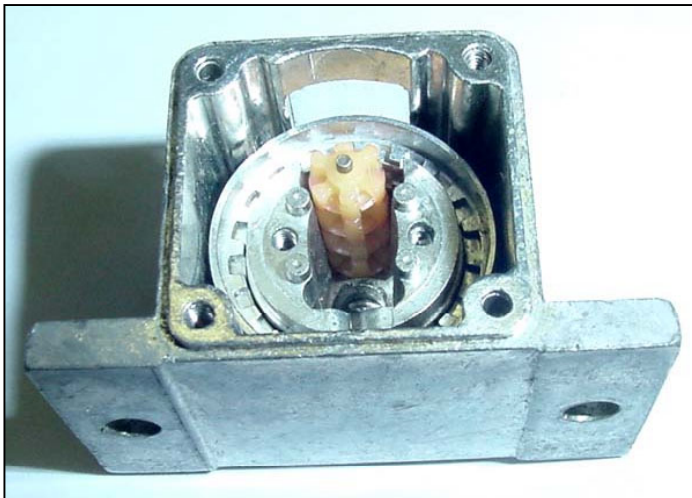
The present Veeder-Root counter is made of plastic and held together by rivets. I was reluctant to damage a counter just to see what was inside, but found another way. Years ago I acquired a metal counter made by Veeder-Root, and I believe the internal construction to be very similar to that used today. This counter was held together by screws, so I took it apart to see what was inside.

There are five numbered metal rings which nest together to provide a five digit readout. Located near the inner surface of the five rings is a shaft with four plastic gears. They engage the gearing on the metal rings such that when the shaft-driven ring completes a full revolution (10 counts), the plastic gear is given a push which rotates the adjacent ring 1/10 revolution (1 count). In this way counting is maintained through the whole gear train.

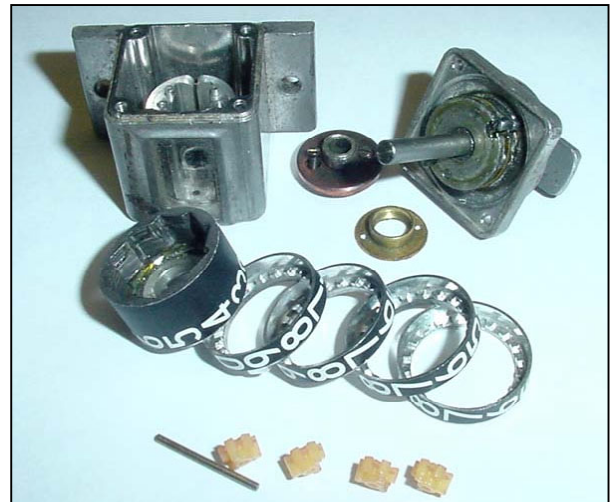


Counter before disassembly.

Here are some pictures of the counter:



Counter partially disassembled. Note the stack of plastic gears adjacent to the metal counting gears.



Counter fully disassembled.

Author's note: It was easy to take apart, but awful to get back together. There are lots of ways to get the bits back in place, but only one I found seems to work. Naturally, I found it on my last try.

Measurement of the Month

Bob Thurston

MARINE CORPS MARATHON 2004

WASHINGTON, DC

For the last 20 years or so, I've been measuring the course for this race and also riding the course on race day to make sure it is set up as measured. These days the setup has been very good to excellent, but when I first started there were enormous bloopers. There were years when I had to move, or get someone to move, nearly half of the mile markers— and it did take 2 or 3 people to move those old markers, huge timber towers that they were, weighted down with sand bags. In 1994 they used the wrong starting line! I was checking on some of the other points on the course because I “knew” they would get the starting line correct! Apparently they used a mark from some previous year, which had the effect of shortening the course by about 80 feet. I didn't learn this until about 20 minutes after the race had started. I thought about Garfield Circle, just west of the Capitol, that the course passes by in the 14th mile — and I remembered from prior measurements that we could add 200 feet by making the runners go around the circle instead of running by it. I wasn't completely sure my memory was right, so I rode to one of my calibration courses, and (by now, in the pouring rain) measured the distance added by going around Garfield Circle. Yes, it was 200 feet, and I kicked myself (by now, I am completely soaked) for not being sure enough! I asked if it would be feasible to move the finish line by 120 feet and got the answer I expected (that's a “No!”). So here's what we did: we directed the timers to take finishing times at a point 100 feet prior to the finish line. The net result was that the runners were running only an extra 20 feet before getting their times. Problem solved — well, almost. I learned later that a few of the front runners had already gone by Garfield Circle when we made the changes— so those few actually did run a bit short of the intended distance. As for the vast majority, they got the correct distance and a fair time for their race. We never told them that times were being taken 100 feet before the finish line, and I did feel bad for them — running their butts off over the last 100 feet!

Up to 1994, all the points were marked “M1, M2, ...” To identify each point for the crew that set out the mile markers, we would tour the course and paint each mark with a color of the year (usually fluorescent). But I realized after the fact that over time those colors wear off, leaving a whole collection of “M0”s up and down Route 110 in the general region of the start. After that year I switched to a four-digit marking system: “M9505” would be the 5 mile point in 1995.

Probably the most dramatic race-day emergency adjustment was the year (I think it was 2000) when the course, just west of the Capitol, mistakenly sent runners along the hypotenuse instead of the two legs of a right triangle (instead of First St/Independence Avenue, they were sent along Washington Avenue). When I discovered this, I was already behind some of the runners due to other problems I had encountered and fixed. So there was no changing it. I had to measure how much had been cut and then add it, and it had to be done at a point I could actually get to and change before the runners came through. After wasting some precious minutes trying unsuccessfully to contact the race director via radio (this was before I had a cell phone), I basically raced across the river to the Pentagon South Parking Lot. There was a water station set up along at Eads Street, which at that time ran straight through South Parking to Route 110. I alerted the officer in charge of what I was up to, and after a few minutes I had the answer: the route was going to shift two lanes over into one of the parking lanes, and then back onto Eads St. As soon as they got the word, dozens and dozens of marines

picked up the entire water station and moved it into the appropriate parking lane. It was like an ant colony, and it was accomplished in minutes. The last directional cones went into place just as the leading runner rounded the turn off the highway ramp onto Eads St. Only a few of the wheel chair racers had gone through the wrong way (the faster wheel chairs are usually too fast to catch with any of these "saves").

Just last year, the race came within minutes of diverting runners an extra quarter of a mile. The race was supposed to go past the Capitol on First St (NE/SE), then turn right onto Independence Avenue, but everything was set up for them to continue straight down to D St before turning to the west. The Marines were all set to make the change but the Capitol Police officer in charge was not budging. We got Rick Nealis, Race Director, on the phone; he spoke to the officer but he still wouldn't let us change the route. So Rick had to sprint up the hill from where he was to the "COC" (I think it's the command center) and have them place the call. Finally we got an OK, and we made the change, just about two minutes (!) before the first runner came through.

Because of construction around the Pentagon and some drastic changes in road configuration, the Marine Corps Marathon made a major shift this year: instead of heading south from the Iwo Jima Memorial area and running through and around the Pentagon, the race starts off going north, into Roslyn and Arlington, then doubling back to cross Key Bridge into Georgetown. To make up for distance lost from this switch, the course extends further upstream in Rock Creek Park, adds back a trip around the notoriously windy East Potomac Park (Hains Point) that had been absent for several years, and adds a new jaunt into Crystal City. So the job for this year was to get all of those changes measured, make any adjustments needed to make this "work", and then lay out and measure the course. I started in March, with Operations Coordinator Bret Schmidt showing me all of the new portions of the route.

The first problem showed up immediately: within the first mile, the runners were supposed to turn right from Route 110 onto Arlington Ridge Road, and it looked like a recipe for a huge traffic jam. Route 110 has at least 50 feet of roadway width, but Arlington Ridge at its mouth is only 29 feet wide. Just a block later lurked a 24-foot throttle point. I envisioned most of the field of 18,000 churning around, bumping into each other, some getting through but most getting mad..I told Brett of my concerns, and he agreed that it wasn't good but said this was what Arlington authorities had insisted on. We agreed that I should write a letter stating the case for changing the route. A better route was at hand: the runners could stay on Wilson Boulevard and then turn right onto Lynn St. until they reach Lee Highway. This way they would have the same road width all the way through Roslyn, and would not have to narrow down before reaching Spout Run, three miles into the race. There is a good climb (to 244 ft elevation, compared to about 30 feet at the start) that should serve to thin the ranks a little before Spout Run. Anyway, I did write the letter, and in the end the Arlington police agreed to the proposed change.

Crystal City presented another kind of problem: this portion was to be out-and-back on Crystal City Drive, with the runners keeping to their own left. But when I first looked at the course in March, the road was not divided into a left and right; it was still one-way northbound, with plans that it would be a divided, two-way street by the date of the race. Do I measure using the full width of the road in each direction, or do I wait until the changes are final? I decided to do both: measure it right away using the whole road, but to measure and adjust later on.

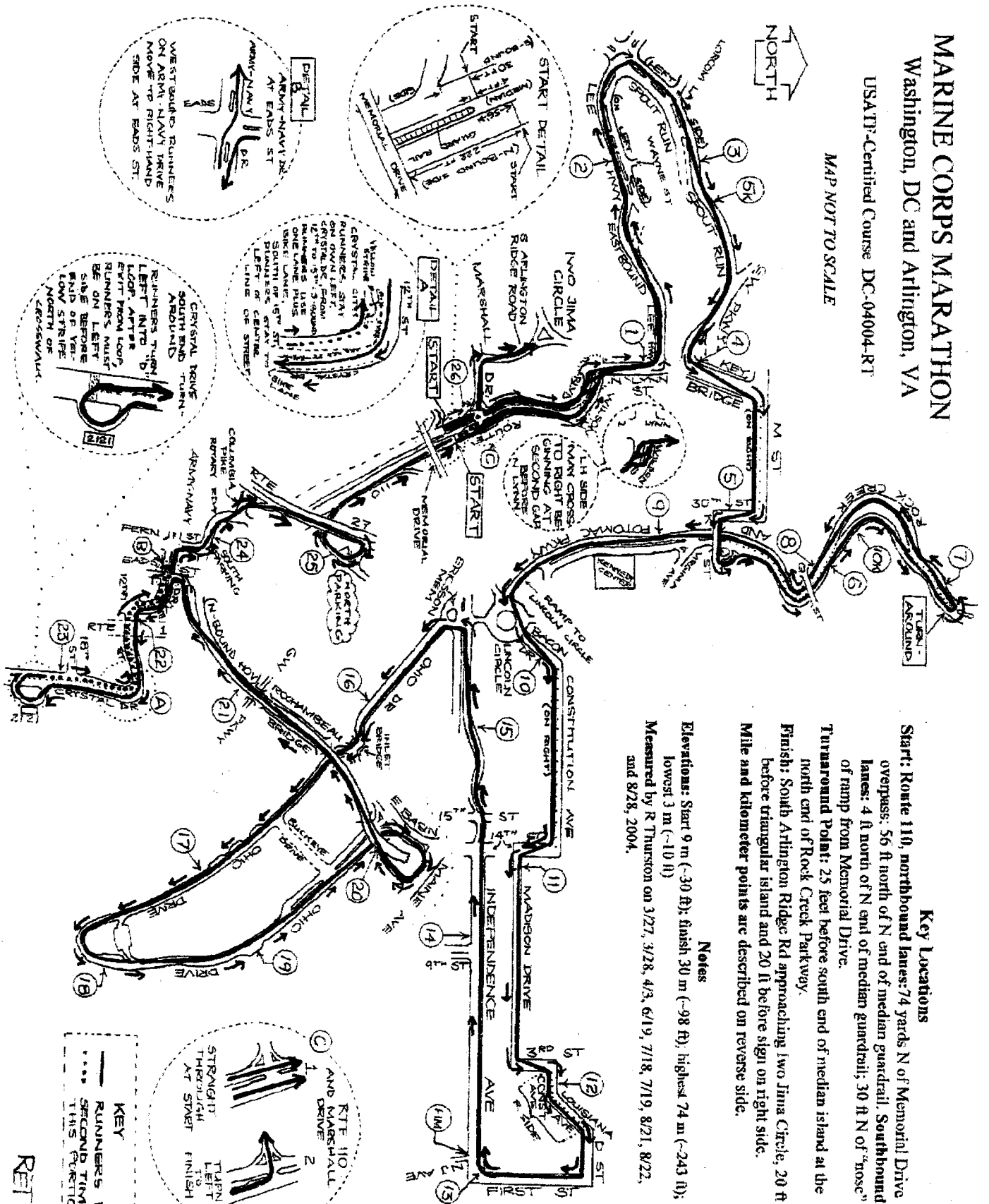
By far the knottiest and most worrisome problem was Rock Creek Parkway. It is essentially a

MARINE CORPS MARATHON

Washington, DC and Arlington, VA

USATF-Certified Course DC-04004-RT

MAP NOT TO SCALE



Key Locations

Start: Route 119, northbound lanes; 74 yards N of Memorial Drive overpass; 56 ft north of N end of median guardrail; Southbound lanes; 4 ft north of N end of median guardrail; 30 ft N of "nose" of ramp from Memorial Drive.

Turnaround Point: 25 feet before south end of median island at the north end of Rock Creek Parkway.

Finish: South Arlington Ridge Rd approaching Iwo Jima Circle; 20 ft before triangular island and 20 ft before sign on right side.

Mile and kilometer points are described on reverse side.

Notes

Elevations: Start 9 m (~30 ft); finish 30 m (~98 ft), highest 74 m (~243 ft), lowest 3 m (~10 ft)

Measured by: R Thurston on 3/27, 3/28, 4/3, 6/19, 7/18, 7/19, 8/21, 8/22, and 8/28, 2004.

KEY

— RUNNERS PATH

--- SECOND TIME ON THIS PORTION

① STRAIGHT THROUGH AT START

② TURN LEFT TO FINISH

③ RTE 110 AND MARSHALL DRIVE

RET

high-speed highway, except when it is closed due to a flood or a road race. If you go to Google and type in “most laughable road signs” I think you will see the Rock Creek Parkway speed limit signs: “25 MPH”(!) It is a rare vehicle that is moving slower than 40, and the median speed has to be at least 45 to 50. In short, it’s not the ideal place to comfortably ride the SPR on a bike. Even with Bret driving the Marine Corps Marathon van behind me, lights flashing on top, it was still tricky. There’s always someone who doesn’t want to give way, who just has to squeeze by and get there 10 seconds faster. My rule is, NEVER assume you are okay to change lanes unless you see your escort car right behind you and you can tell that no vehicle is trying to get around. Measuring on weekends, you try to pick a time to measure after the drunks, or most of them, have gone home or passed out, and before the early risers are up and speeding on their way to work. Four a.m. is pretty good; by five there is really too much traffic, including a lot of taxis making runs for early flights.

There were other sections of the race that required a backup vehicle: Route 110, for the two-sided start up into Roslyn; Lee Highway and Spout Run; and the Rochambeau Bridge (part of the 14th Street Bridge). Bret Schmidt was always at the ready whenever one of those sections needed to be measured. I also learned that he was also good at predicting the weather: more than once he would tell me on Thursday or Friday that it would be raining on Saturday— I didn’t believe him and made plans to measure, but always ended up calling him up on Saturday morning to call off the measurement. Eventually I stopped trying to get the weather on my own; I would just ask Bret if I would be able to measure on a given day!

I have a practice of making preliminary mile marks until all measurements are completed; then I figure out correct locations for all those points, make the adjustments, and paint the numbers (four-digit numbers ever since 1994!). In the past I have usually made just a simple paint line for these preliminary marks, but this year I needed to paint something that Bret and the other operations folks could look at and identify, even though they weren’t the permanent marks. So I hit upon a 5-digit binary code, using a vertical line for “one” and a horizontal line for “zero”: - - - - 1, - - - 1 -, - - - 1 1, and so on, all the way up to 1 - 1 1 - - (26). (I can’t decide if this was a brilliant idea or — more likely — a diversion to keep my mind off of the enormous amount of work remaining to be done.)

Once all the measuring and re-measuring is completed, including correcting all those dumb mistakes that I should have learned to avoid by now, I take a big breath and have a go at drawing the map. It still seems like one of the most daunting tasks of the whole process— getting all the essential pictures and information onto one sheet of paper. A laudable restriction (and one that should have been imposed on me in writing this!), but I still wonder every time (well, at least for every marathon course) how in the world I will pull it off. How to fit the course onto the paper, which details need to be drawn in, what words are necessary— these and many more questions go through my mind. I toy with different schemes, sometimes go down dead ends, but usually I will start a rough draft and the map starts telling me what it needs and what has to be changed. For a complex map like the one for this course, I do the drafting on paper that measures 11” by 14.25”, because that size will reduce proportionally to 8.5” x 11”. And I use a light table so that I can be guided by the rough draft as well as some squared or graph paper to line things up. On this particular map, one of my regrets is that in spots I kind of forgot that the map was going to be reduced to 8.5 by 11, so some of the detail is uncomfortably tiny. Oh well. I wish I could show you the original 11” by 14.25”; at least you can read it without a magnifying glass!

When I went to write the measurements on the map and the certificate, I was a little astounded (and maybe embarrassed) to realize that I was giving nine different answers to the question, “When

did you measure this race?" The measuring spanned a period of five months, from late March to late August. It seems like I could have been more "efficient" in this job, and yet I can justify every session, explain what was accomplished each time, and explain why it couldn't all be finished immediately. It wouldn't be much of an exaggeration to say that every hour working on the course was matched by another hour spent crunching numbers, double-checking figures, drafting a map, and in other ways worrying the course through.

What I'm getting at is that we devote an enormous amount of time to measuring and documenting races. I hope that everyone doing this loves the doing as much as I do— but even so, it is a lot of time to spend. With many of the races I measure, after all the time I spend, I send off a map, and then I just have to hope and trust that the organizers will get it right— put cones in the right places, enforce any course restrictions, place mile markers or timers in the right spots, and so on. But with the Marine Corps Marathon, I can be sure, and that is enormously satisfying. Trust, but verify!

From the Online Measurement Bulletin Board

REFERENCING SPLITS

I find that I am often frustrated in referencing splits in my locale as there may not be a distinctive landmark such as an address or a manhole nearby. Even things like lightpoles have a tendency within a 2 year span to be less than permanent in our hurricane prone corner of this country! The roads are repaved very often here as well making it essential to be very specific for not only the start and finish but for the intermediate splits since the nail/washers go bye bye... What do you do when you have difficulty finding appropriate references? Often I have to reference locations of more than 150 Ft. from the split. Thanks to all of you kind folks who have made such thoughtful replies and joined in these discussions

Matt Sonneborn

Referencing splits is easy in settled areas. Cross streets, mailboxes, front doors of numbered houses – there is no shortage of reference points. Out in farm country it is different. Endless cornfields, with nothing at the side of the road but telephone poles. These aren't always numbered, either. I've often had points referenced as "172 feet east of the fourth pole east of Leppert Road on the north side" or such. Rails-to-trails courses are even worse - they don't even have telephone poles.

You can't do much about this, except to use the best mark you can find, even if it's far from the split. You can always put in a nail, but that's hard to spot. I look at it like this – the race director will have a nicely painted course when I am done with it, and it will not be hard for him to find the marks. After the first race has been run, it's his problem to stay current with the course.

There is a local 15 mile run that I measured a long time ago. I was called by the race director (fifth or sixth one since I

measured) and asked to remeasure the course, although it had not changed. "Why?" I asked. "We can't find the marks" was the answer. I grumpily agreed. I found out why they couldn't find the marks – they had never repainted them in the decade since it was originally laid down.

In remeasuring I found that some of the reference points I'd used had vanished. If the race organization had done their job, they could have kept up with the changes – but it was easier to call me.

Once the measuring and certification is done, the owner is the race director. It's not the measurer's problem if they fail to maintain the course.

Pete Riegel
riegelpete@aol.com

COURSE MAPS

I am wondering if you folks who do such a great job with your maps can give me some general advice on how to make maps with lots of S curves, and accurately represent every segment of the shortest course taken. I find it very difficult to draw the maps. I have used Real Estate maps, MapQuest and city maps as references but to really accurately denote the detail I would like to, I am embarrassed to say, I feel artistically challenged.

I cannot imagine what you do with limited time either as I know many of you show up at a city far away from home to certify courses. I have only done courses in my home city and must go back to the race location at a minimum two times (mainly three or more times) as the cal course is close to my home and I often have to adjust the start or finish to add distance after the second calibration. Even without that element I go back to properly document splits from fixed locations etc. and try and get a good handle of details for the map.

Without some other city map etc. I would be a basket case. I usually use Adobe Illustrator because I am ashamed of my freehand drawings. When arriving on location to a far off destination what tips do you have for drawing the map so

quickly and accurately as to not have to go back to look at details to notate and show every s curve or even generate a map to scale?

Matt Sonneborn

You can use city maps in conjunction with small sketches to do the job. The key to this is to measure the entire route along the shortest possible route. This way when you show a street there is no ambiguity -the runners have it all.

A curvy road can be taken care of with the notation "Runners are restricted to right of center on Podunk Road." But if there is a left turn after going right of center you will have to figure out a way to describe it. "Runners pass to right of cone located at center of intersection of Podunk Road and Elm St" will do it.

Check out this site:

[http://www.uastf.org/events/courses/search/ /](http://www.uastf.org/events/courses/search/)

Search for 21.1 km exactly, in Elkhart, Indiana. You will find a course map of mine that I prepared using Street Atlas USA, a map program. I could just as well have used a county map and drawn neatly on it.

You can also download "Course Measurement Procedures" from www.rrtc.net. It's the USATF measurement book. Page 60 of this manual has an example of a single-line map.

Don't be afraid to lay down a 1000 foot or 300 m calibration course when you get away from home. It takes only a half hour, and allows you to get everything done on site, so you don't have to come back. I always do this. You never know when you'll be back.

Map drawing is my least favorite part of the process, and the one that gives me the most satisfaction when I'm done. I figure my name is on the map, so I want it to reflect well on me.

Pete Riegel

riegelpete@aol.com

Maps are the least favorite part of certification for me too and I am always trying to improve at it. Some courses are much easier than others to draw.

In the course I recently measured runners had use 1 of two lanes going both directions of the loop. They are restricted to the painted center line each way. The entire course has mini "s" curves that wind back and forth—a real pain to try and show every detail of how I measured it. I spoke to one fellow who tries to show every .1-.2 of a mile in this instance at a time as he sketches the map on an additional ride (either by bike or motor vehicle). Even then I find the process very difficult and basically unusable except for detail drawings.

I have never really had to reflect elevation gain/loss on a map either as it is so flat here—how do you provide that info—from topo maps? I find them confusing to read.

Matt Sonneborn

I too find that maps are a real pain in the butt. I hate having to cram all the detail I want to show on one page. Most of my courses are in dense urban areas or local parks. With smaller races that twist through dense urban streets it's a little tricky to show exactly where the course goes, which side of medians, trees or curbs. In parks the need to string together winding roads, out and backs, and the lack of convenient fixed marks makes accurate design and measurement interesting.

If I could do it on two pages, one of the course and one with a set of exploded details showing start, finish and other critical points, I would be much happier.

One tool that helps a lot is Microsoft's 'Streets and Trips'. Before I go to a site I talk the course over with the race director. While I have him on the phone I bring up 'Streets and Trips' on the computer. This is a cheap program that has most of the US streets on it. (Automap for you UK readers).

'Streets and Trips' has a measuring tool that allows me to layout the course before I get there. You can zoom in to see detail of any point on the course and it allows for the adjustment of any of the intermediary or points or end points as I need. All the time it keeps a running total measurement of the course. This allows for very close guesstimating before I get there. Comparison with my final measured result and the pre-measurement guesstimate is normally less than a couple of hundred feet out. Good for working out and adjusting the course before getting on the bike.

MS Streets & Trips is low cost, and often comes bundled on new computers with MS Works suits. I would recommend getting the free standing version because you don't want all the other Works junk on your PC. Free standing versions often go for about \$20 on Ebay.

I am using the 2001 version. The newer versions have bug fixes and GPS interface software but mostly the street maps have not been updated.

After the measurement rides, I call up the map again. I make any changes necessary, and add the mile marks and water stops. Before printing you have to turn off all the other 'points of interest' junk it likes to display. All you want left is the streets and your marks. Some times marks and stops are easier to add by hand after printing, because S&T does not have good text tools. The resulting map fine for printing 'informational' course maps for volunteers, runners and police but NOT the cert map.

For the cert map I print the S&Tmap, then trace it on to plain paper to get the approximate dimensions. (Using tracing paper or very thin paper works if you then photo copy the result onto thicker paper that you can draw on.)

From then on it's hand drawing. The first thing I do is to change the aspect ratio of the streets by widening them to allow for the detail. Skinny streets get to be fat and wide. It often takes several tracings for me to get the basic street layout right.

I add little detail maps showing blowups of the start, finish and important sections by drawing them big on a separate bit of paper. Then using the photo copier to reduce them to a small version that will fit in one of the blank spaces around

the edge of the map. I do the title and other notes on the computer. Cut them out and stick in place. Often it takes several tries before I have the font size right to fit the block in a space.

The final result is a hand drawn street map, that started as a tracing from the Street and Trips map. Only now the streets are much fatter and artistic licence takes over. On this, around the edge, is pasted a number of insert maps and text blocks. Looks like a scrap book colarge. The result is photo-copied so that it's all on one sheet. I try to make sure no critical detail is in the 1/4" around the edge that may get missed by secondary copying.

At the end I have several maps. The final cert map and several of the Street and Trips maps that may be of various sorts. One may show the course with added direction arrows drawn along side the course. One may show water stops and one the course with mile marks. If necessary one is marked up with street closings and notes on barricades and cones needed. Blowing this up very large is useful when going into a meeting with the city, and or the police. If streets are to be closed, its useful to make a map showing the man who sets the split clocks how to get to them.

For about \$3 you can blow any back and white map up very large at a kinko's. I have had success by sticking a large S&T course map, along with a schedule of events to a door skin. (6 foot by 21/2 sheet of cheep plywood used to cover interior door in a house) Then hanging it up at registration. Looks very pro and costs less than \$10 to prepare. The Street and Trips map works better than a stack of photo-copied cert maps because the cert maps are generally to crowded with detail.

S&T tricks: Once you know approximately where the course is to go, you can layout a very accurate guesstimate by putting down a 'measurement' line while working fully zoomed in. Although you can only see the fraction of the course you are working on, you can move your view and extend the measurement line by clicking on the map, right by the edge of the map. It dos not add another point to the line but instead moves the center of the map in the direction you want to go. If you know where you are going, it's a lot easier to lay out a measurement (guesstimate) line this way than doing it in zoomed out mode, and then having to zoom in and add more points to move and adjust the corners.

Do zoom in on every corner and part of your course to make sure your line runs accurately around the corners and bends before suggesting to the race director the approximate start and finish locations. Once you have the course worked out, zoom out, then highlight just the region with the course in it and then click in it. This will re-size your map to show just the course.

Another very useful resource is TerraServer at

<http://terraserver.microsoft.com>

The free maps only cover the USA but for those of us here its very useful, especially for course in parks with roads and trails that are not on the street maps.

Unless you regularly fly over the US and know what it looks like from 50,000 feet, locating your self is a bit tricky. Start

with using the search to find your city, then zoom in. It helps to have a street map handy so you can figure out what you might be looking at.

Once you have found your location zoom in to the max and start printing. The image you see when browsing is small but when you use the print button on the TerraServer web page, it opens a second window with a much larger image. (Don't use your print button until you have used their's to open larger image)

TerraServer allows you to zoom in to show about one inch for every 100 meters. You can see my house, the boat out back and cars, but you can't see people.

By printing a bunch of large images that are zoomed to the max, I can stick together one large image. The image tends to be shades of gray. I find its useful to highlight the route with white out. This takes a pot of while out and a steady hand. Now you can clearly see and trace the route.

The traced image is then ready for reducing and street widening so that I can use it for the foundation of a cert course. Yes this is a time consuming and rather detailed way to get the shape of the course. But I find it's better than just guessing and the truth of the resultant outline helps the other bits fit together.

If you keep the map made by cutting and sticking the TerraServer printouts together, you can run this through kinkos. This time to make it larger, not smaller. Now you have a sheet with a BIG map. Using a yellow highlighter on the result to make the course stand out, and back marker pens for S, F, & marks. This makes a good informational map to display at the start.

Having Street & Trips on a laptop, and a map made from the print outs from TerraServer on hand when first meeting the race director, saves a lot of pissing around.

Its easy to make and adjust alternate courses with S&T. I have sometimes taken several alternative course maps to show and drive with the RD. With S&T maps I know the distance is about right before getting on the bike.

James M

I create maps on my computer and like my typing, it gives me a chance to edit before I commit the map to paper.

I typically capture a map of the route from Yahoo maps or Mapquest. On a Mac, you can use something like Grab. If you're using a PC you can capture a window (to the clipboard) by placing your mouse pointer in the window and simultaneously pressing ALT and PrintScreen. Once on the clipboard, you can paste it into most applications. Then I just trace over it with a vector drawing program. I use Framemaker, but I'm sure you can use Illustrator.

But this doesn't keep you from going back to the scene of the measurement. For that, you need to be careful to take good notes. I also like to have a cal course that's fairly handy to the course. If there isn't one, I'll create one. It doesn't take that long and it can save you trips.

Ron Fitzpatrick

The USATF requirement for putting the course map on one piece of paper arose because of filing and distribution needs. With over 20,000 certified courses a couple of filing cabinets are needed to hold the documents. If we permitted multiple sheets it could double (or more) the storage requirement. Also, since a course certificate and map are available on demand for anyone who asks, a standard format is needed.

Pete Riegel
riegelpete@aol.com

Like James, I too use MicroSoft Streets & Trips for initial course layout and preliminary measurement. To generate the certification map, I save the map as a .GIF file, then import it into AutoCad. It helps that I have access to AutoCad at work. With AutoCad, I trace the roadways and other points of interest, then delete the map image. I can then resize and reshape the tracing as needed to produce the finished map. For detail areas I can copy and paste the area of interest, then scale only that section up as needed. I have recently started to take longitude and latitude measurements using a handheld GPS at the start, finish, and mile split points on the course. I include that information on the map along with the measurements from permanent landmarks. I also include a disclaimer that the GPS locations are taken with consumer grade equipment and are subject to the inaccuracies of such equipment. Someday, I'll have the time to return to a course with the GPS and see just how close I can get to a marked point using the GPS alone.

For elevations, I use Delorme's Topo USA. Using information from the GPS, I can locate the start and finish points exactly on the map. I take the elevation information for those points. Topo USA will also generate a topographic profile of a draw object. I trace the course on the map and then create the profile. In addition to the graphic profile, the software shows the high and low elevations, along with other information such as climbing and descending distances.

Since Topo USA allows saving maps as .JPG files, I could use it alone for everything, but I find that Streets and Trips is much easier to use so I do the bulk of the work with it.

Danny Michael

LOCATING SPLITS IN THE DARK.

Just wondering how you folks deal with this problem. I measured a local 8K and marked all the splits and gave the race director the course map with references to fixed permanent locations.

The course was such that most splits were in reference to a light pole or hydrant that was 100 feet away as there was nothing else distinguishable nearby and in the pitch dark it was difficult to locate them. The obvious thing I could have done was to use white which I was out of at the time.

I was not worried about using bright green as the course director assured me he would go on site to locate all of the splits before the race. This proved to be untrue despite his best intentions.

Luckily I decided that though I couldn't actually run the race that I would get up at 4AM to run the course 4X for a 20 mile training run. (yes I added the extra 204 yds+)

It was a good thing I was there—you just couldn't make out the splits in the dark easily and I found myself taking the mile markers from the truck and like a 25 Lb baton running with them to their split locations as I passed the pickup with cones setting up the course.

I always try to be sensitive to communities to not over paint making an eyesore yet bold enough to be sighted easily by using spray paint that eventually washes away after a couple weeks and keeping the nail/washers as the obvious marks to repaint next year.

Do you folks ever use paint with glass that leaves a more permanent mark? Is white paint the only thing that would have helped here (besides a pre-ride of the course by the race director) or is there a better solution? I know some folks take pics w/digital cameras too to give to the RD—realize it was 5 AM and this guy was just skimming the map trying to find the splits day of (even loaned him my GPS..).

Matt Sonneborn

I often use two colors, some show up better in different lights.

I also find a nearby white or yellow lane marker, a stripe painted down the side of the road or a stripe in the center. Then, with dark paint, I put a couple of bars across it.

This helps me locate the vicinity of the real nail.

Since the highway department was nice enough to put down reflective paint, my small dark marks on their stripe show up wonderfully.

When possible one of us goes out the night before to bang in wooden stakes on S,F and marks. We paint the stakes fluorescent orange, and staple a bit of yellow corrugated plastic to them. (Same stuff you make signs out of.)

A wooden stake, right by the road, driven in a foot or so, with a 5LB hammer, tends to stay put. Show up very well in headlights. Makes it easy for the people putting out mile mark signs and water stops to find.

You can indicate on the yellow plastic something like M2 or W1 so they don't put water stops on mile marks, etc.

I put on a very official looking yellow safety jacket with reflective stripes when putting out marks. Keeps me safe and probably makes onlookers think I am from the city or something.

One night before a race, we were out looking for a mark while driving a car. Up comes a cop with lights on, he leans out and says "I am sure there is a good story you have as to why you are driving down my sidewalk in the middle of the night.... I am dying to hear it."

We step out wearing our 'official looking' reflective jackets and say "We are just attempting to locate a survey mark" and the problem solved.

James M

I've taken to using white paint for night rides. When I'm calibrating my bike at night I refresh the end markings with white paint and add a couple of warning stripes at 20 to 30 foot intervals at each end of the cal course, leading up to the end point. The warning stripes let me know that the mark is coming up and give me an opportunity to slow and downshift.

Here in the northeast, many of the courses are in high trafficked areas, even at night. Last year I bought a lighted safety vest and it's a real comfort when measuring to know that I'm very visible.

Ron Fitzpatrick

I help set up a half marathon course in a park where we are not allowed to mar the road surface with either paint or nails. To top it off, the split locations have to be found well before sunrise. The nails are planted at the edge of the road (where they are often covered with gravel) and finding them in daylight can be a challenge. I have a record of the splits' locations in relation to landmarks, as well as GPS waypoints recorded to aid in finding them. The afternoon before the race I lay down brightly coloured duct tape on the road and plant a 1 m long stake with a reflector on the side of the road. The reflectors are quite visible in the dark from 30 - 50 m when they're illuminated by a vehicle's headlights.

Some other tricks I use for night measuring. I place flashing LED tail lights and/or traffic cones at the ends of the calibration course in addition to freshening up the paint. I have a 10W halogen lamp attached to my helmet which makes reading notes, calculators and counters a lot easier.

Laurent Lacroix

I think the question was about finding the marks in the dark. Measuring in the dark is quite a different kettle of fish.

I find that once the light fades my counts are not as repeatable. My cal course is right outside my house. 1/2 a mile, dead flat and stright as an arrow. In full daylight, and so long as the wind is not strong, the counts are very consistant, often running exactly the same or one up, one down. As soon as the light fades the same bike, at the same temp, adds counts. The wobbles must be me in the fading light.

When doing a local course I make sure to get back to base in time to do my second set on the cal course before the light starts to fade. Once the visiblity gets poor it adds counts, that means I will have to go back out and lenthen the course!

Intestingly, after riding in the eaving and getting more counts, I have taken the bike out next morning in the full day light been able to ride as well as the first day. Right on the mark again.

Sometimes I find it hard to accuratly ride the shortest path, even with full day light. You have to look a good way ahead to figure out just where you need to be heading. Much hard-

er to ride shortest path in the dark.

Matt Sonneborn

OUT-BACK MEASUREMENT SHORTCUT

I'll be measuring a 50-kilometer outback course on a Rails-to-Trails path this weekend. Since the out and back segments are identical, is it acceptable for the first measurement to be the out segment and the second measurement to be the back measurement? If so it would save a second 50-km ride. That would certainly be acceptable if the course was a 25-km point-to-point so I believe it should be ok for the 50 km.

John DeHaye

John, it certainly should be, as long as you ride SPR. That will probably result in the course running a little long for the runners, since the leaders may not be able to follow the SPR on the return due to oncoming slower runners still heading out. The alternative, though, is to create coning restrictions, virtually unenforceable over a race that long. Plus you'd have to do 2 rides.

Jim Gerweck

MAP BEFORE YOU MEASURE

It can be a pain to document all those cones. Given this, if you carry a mental picture of the documentation needed, you can avoid measuring that requires cones. As an example, I had a course where the runners entered a street from the left, ran to the left for some distance, and exited the street to the right. The race director was making gestures about how he was going to use cones to guide the runners as they crossed the street. I told him I was going to measure the shortest possible route, and he could cone on race day as he wished.

Pete Riegel
riegelpete@aol.com

Pete, your Map before you measure post reminded me of a problem that I often run into, where the race director must keep runners to one side of the center line of a roadway.

In theory, measuring "S" curves under these restrictions would have me riding the center line on left curves and the gutter edge on right curves or vice versa depending on the course direction.

In practice, unless I'm riding at midnight with no traffic, for my personal safety I ride the shortest possible route using the entire roadway. In some cases this yields a bit longer route, but I live to ride again.

Ron Fitzpatrick
MEASURING DIRT ROADS

Ever since I started measuring courses in 1981, I've felt

uneasy about the actual distance I'd measure on dirt roads. Recently, I turned down a good pay day because my unease rose to my eyeballs regarding a 30 km that had about 11 miles on dirt roads. I simply didn't and don't feel I'd be able to measure accurate miles/kms out on the dirt stretches.

Sure, I could just measure like I do normally and say, there, it's measured according to USATF standards...but dirt roads come in all shapes and conditions and I don't feel I'd know how long my miles were out there. I don't recall reading any discussion nor 'studies' on this topic.

Scott Hubbard

I don't see a lot of options here. There have been few studies done, and results differ. As Scott says, there's no clear consensus on dirt road measurement.

One way to look at it is this:

1) Consider that a standard measuring tool is a standard bicycle calibrated on a standard road. Where I live a standard road is a road paved with asphalt or concrete. In other areas this may not be so.

2) Courses measured with standard tools will agree within varying tolerances. If the course is on ordinary roads we think the tolerance is about 1/1000. This approach and tolerance limit has served to support record-keeping.

3) On a dirt road the tolerance is likely to be different. How much? We don't have a good idea yet, but it's probably more than 1/1000. What should be done? Something? Nothing?

I lean toward doing nothing. Road running records on dirt roads are likely to be few, and if the few resulting record courses are checked by the standard method – as they were measured – they should have a similar “pass” rate as the paved ones.

It's possible to require people who measure on dirt to set down a calibration course on dirt, but what kind of dirt? How does one find a representative stretch of dirt? Pavement surfaces will vary, but not nearly as much as dirt surfaces.

There was a time when all USA dirt surfaces had to be measured by steel taping. This produced a few accurate courses, but it's not known how many measurements were canceled because it was just too difficult to do.

My view is a relaxed one – use whatever paved calibration course you have and go out and measure whatever you want, wherever you want. Accuracy will not be as good as on pavement, but it is still way ahead of any other alternative. It will yield a course that is reasonably accurate, and provide the runners with an honest course.

What about records? What about the courses being found short on validation? To begin with, if I was assigned a validation ride, and the course had originally been measured using a steel tape, I'd plan on doing a bike measurement. I think this is generally understood to be the method of choice.

There's a balance that needs to be struck. Dirt measurements may be less accurate than pavement, but not measuring at all is a bad choice. It's a bad idea to make the mea-

surement process more complicated and time-consuming than it already is.

Pete Riegel

This is a post I made to MNF a few years ago. It is the only time I have measured a substantial distance on a non-paved surface.

MNF#0653 7Aug2000

Steel Tape Measuring

It is Sunday morning and I am looking at my calculations of last weekend's measuring for the Sound and Silence 10K. I am mystified at the results. I used the Jones Counter to double check the sections of this route that we had to measure by hand. There were three sections: 1247.0 meters, 543.7 meters and 1117.2 meters for a total of 4154.9 meters that would be used on race day. The 1247.0 m. section is run twice. These three sections each have different types of gravel surfaces so I was not going to spend the time to lay out three more calibration courses since I knew we could measure them more accurately by hand. My checks are as follows:

steel tape: ride 1: ride2:

1247.0 1245.3

543.7 543.1 543.0

1117.2 1116.7 1114.0

I did not include the SCPF for the rides as I wanted a direct comparison. I would have expected the rides all to be longer but as you can see they are all just the opposite. I am on my way back out there right now to remeasure the 543.7 m. leg to satisfy myself that I'm not certifiably crazy. If this route were completely paved I would have been done two weeks ago.

Later:

I have to stop second guessing myself. We remeasured the 543.7 meter leg and got.....543.7 meters. So that is what it is. I am going to treat the steel taped distances as %100 accurate and only apply the SCPF to the bicycle measured parts.

I wouldn't steel tape that sort of distance again. I would do as Pete has suggested and simply measure it by bike. It is WAY too much work to hand measure much over a few hundred meters.

Laurie Upton

Hmmmm...that didn't format very well. I hope its clear that the Jones counter distances were always shorter but not by very much if I had included the SPF.

As well, the responses, if I remember correctly, suggested that the front wheel may be slipping in the gravel and therefore not turning fully as it would on a smooth paved surface. Sounded reasonable to me.

Laurie Upton

I measured a course (out and back) today that had a half mile stretch on dirt/gravel bike path, and for me, the biggest

pain was that the one mile point was on the trail. How do you landmark such points: "Third big oak tree on the left past the two granite boulders"?

Jim Gerweck

The 30 km I cite is the only measurement job I've turned down because of any uncertainty I had about a surface. I know, as Pete said, that our method produces the best measurements available but the thought of measuring 11 miles of dirt roads of various shades made me come unhinged a bit.

I'd be curious to see studies that compare different kinds of dirt surfaces to pavement/concrete. Do dirt surfaces make miles longer? Does it depend on the condition of the dirt surface?

Trying to describe where marks are on dirt roads is maddening Jim. Unless it's to a certified point, I'll step off marks to things that appear permanent and let it go at that.

Scott Hubbard

Jim Gerweck raised the question of how to mark splits on a dirt road or trail. I recently encountered this problem and came up with the "whisker" or "stake chaser." They can be obtained from surveyor suppliers and come in many colors. They are essentially a 9" long grouping of plastic strands with a metal slot at the bottom for a 60d nail. It's driven into the ground about an inch with the nail providing solid anchoring deeper and the whiskers showing eight inches of vertical prominence. I do document them as best as I can, but at least they are a specific point to look for in relation to the documentation.

I paid \$4.25 for 25 of them then obtained the nails at the hardware store for 6.5¢ each, pretty cost effective in my book.

I have not yet had the opportunity to check on their durability since the race against trail maintenance and traffic but they were fine for that race day.

Dave Poppers

Dirt trails brings up a second question, along with snaking paved roads in parks that have no curb. In theory they should be coned all the way down the inside of the curves. In practice we know the race directors just tell people to stay on the road.

Both conditions give a course that may be the correct length, but none of us would want it used for records.

We already have a system with two effective grades of certified course. Record eligible, or ineligible, because of altitude loss or Start, Finish separation, etc.

It's therefore strange that we only advertize one grade of certified. The certification number fails to tell the client or runner much about the quality of the course or record eligibility. Should there be two grades, A and B ?

The B should not be for bad measurements of length, but for quality of environmental conditions that affect the confidence in records set on the course. Grade A would be

record eligible with curbed corners, run paved roads with all the other records eligibility requirements.

The second grade B, would be anything where the overall accuracy in length exceeds the standard for accuracy and repeatability, but the course it self, because of other environmental conditions, make the measurer or certifier less than confident that the course should be record eligible. For example poor surface conditions, off road trail, lack of defined curbs, ability for runners to short cut, or obvious inability to marshal or monitor course complacence.

I think measurer would be more comfortable being able to say to a RD that the overall measurement is on target but for this course I can only issue you a B level cert because ...

Most Race Directors understand that off road or dirt can be a problem and would be more happy to have a B level cert rather than nothing at all. They are often putting on a fun local event, or a training run. They want the course to be the right length with good splits but don't expect any one to break any records.

I can think of several courses laid out in local parks that are exact in length, so long as the runner stays on tack. But the course winds around uncurbed corners or takes off on to foot paths.

Monitoring if a mid pack age group runner was really on the course, and not cutting corners is just about impossible. Maybe some of these should be considered as grade B courses because of the course environment.

The second problem is that Race Directors of local events are probably are not planning to have the timing systems in place that are required for a record to be validated. They would probably be relieved to know that no idiot is going to turn up and try to set a record at their event, when they have not planned for it. The B level course would warn people that it may contain off road or other issues.

I just did a cross country 5K. Put the counter on a mountain bike and callabrated on my 1/2 mile cert course. Did the course 3 times and all three counts were very close to dead on. The cross country runners were thrilled to run a 'real' 5K distance. I could never pull a cert on that course but the distance was right on, every turn defined by a natural barrier or obstical, and the results were repeatable.

Maybe this is a way for us to spread our measurement competence into other areas of the athlete universe. I have often done triathlons where the advertized distances were WAY off the mark. Where I am there are getting to be a lot of tri and du races. Should we get involved in measuring the bike and run segments of the events ?

How many people here have become involved in measuring un-certified events like off road races or triathlon courses, or doing certficatons for just part of the event ?

James M

ARE THE SPLITS PART OF THE JOB?

I recently traveled to adjust three courses that I'd measured years ago. They needed to have their finish lines relocated from a busy highway into the parking lot of a shopping cen-

ter. This was a simple job, as all I had to do was to establish two reference points and measure both the old and new finish paths.

This was the limit of the job I had contracted to do.

However, there was a complication that bothered me. Two of the three races had been originally set up to run in the reverse direction. This posed no problem for overall accuracy, but it left the original splits useless. I elected to do a check ride of the two courses and set down new splits. Was this necessary?

Pete Riegel

I've always worked under the assumption that splits are part of a course measurement job, unless it's otherwise specified. In fact, I usually wind up giving more splits than most RDs use (miles and kms, halfway, 500 to go in a 5k). And I know runners will complain more about an intermediate split being off than the total distance. So yes, I'd figure out the splits for the reversed course.

Jim Gerweck

My view is that splits are not essential in order to have the course length certified. At least this applies in my area of UK and I believe this also applies for International measurements.

However, accurate splits are obviously useful for runners, and so it would be quite rare not to provide them as a matter of course, especially since in normal circumstances we ride the course twice.

Mike Sandford -

Maybe its just me or my riding style (poor sense of balance...whatever) but I've found that searching for and marking the splits always screws up that particular ride for the total distance. I stopped doing splits years ago on the certification rides and of course end up riding at least a third time for the splits which I later document with digital pics and descriptions.

But then for me it doesn't really matter as I only measure local races and have never travelled farther than 60 km to do a measurement so the time factor isn't an issue.

Laurie Upton

I find it frustrating, but regrettably it is understandable, that accurate splits are not a mandatory part of our measurement process. I generally refuse to just measure 'start to finish' and leave race organisers to lay out the splits, as they will almost always get them wrong. Even when I do measure accurate splits, inexperienced organisers often don't bother to place their kilometre signs in the right places.

Inaccurate splits result in runners questioning not only the splits but the overall distance. There is no doubt in my mind that inaccurate splits are far worse than no splits.

Dave Cundy

Dave, as a former competitive (in my mind anyway) road runner I lived (and often died) by my watch. The reason I started measuring was that I was so tired of races where I knew by the splits that there was something obviously wrong with the course and I couldn't depend on the distance being accurate.

There was a local 5K race some years ago where I took my split at the 1K and then at the mile and was surprised to find that I had just run that 600+ meters in an amazing time. I got myself in hot water with a few people by measuring it later and letting some know that the 5K was really only about 4850 meters. I should have just kept that to myself.

I have a fairly good relationship with the local people I measure for and they have come to expect the kilometer location documents I produce. I'm not sure what I would do if I was to travel outside of my home town to measure. I suppose I would have to overhaul my routine to make it fit with the time available.

Laurie Upton

I have always felt that accurate splits were an integral part of course certification. Agreed that the start to finish distance is almost always all that is certified but when the splits are obviously inaccurate, the course distance is suspect to the runners trying to figure out just what pace they ran.

I was also recently re-certifying a course that was to be run backwards. Since it was a 5k with mile splits and the start line was being moved up to almost the old 3 mile mark, adjusting the splits became more of a question of keeping track of which way to move from the old marks. I chose to adjust rather than ride the entire course. Upon completion, I drove the course and noticed that I had adjusted the wrong way on two of three splits. Out came the dark spray paint, the bike, and new accurate but not certified splits were in place.

I could have gotten away with using the old splits, but my conscience dictated the extra effort to provide the runners with both a certified distance and reliably accurate splits.

Was it necessary? No, but I felt it appropriate.

Mike Wickiser

Like Laurie I measure the splits in a third ride after the two certification rides. I usually do a fourth ride to document split locations, measuring their distances from landmarks.

After a two certification rides, I measured kilometer splits for an 8 K race in August. I didn't have time to measure mile splits and recommended that the race director not have inaccurate mile splits. The race had no mile splits.

Dale Summers

When I started measuring I followed the letter of the law (the course manual) and marked EVERY split on the first ride, then stopped and took readings at each one on the second. I used the Sum of Shortest Splits method and I'm sure some of my courses were lengthened unnecessarily.

Now, I generally do the first ride to establish the overall distance, then lay out the splits on the second.

Jim Gerweck

I generally lay out temporary splits on the first ride- miles and 5Ks, unless the RD wants kms- and check them on the second ride. I'll make permanent marks on a third trip over the courses, by car if the course allows it.

I agree with those who say that setting the splits is part of the job. One of the reasons I developed an interest in course measurement was the frustration of running on poorly marked courses. While the USATF certification process was developed to support record keeping, records aren't set at many races, and the main selling point to race directors is that a certified course is the right distance and that its splits are the right distance from each other.

An anecdote on the above: Earlier this year I measured a 5K/10K combo in the Chicago suburb of Aurora, Illinois- probably best known as the home of Wayne and Garth of "Wayne's World" fame. Aurora is along the Fox River, and the week before the race was wet enough to cause the Fox to rise and put portions of both courses under water.

The RD could not make contact with me the day before the race, so she had "high water" courses measured with a wheel. None of the intermediate splits were adjusted. The Chicago Area Runners Association gave her crap about it, so she had me come out late in the summer to do a "forensic measurement" on the courses actually run, and certify a high water alternative so the experience wouldn't be repeated.

As it turns out, both of the courses used on race day were within a few meters of the advertised distances- but because the intermediate splits were off, the assumption was that the courses themselves were way off.

I'll certify a course without splits, as it's the start to finish distance that counts, but I sure won't measure one that way.

Jay Wight

I have never been complimented on the distance being right, except when laying out a cross country course, I guess its rare in that game. I have however been complimented by visiting runners on accurate splits.

On one 15K where a volunteer put the 6 mile sign at the right place, but facing the wrong way near a turn around, I heard all about it. So splits matter.

It seems to me that the certification map for a race REQUIRES the direction of the start and the direction of the course on it. It seems that it's certified if you run that way. The reverse may be about the same distance but its not as per the cert and so not certified. I did a loop course a couple of years ago where I thought it may get use in both directions so I did two certs with two sets of rides, maps and certificates, one clockwise and one anti-clockwise. The starts and finish were on a road in the center of the loop. So the two versions are different cert numbers. You still have to start from the common start line. If a race director wanted to start from the finish, and finish on the start, I think it would

require a new set of rides for a new cert, with new splits. Once you tell RDs that they can ignore bits of the cert requirement, like where the start and finish are, or the direction runners go, you are opening it up for them to use other creative interpretations.

JamesM

MEASUREMENT FEES

Curious about what other measurers charge for their services. Like many, I have a sliding scale, based on when and where I have to measure, who's sponsoring the race, how difficult I think the ride will be (that's often a grey area).

Another topic: Who's going to be the first one to tell a race director his course certification has expired, and he's got to pay to have it redone? And would you charge as much for a remeasure (assuming the course has merely expired, not changed)? This is one case where I think I wouldn't check the splits, just the start and finish, and use the splits from the expired measurement.

Jim Gerweck

I charge \$100 for a 5K plus \$20 for the review, \$150 for a 5K-10K combo (plus \$40), \$200 for a half plus the \$20, and \$400 for a marathon plus the \$20. My fees are a bit low if you consider the amount of work, but I consider it a hobby. A marathon can take three days of riding plus a half a day at least doing the maps. I charge a little extra when there are changes made after I measure.

RE: 10 YEAR EXPIRATIONS: It is my understanding that you can request a renewal of the certification if you state that the course has not changed. It is a moot point for me; my ten oldest certifications are all races that are dead and gone, or recently remeasured because of major changes. Of the 100 or so that I have measured, I bet the oldest is less than 5 years.

Louis Joline

Jim, I charge \$30 per kilometer and have for several years. I could charge more, easily.

Per dealing w/expired courses...presently, it's nobody's job to tell race contacts their course has expired. There's no mechanism in place for an orderly way to remind them. As so many know, race contacts come and go, making it tougher to get ahold of after 10 years. It can be done, however and behooves the RRTC to address this soon. Doing something feels like a natural extension of our duty, albeit possibly time-consuming and secretarial seeming.

Scott Hubbard

About 10 year expiration, Louis Joline wrote "It is my understanding that you can request a renewal of the certification if you state that the course has not changed." This is true currently, except that renewals are being phased out, and after 2010, there won't be any such thing as renewal of a

course certification. For full details, see

<http://www.rrtc.net/news/#renewal phaseout>

Bob Baumel

Re: Louis' comments, I guess it's true that "everything's up to date in Kansas City." Oldest course 5 years old or less - wow. Here in CT, "the land of steady habits," I've measured some courses that have been run unchanged for 40+ yrs. My suspicion is that many RDs, when/if they find out their course certification has expired, will simply continue using the course, assuming it hasn't changed, knowing that it's still accurate. I believe the status of such a course would be "inactive," meaning records could still be set on it, correct? In any case, the percentage of races that worry about records is extremely small.

Jim Gerweck

I'll provide some feedback from the southern hemisphere. For commercial events, I charge a base (minimum) fee of \$250 and for this fee I provide up to five hours measurement work. In that time I can generally measure (once) a straight forward course (even a marathon, dependent on the course configuration and traffic density). I charge \$50 per hour for each additional hour after the 5 hour mark. This ensures I get an appropriate payment for second and third rides to lay out splits and also ensures I get paid by the hour when disorganised race organisers waste much of my weekend while they make up their minds where the course will go (after the measurement has shown the course to be a couple of kilometres short!).

Dave Cundy

CYCLOCOMPUTER MEASUREMENT

Neville Wood has invented an electronic form of measurement which uses an ordinary and cheap electronic bike odometer, combined with a bike wheel divided into fractions of a revolution, to use as a substitute/replacement for the Jones/Oerth counter. You can read about it at:

<http://home.earthlink.net/~caverhall/newrevcounter/abstract contents.htm>

I tried it and found it to work just fine, but it required a lot of concentration, as I feared spurious counts.

Does anybody have experience?

Pete Riegel

I have a Protege 9.0 from Planet Bike. I used both a JO and this cyclocomputer to measure a course. I numbered each spoke as a percent of a total rev. and set the computer at 99.99 and used 1 magnet. This gave me 1 count per rev. I recorded the reading as number of revs on the computer followed by the fraction from the wheel (148.37). I did some approximating between spokes but always recorded a 2 digit number.

My only problem was the fact that when you reset the com-

puter, the first rev turns on the device and the next rev gives you a count of 1. The problem was that I wasn't sure if the next count would turn it on or count as 1. To be sure I put on a count or 2 so I knew where I was.

With this straight in my mind the device worked perfectly. I love it.

The course was a loop with an out and back. I rode the first 2 miles to a point on the out and back that would be common to the finish leg, the finish leg and then the out and back to give the correct distance.

Here is the results

Start to common first 2.1218766 JO
Start to common first 2.1219713 NFW

Start to common second 2.1225214 JO
Start to common second 2.1225683 NFW

Common to finish first 0.5526218 JO
Common to finish first 0.5526609 NFW

Common to finish second 0.5527293 JO
Common to finish second 0.5527371 NFW

Common to turn first 0.2161572 JO
Common to turn first 0.2161360 NFW

Common to turn second 0.2161035 JO
Common to turn second 0.2160598 NFW

The difference in the complete 5k course by the 2 methods is 3 inches. The largest difference in any measurement is 6 inches.

I like this system with only one magnet. You are less likely to get a false count and it gives you a 7 to 8 foot window so if you only overshoot a little, there is no problem.

I have another course to measure shortly and I plan to use the NFW as the primary and see how mixed up I get after used a Jones counter for 19 years.

Bill Grass

Bill, I've got the same unit and had the same concern. The trick is to roll the wheel backward before you begin each measurement after resetting.

I've yet to use it on a full-scale measurement, but your experience seems to highly recommend it. I have an out and back 5k to do Wednesday and will try it then.

Jim Gerweck

When I use the Wood method of electronic measurement I have four magnets on the front wheel. I am very careful to stop at a point where the magnet is far from the sensor, as I fear that if I stop with the magnet adjacent, small rocking back and forth will add spurious counts.

To assist me in this I painted four yellow stripes on my front wheel. They are located such that when a stripe is adjacent to the ground, the magnets are well-separated from the sen-

sor. This helps.

Pete Riegel

One of the reasons I went with the Protégé is that the single magnet method can be used, which virtually eliminates that problem.

I measured a 5k course today and was happy with the way it went. It took a bit of mental stretching to get used to looking for 823.26 revolutions/mile rather than 16,024 Jones counts.

Another thing I noticed is that after years of measuring with a J/O, I have a pretty good feel for how far a certain number of counts are in the real world, i.e. if there are 590 counts to the next split I know it's going to be beyond the next intersection, etc. I couldn't do this with the cyclocomputer, but I think it's just a matter of experience.

Jim Gerweck

email from Neville Wood to Pete Riegel

I should like to congratulate you as the first measurer to dare to embrace the new method of using electronic counters in course measurement .

However, I am disappointed that you continue to harbor fears that they may skip impulses and give wrong measurements without your knowing it. I should like to reassure you that, if you use any of the many models I recommend, that there is not the slightest danger of this happening.

With the four-magnet method you would almost certainly detect it if it occurred through the destruction of the synchronization of the meter with the rim calibration. Also, I rode hundreds of miles and measured several courses with the simultaneous use of the Jones, the Sigma Sport 600, and the Protégé 8 and always got precisely the same results from all three. I concluded from this agreement that it likely that all three were measuring revolutions accurately. Since then I have given up using the Jones, but have evaluated many other cyclcomputers against the first two mentioned above. In this way I have identified some that very occasionally miss an impulse and some (mostly cordless) that never register any impulses at a walking pace or less. The only stressful thing might be the fear of generating a spurious impulse at an emergency stop, but it is easy to check for this if it occurs. You should probably purchase one of the Protégé models which record individual revolutions using only one magnet and are usual on sale for less than \$20. With these it needs only a quick glance at where the wheel touches the ground to avoid stopping at the zero point on the rim. I have now identified another model, dBase 4L, which also uses only a single magnet and is almost as convenient to use as the Protégés.

If you are only interested in using my method for calibration, then you do not even need a cyclocomputer. Read the Jones once to get the number of whole revolutions and for all partial revolutions you can read the calibrated rim. With the old gearing it is easy to calibrate the rim in counts.

I am afraid your advice about never rolling back is not good. I describe in detail the way to do this in my on-line

report(<http://home.earthlink.net/~caverhall/newrevcounter/abstractcontents.htm>), but I will give one example of where it is accurate and useful.

Suppose the measurer plans to stop at 1200.34 rev with rezeroing afterwards. He overshoots to a meter reading of 1202 . All he has to do is roll back twice through the rim zero point and on to a rim reading of 0.34.

I hope the above information might persuade you to relax more when using electronic counters.

Neville Wood

Pete's reply to Neville's note:

I already knew about how to handle overshoots. When it's only a revolution or two, no problem. Otherwise it becomes an occasion to record a count, calculate, and measure backwards to the desired point. With the Jones counter I can roll backwards 20 or 30 meters without having to think. I like not having to think any more than I have to during a measurement. I know I can check to see whether a count has been missed, and have done so. But it is something I don't have to do when using the Jones counter. Also, if I find I have lost a count, what then do I do? Roll back to the last reliably-recorded place? Maybe. But I'd have to think about it. I am not at all worried about losing a count and not knowing it. It is the continual checking that I find an added and unwelcome burden.

I did have an occasion where I lost a count. I measured a course that included an 80 foot climb up a flight of stairs going to the top of a dam. Rolling the bike up the stairs produced a length of about 75 meters. Rolling down the stairs got me about 72 meters, and at the bottom I noticed that I'd lost a count somewhere. I had tried to be careful when wheeling the bike, but there was some bumping up and down. I used the 72 meters as official.

I have also found that when I later write up the results of the measurement I find it nicer to have an unbroken string of data. Just personal preference.

Now that I have tried the electronic way, and am satisfied that I can use it, I have concluded that I will think of it as a nice fallback position. The Jones counter allows me to think less, and save my mental resources for the task at hand.

I think you have done a valuable service in presenting your work to the measurement community.

Best regards, Pete

Pete:

I agree it is very desirable to reduce the amount of thinking during measurement. Tasks that are very simple done in the comfort of the home can become difficult and prone to error when attempted on the road. My idea of introducing the electronic counter as a replacement for the Jones is to make tasks easier by improving the clarity of meter reading, and reducing readings and calculations needed.

One of the great advantages of the clarity of reading is to dramatically reduce the incidents of overshooting. At normal cycling speeds the meter reading can be continuously mon-

itored as a small number without the necessity of stopping from time to time to read the meter as with the Jones. If I am very careless I do still very occasionally overshoot with the electronic counter, but it is always less than a revolution. To correct, I simply roll the wheel back to the desired rim reading! If I desire to retain meter reading and a magnet has to pass by the sensor (less likely with the single magnet technique), I temporarily disconnect the meter by sliding it back on its mount. (Cateyes have an off switch.) I do not find this sort of correction requires a lot of concentrated thinking!

I know you have been using the BC600 meter and this meter does not lose impulses. Therefore, when you talk about "lost counts" I think you really mean "gained spurious impulses". You should not be reluctant to use the meter for uninterrupted rides, because these are the very times when gained spurious impulses are impossible!

You say you lost a count during a measurement up stairs climbing 80 feet. Actually, I believe you gained three impulses, and I am not surprised since there must have been a strong tendency for the bike to roll back. Going down there should have been no such tendency, and I am sure you made the right choice in choosing the down measurement as the valid one. There should be no problem with electronic counters if stairs are measured in a downward direction. I tried out my Protégé with a single magnet measuring up and down my ten-foot high deck stairs and found no spurious impulses.

You say you prefer an unbroken string of data, and there is no reason why you should have to sacrifice this preference with electronic counters. You do not have to rezero after each split, but can easily prepare a table of goal values for splits at various values of total distance. This is easier to do than for the Jones and unlike the Jones is valid for repeated measurements. Also, in addition to showing trip distance, all electronic meters have odometers and some have two. With the special single-magnet Protégé method you would not have the "unwelcome burden" of checking for spurious impulses. About all you would have to be alert for is the case where you have a very sudden emergency stop at the zero point on the rim. You would find the Protégé a delight to use.

Neville Wood

I have to agree with Neville that the Protégé is great - I measured a course yesterday as the light was fading and it was nice to have larger digits a foot from my face.

That said, I have yet to use the re-zeroing method, and wouldn't anticipate doing so under normal measuring - I measure too many split points on a metric course - it would seem to require more, rather than less, calculations to figure out the interval between, say, 3km and 2 miles. I may try it on a course where mile splits are the only ones I locate.

Jim Gerweck

You could measure a course once with the rezeroing method at mile splits and then again rezeroing at kilometer splits. This would give you two measurements for certification of the overall course. You would have only one mea-

surement for each split, but I do not think this matters very much since certification of these points is not normally required.

Neville Wood

In all my years measuring, I never thought of doing one "metric" ride and the other "imperial." Good idea.

Jim Gerweck

One metric ride and one imperial ride is fine only if you know how long the course is before you start. It's generally wasted effort to lay down splits on an unmeasured course, as when it doesn't come out right you will likely have to adjust everything, repainting and redocumenting all the splits.

The first ride serves to tell you what you need to do to get the course to come out to the proper length. Only when this is done is it a good idea to lay out splits. Whether a third ride, confirming all split positions, is to be done is an individual choice, as the overall course will have been measured twice.

Pete Riegel

Pete:

I am not sure what you mean by the following: "The first ride serves to tell you what you need to do to get the course to come out to the proper length"

I assume before making imperial and metric rides, the measurer would plan the course in detail. (I like to do my planning using "Streets" because I can place all points along the course with an accuracy of about 1 in 1000.) Of course if the rides do not agree within 0.08% a third ride would be required and it might be desirable to redo some of the splits as you indicate.

Neville Wood

I also use maps to rough out courses before I ride. This does not always work well enough to be sure the course will work out. If my first ride of a 10 km course comes out to 9500 meters, and I have already laid down the splits, I have wasted my time. I need to find 500 more meters, and establish the start and finish where the race director wants them. Combining these measurements yields my "first ride." Only then is it possible to lay down splits. When I have done so, I have my "second ride."

In general I don't do a third ride to check the splits.

An exception would be on a pure out-back course on which I can lay out all the splits going out, and check them coming back, thus getting two measurements of the course.

Pete Riegel

riegelpete@aol.com

THE AMB TIMING SYSTEM

I had a chance to see this in action at a local race. I was

especially impressed at how easy it was to lay down the sensor - just a pair of parallel wires, instead of heavy rubber mats.

The downside is that the chips provide the power, and they are more expensive than mat-activated chips.

Also, the chips are worn around the ankle using a velcro strap. None of the runners appeared to mind.

I checked some select times later and found that they matched up just fine.

Pete Riegel

AMB system is a very accurate system and easy to lay down. Why we still use the other system is very easy. With Championchips we are able to set up a back up system, computers can fail. Championchip has been proved for more than 4000 events a year. Economics, AMB chip is a battery power chip that last for 3 years compared to a Championchip wich is passive(no Batteries to replace) at at 40 dollars per chip without an option to rent them, Championchip does not riquire to change the battery and they can be rented for a minimal cost.

As a timer, wich system would would prefeer, if you have to carry heavy nats, get a team of volunteers.

Pedro Zapata

True, although according to AMB, it's not that you CAN lay down a second, backup mat w/ ChampionChip, but MUST, since there are a fair amount of missed reads by the first mat. At the RRTC meeting presentation in August, the AMB rep claimed a 100 per cent capture rate with their system (assuming the chips are worn correctly). If it works in bike and auto races, where the finish speed is far faster than running, it should be reliable, I would think,

Jim Gerweck

Bike and car events are high speed low density events meaning not many people going at the same time thru a reading point. The Olympics were very very low density events.

What would be your excuse to a Race Director if your system crash and you didn't place a back-up system?

I do like the two cable system for the antenna and the ease of the lay down but all comes down to a financial decision. Figure yourself buying 15000 chips at 40 dollars that with a claimed usefull life of 3 years only. What kind of a price you would have to put for your services to have a return on the investment on three years, time that you must referbish the chips again.

I have ask this question to AMB guys at Atlanta, still waiting for the answer. How much is a Race Director willing to pay for his results?

Pedro Zapata

There a couple timers here that have the AMB system. I have seen it in action and it is very good technology.

From what I understand from talking to those AMB timers in my area, is that the chip return isn't a problem. I think it is a function of having the ankle strap and only using race day distribution of chips. As a ChampionChip timer, I can live with a chip loss of 1% from my each event I time (which is what I normally expect to see) - its just the cost of doing business, but if I were using AMB, that would be too much of a risk.

It will be interesting to see what develops in the next year or so with all of these competing systems. There are many established timers in the ChampionChip network that are heavily invested in the ChampionChip "Classic" system (as it is now called) that I wonder how immediate the penetration of new systems (the CC active and CC high frequency) will be. For that reason, there may not be so much an incentive to buy into the new technologies right now.

However, for someone that wants to get into the timing business without much expenditure in equipment, purchasing an active system might be just the right option. AMB does allow its timers to rent chips from each other and that could be a significant advantage in the years to come.

However, I don't think there is a definite advantage of using one system over the other with regards to timing and accomplishing the task of producing results. Sure, with active chips, the read efficiency approaches 100% with just one system. Sounds good, except that even with passive cheaper chips used by the CC Classic system, the read efficiency is 99.8 % to 99.9% on the primary system (the first set of mats). So figure 1 or 2 misses per 1000 finishers on the set of mats. Using the secondary system, of course, you approach 100%.

Pat Leone

When the three years comes around do the chips just stop, do they get flakey like heart rate transponders, or do they send out a help change my battery tansmission.

What would happen in a race when the chips get to flakey age ? Can you change the battries?

The transponder in a champion chip chip is just a TI RF chip that came out many years ago. They are dirt cheep. You can get them by the barrel full. I am not sure why people are still paying so much for them. All it is is a dirt cheep transponder that has been embeded in a plastic blob with wings. It seems that the only thing that could possibly be patented by CC is the mats and the blob because TI owns the chip. So get some chips and make your own plastic blobs. Would reduce the cost of chips no end.

The parking structure by the start of one of our races uses the same IT chip in its parking token system. Go in, machine spits out a chip embedied in mini hocky puck. Check out, it eats the puck and calculates the time diffrence.

Run a race with hocky puck in pocket and the timing man about has a heart attack because there are hundreds of finish times with no runner name attached to that chip ID !

JamesM

USATF/RRTC CERTIFIED COURSE LIST
New Entries, September - October 2004

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct			REPLACES
				DROF	SEP	MEASURER	
10 km	AK 04006 FW	A Anchorage	Alaska 10k Classic	3.5	63	F Wilson	AK 92007 FW
42.195 km	AL 04011 JD	A Mobile	First Light Marathon	0.0	1	L Mattics	AL 03033 JD
5 km	AL 04012 JD	A Fort Rucker	AAAA Chili 5k	-0.9	9	B McGuire	
Cal	AL 04015 JD	A Tuscaloosa	Old Colony Rd. 300m	0.0	100	R Carroll	
10 km	AL 04016 JD	A Tuscaloosa	TNT 10k	0.0	0	R Carroll	
10 km	AL 04018 JD	A Northport	Tuscaloosa' s Toughest 10k	-0.3	5	R Carroll	
5 km	AL 04019 JD	A Mobile	Panther Pride 5k	0.0	3	L Mattics	
5 mi	AL 04020 JD	A Northport	Roger Pritchett Mem. Wildcat	-0.2	1	R Carroll	
3 mi	AZ 04007 GAN	A Sahuarita	Quail Creek 3 Mile Loop	0.0	0	G Newman	
5 km	AZ 04008 GAN	A Sahuarita	Quail Creek 5k Run/Walk	-0.2	3	G Newman	
42.195 km	CA 04001 KY	A Weott	Humboldt Redwoods	0.0	0	K Young	CA 94021 CW
21.0975 km	CA 04002 KY	A Weott	Humboldt Redwoods	0.0	1	K Young	CA 94001 CW
2.5 km	CA 04007 TK	A Oakland	Arrowhead Marsh 2.5 km	0.0	0	T Knight	CA 93014 TK
1.5 km	CA 04008 TK	A Oakland	Arrowhead Marsh 1.5 km	0.0	0	T Knight	
5 km	CA 04009 TK	A San Francisco	Jamba Juice 5k	0.9	4	T Knight	CA 00011 TK
5 km	CA 04010 TK	A San Francisco	Race for the Cure	0.0	6	T Knight	CA 03009 TK
5 km	CA 04011 TK	A Palo Alto	Running of the Bulls 8k	0.0	2	T Knight	
21.0975 km	CA 04012 TK	A Monterey	Big Sur Marathon - Monterey Bay	0.0	1	T Knight	
42.195 km	CA 04013 TK	A San Francisco	The Nike 26.2 - Marathon	0.0	1	T Knight	
21.0795 km	CA 04014 TK	A San Francisco	The Nike 26.2 - Half Marathon	0.0	2	T Knight	
21.0975 km	CA 04027 RS	A Napa	Wine Country Half Marathon	-1.0	95	D Thurston	
5 km	CA 04028 RS	A Sacramento	Pace Race Sacramento 5km	0.0	1	D Thurston	
5 km	CA 04029 RS	A Sacramento	Race for the Arts 5km	1.0	3	D Thurston	
10 km	CA 04030 RS	A Los Angeles	Azteca 10km Run	0.3	5	R Scardera	
Cal	CA 04032 RS	A Chico	Midway Bike Path 1000 ft.	0.0	100	D Welch	
5 km	CA 04033 RS	A Sacramento	Chevy's Fresh Mex 5km	-0.9	31	D Thurston	
12 km	CA 04034 RS	A Sacramento	Chevy's Fresh Mex 12km	-0.4	13	D Thurston	
42.195 km	CA 04035 RS	A Tahoe City	Lake Tahoe Marathon	0.4	95	D Thurston	CA 99053 RS
42.195 km	CA 04036 RS	A Carlsbad	Carlsbad Marathon	0.0	0	G Rahill	
5 km	CO 04018 DP	A Fort Carson	Fort Carson 5k	0.0	9	B Bennett	
Cal	CO 04019 DP	A Boulder	Boulder Reservoir 400 meter	0.0	100	S Sellars	
5 km	CO 04020 DP	A Westminster	Holy Cow Trail Stampede	0.0	0	D Poppers	CO 94007 DP
10 km	CO 04021 DP	A Westminster	Holy Cow Trail Stampede	0.0	0	D Poppers	
5 km	CO 04022 DP	A Golden	Golden Demon's 5k	-1.4	4	D Mangan	
5 km	CO 04023 DP	A Denver	Stapleton Stampede	0.0	1	P Tanui	
42.195 km	CO 04024 DP	A Colorado Springs	American Discovery Trail	0.1	1	T Noll	CO 02018 DP
15 km	CO 04025 DP	A Denver	Stapleton Stampede	0.0	1	P Tanui	
42.195 km	CO 04026 DP	A Fort Collins	Easy Street Marathon	-0.3	3	M Moore	CO 03021 DP
42.195 km	CO 04027 DP	A Boulder	Boulder Backroads Marathon	-0.1	1	B Durden	
5 km	CO 04028 DP	A Broomfield	Credit Union Harvest Run	0.0	0	P Tanui	
5 km	CO 04029 DP	A Denver	Jingle Bell Run	0.0	6	D Poppers	
21.0975 km	CO 04030 DP	A Denver	Mile High City Half Marathon	0.0	1	A Mabry	CO 03019 DP
42.195 km	CO 04030 DP	A Denver	Mile High City Marathon	0.0	1	A Mabry	CO 03020 DP
42.195 km	CO 04031 DP	A Durango	The Durango Marathon	2.0	3	J Carpenter	CO 02026 DP
21.0975 km	CO 04032 DP	A Durango	San Juan Mts. Half Marathon	4.1	5	J Carpenter	
10 km	CO 04033 DP	A Durango	Mesa to Main	8.6	11	J Carpenter	
10 km	CT 04012 PH	A Hartford	Hartford Women's 10k	-1.2	7	P Hawley	
5 km	CT 04013 PH	A Hartford	Hartford Women's 5k	-0.6	3	P Hawley	
5 km	CT 04014 PH	A Monroe	Lakewood Trumbull YMCA 5k	0.0	0	B Stephenson	
5 km	CT 04015 PH	A Stratford	MADD DASH 5k	0.0	13	B Stephenson	
Cal	CT 04016 PH	A Somers	Field Road 1000 ft.	0.0	100	R Arsenault	
5 km	CT 04017 PH	A Somers	Somers Great Escape 5k	0.0	2	R Arsenault	
42.195 km	CT 04018 PH	A Hartford	Greater Hartford Marathon	0.0	0	P Hawley	CT 00015 DR
21.0975 km	CT 04019 PH	A Hartford	Greater Hartford Half Marathon	0.0	1	P Hawley	
5 km	CT 04020 PH	A Hartford	Huck Finn 5k	0.0	9	D Bolt	CT 03012 DR
5 km	DC 04002 RT	A Washington	Pennsylvania Avenue 5 & 10 K	0.0	0	R Thurston	
1 mi	DC 04003 RT	A Washington	Pennsylvania Avenue Mile	0.0	0	R Thurston	
5 km	DE 04001 LMB	A Wilmington	Making Strides 5k	0.0	1	D White	

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct			REPLACES
				DROF	SEP	MEASURER	
10 km	FL 04031 DL	A Largo	Seminole Stampede 10k	0.0	5	E McDowell	
5 km	FL 04036 DL	A Palm Bay	Palm Bay Freedom Run/Walk	0.0	1	B Dillard	
10 km	FL 04037 DL	A Melbourne	Eye of the Dragon 10k	0.0	0	B Dillard	FL 92049 DL
5 km	FL 04038 DL	A St. Petersburg	Race for the Cure 2004	0.0	10	E McDowell	FL 03037 DL
5 km	FL 04039 DL	A Jacksonville	Children's Way 5k	0.0	1	D Aldred	
21.0975 km	FL 04040 DL	A Jacksonville	Marine Corps Half Marathon	0.0	2	D Aldred	
5 km	FL 04041 DL	A Jacksonville	Run for the Pies-Champions	0.0	9	D Aldred	
21.0975 km	FL 04042 DL	A W. Palm Beach	Palm Bay Half Marathon	0.0	0	D Loeffler	
42.195 km	FL 04043 DL	A W. Palm Beach	Palm Beach Marathon	0.0	0	D Loeffler	
42.195 km	FL 04044 DL	A Cocoa	Space Coast Marathon	0.0	0	B Sher	
10 km	FL 04045 DL	A Boca Raton	Boca Raton 10k	0.2	2	G Witkowski	
5 km	FL 04046 DL	A W. Palm Beach	JCC 5k Torch Run	0.0	0	D Loeffler	
5 km	FL 04047 DL	A Cooper City	S W Ranches 5k	0.0	3	G Witkowski	
21.0975 km	FL 04048 DL	A Weston	Weston Rotary Half Marathon	0.0	2	G Witkowski	FL 03043 DL
5 km	FL 04049 DL	A Weston	Weston Rotary 5k	0.0	0	G Witkowski	
5 km	FL 04050 DL	A Palm Harbor	Run to the Rock 5k	0.0	9	G McFerren	
5 km	FL 04051 DL	A Wellington	Wellington Community 5k	0.0	1	G Witkowski	
5 km	FL 04052 DL	A Tallahassee	The Albertson's 5k	0.0	5	B McGuire	
10 km	FL 04053 DL	A St. Petersburg	Run for the Kids 10k	0.1	1	A Johnson	
5 km	FL 04054 DL	A Jacksonville	Cash 5k	0.0	1	D Aldred	
5 km	FL 04055 DL	A Jacksonville	Festival of Lights 5k	0.0	2	D Aldred	
5 km	FL 04056 DL	A Jacksonville	Freedom 5k	0.0	4	D Aldred	
5 km	FL 04057 DL	A Jacksonville	Shands Superbowl Run	0.0	1	D Aldred	
5 km	FL 04058 DL	A Gulfport	Gulfport Chamber Challenge 5k	0.0	4	A Johnson	
Cal	GA 04011 WG	A Hiram	Silver Comet Trail 333.2m	0.0	100	S Hubbart	
5 km	GA 04012 WC	A Calhoun	United Way Unity Run 5k	0.3	9	W Cornwell	GA 01016 WC
5 km	GA 04013 WC	A Dalton	Carpet Capital 5k	0.4	4	W Cornwell	
50 km	GA 04014 WC	A Peachtree City	Peachtree City 50k	0.0	0	D Olson	
Cal	GA 04015 WC	A Peachtree City	Holly Grove Rd. 1013.72 ft	0.0	100	D Olson	
5 km	GA 04016 WC	A Augusta	ASU Jaguar Jaunt 5k	0.0	1	T Crute	GA 01017 WC
Cal	GA 04017 WC	A Alpharetta	Windward Concourse 1000 ft.	0.0	100	W Cornwell	
5 km	GA 04018 WC	A Alpharetta	"Go Red For Women"	0.0	2	W Cornwell	
Cal	GA 04019 WC	A Millen	Jenkins Co. Millen 1000 meter	0.0	100	R Miller	
5 km	GA 04020 WC	A Ellijay	Apple Festival	0.3	4	J Hite	
21.0975 km	IA 04005 MF	A Des Moines	Drake Relays Half Marathon	-0.3	2	M Franke	
0.5 mi	IA 04006 MF	A Iowa City	Iowa City Road Races 1/2 Mile	0.0	3	J Shimek	
1 mi	IA 04007 MF	A Iowa City	Iowa City Road Races 1 Mile	0.0	1	J Shimek	
5 km	IA 04008 MF	A Sioux City	Siouxland Lewis & Clark 5k	-0.6	32	S Uhl	
21.0975 km	IA 04075 PR	A Des Moines	Des Moines Half Marathon	0.1	1	L Joline	IA 03011 MF
42.195 km	IA 04076 PR	A Des Moines	Des Moines Marathon	0.1	1	L Joline	IA 03015 MF
5 km	IL 04006 KU	A Moline	Crimestoppers 5k Run	0.0	0	K Ungurean	
10 km	IL 04007 KU	A Rock Island	Nancy M. Kapheim Memorial	0.0	1	K Ungurean	
5 km	IL 04008 KU	A Rock Island	Nancy M. Kapheim Memorial	0.0	2	K Ungurean	
42.195 km	IL 04012 KU	A Rock Island	Quad Cities Marathon	0.0	0	K Ungurean	IL 03011 KU
5 km	IL 04056 JW	A Chicago	Chris Zorich Run 5k	0.0	2	J Wight	IL 03061 JW
5 km	IL 04074 JW	A Chicago	Jim Gibbons Run 5k	0.0	2	J Knoedel	IL 00042 JW
5 km	IL 04075 JW	A Palatine	Race for Young Life	0.0	3	J Wight	IL 03065 JW
5 km	IL 04076 JW	A University Park	I Care for Autism	0.0	3	C Hinde	IL 04022 JW
5 km	IL 04077 JW	A Evanston	Ricky Byrdsong 5k	0.0	0	J Knoedel	IL 00045 JW
5 km	IL 04078 JW	A Wheaton	Veterans Day Run 5k	0.0	2	C Hinde	
10 km	IL 04079 JW	A Oak Brook	Run for Fun 10k	0.0	1	C Hinde	IL 04044 JW
5 km	IL 04080 JW	A Elk Grove Village	Rainbows Run 5k	0.0	0	C Hinde	
5 km	IL 04081 JW	A Chicago	Bastille Day 5k	0.0	2	C Hinde	IL 03068 JW
10 mi	IL 04082 JW	A Chicago	Insurance All-American Run	0.0	0	J Knoedel	
5 km	IL 04083 JW	A Palatine	Forest Grove Athletic Club 5k	0.0	0	J Knoedel	IL 03033 JW
5 km	IL 04086 JW	A Sugar Grove	Sugar Grove 5k	0.0	5	C Hinde	IL 94023 JW
10 km	IL 04087 JW	A Palos Heights	Run for the Health of It	0.0	1	C Hinde	
5 km	IL 04090 JW	A Chicago	Chinatown 5k	0.0	0	N Marquez	
5 km	IL 04091 JW	A Orland Park	Citizens for Orland's Children	0.0	0	C Hinde	
21.0975 km	IL 04092 JW	A Chicago	Chicago Half Marathon	0.0	0	J Knoedel	IL 03094 JW
5 km	IL 04093 JW	A Chicago	La Villita 5k Run	0.0	2	C Hinde	IL 03076 JW
5 km	IL 04094 JW	A Chicago	Can You Stand the Heat 5k	0.0	0	C Hinde	IL 03085 JW
21.0975 km	IL 04095 JW	A Chicago	Chicago Distance Classic	0.0	0	N Marquez	
5 km	IL 04096 JW	A Chicago	Chicago Distance Classic 5k	0.0	0	N Marquez	IL 03082 JW
5 km	IL 04097 JW	A Chicago	Life Without Lupus 5k	0.0	0	N Marquez	IL 03095 JW
25 km	IL 04098 JW	A Channahon	National Heritage Corridor 25k	0.0	1	C Hinde	IL 00055 JW

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct			REPLACES
				DR	OF	SEP MEASURER	
5 km	IL 04099 JW	A Downers Grove	Thanksgiving Day 5k	0.0	6	C Hinde	
5 km	IL 04101 JW	A Marengo	Marengo Midnight Run	0.0	5	C Hinde	
5 km	IL 04102 JW	A Grayslake	Run on the Prairie 5k	0.0	16	N Marquez	
5 km	IL 04103 JW	A Elmhurst	Breadbasket Classic	0.0	0	C Hinde	IL 03096 JW
5 km	IL 04104 JW	A Chicago	Step Out to Stop Abuse 5k	0.0	5	J Wight	
5 km	IL 04105 JW	A Libertyville	Rally for Autism	0.0	2	J Wight	IL 03087 JW
5 km	IL 04106 JW	A Chicago	MMRF Ann Landers Race	0.0	5	J Wight	
5 km	IL 04107 JW	A Chicago	Nike One Hit Wonders 5k	0.0	0	J Knoedel	
10 km	IL 04108 JW	A Chicago	Nike One Hit Wonders 10k	0.0	0	J Knoedel	
42.195 km	IN 04013 MW	A Warsaw	Lake City Marathon	0.0	0	M Skipper	
Cal	IN 04014 MW	A Warsaw	300s Half Mile Calibration	0.0	100	M Skipper	
21.0975 km	IN 04015 MW	A Indianapolis	Indianapolis Half Marathon	0.0	0	J Sauer	IN 00015 MW
42.195 km	IN 04016 MW	A Indianapolis	Indianapolis Marathon	0.0	0	J Sauer	IN 00014 MW
4 mi	KS 04030 BG	A Wichita	East High Community Run	-0.2	1	S Riley	
5 km	KS 04031 BG	A Wichita	Wichita Race for the Cure	0.0	5	S Riley	
10 km	KS 04034 BG	A Abilene	Chisholm Trail 10k II	0.1	3	L Richardson	
5 km	KS 04035 BG	A Lansing	Steeplechase 5k	0.0	0	S Riley	
5 km	KS 04044 BG	A Wichita	Great Pumpkin Run II	-0.6	4	L Richardson	
1 mi	KY 04059 PR	A Louisville	Southern Parkway Mile	3.8	100	P Mahoney	
Cal	KY 04069 PR	A Louisville	Eleanor Avenue 500 meter	0.0	100	J Mazzone	
5 km	KY 04070 PR	A Louisville	Highlands Cup 5k	0.0	3	J Mazzone	
Cal	MA 04014 RN	A Falmouth	Shining Sea Bike Path 1000 ft.	0.0	100	J Gerweck	
7 mi	MA 04015 RN	A Falmouth	Falmouth Road Race	0.0	58	J Gerweck	
1 mi	MA 04016 RN	A Newburyport	High Street Mile	1.9	100	S Vaitones	MA 91011 RN
42.195 km	MA 04018 RN	A Wakefield	24 Hour Marathon	0.0	0	L Horlick	MA 99018 RN
5 km	MA 04020 RN	A Boston	Brian Honan 5k	-0.2	4	S Vaitones	
5 km	MA 04021 RN	A Somerville	Shape Up Somerville 5k	0.9	2	S Vaitones	
3 mi	MA 04022 RN	A Newton	Paddy's Shillelagh Shuffle	-0.3	3	S Vaitones	
5 km	MA 04023 RN	A Boston	Komen Race for the Cure	-0.3	4	S Vaitones	
15 km	MD 04002 RT	A Greenbelt	Larry Noel 15k	0.5	1	R Thurston	MD 02028 RT
10 km	ME 04009 RF	A Portland	Portland Peninsula 10k	0.0	6	R Shevenell	
5 km	ME 04010 RF	A Falmouth	Dan Cardillo 5k Road Race	0.4	5	C Burnie	
5 km	MI 04009 SH	A Northville	Fifth/Third Solstice	1.6	12	D Kurtis	
1 mi	MI 04010 SH	A Northville	Mustang Mile	29.2	68	D Kurtis	
10 km	MI 04011 SH	A Farmington	Mary Angela	0.0	0	K Medelis	
1 km	MI 04013 SH	A Dearborn	Levagood Park Course	0.0	0	S Hubbard	
5 km	MI 04014 SH	A Ann Arbor	Pfund Run	-0.2	19	K Medelis	
5 km	MI 04015 SH	A Detroit Lakes	St. John Health	1.6	3	S Hubbard	MI 03021 SH
21.0975 km	MI 04016 SH	A Detroit Lakes	Detroit Free Press/Flagstar Bank	0.4	1	S Hubbard	
42.195 km	MI 04017 SH	A Detroit Lakes	Detroit Free Press/Flagstar Bank	0.2	1	S Hubbard	MI 03020 SH
10 km	MN 04020 RR	A Minneapolis	Lifetime Fitness Tri	0.0	3	D Wright	
10 km	MN 04021 RR	A Walker	Walker	-0.8	2	R Recker	
8 km	MN 04022 RR	A Moorhead	Red River Valley	0.0	4	D Summers	
42.195 km	MN 04023 RR	A St. Paul	St. Paul	-0.6	2	D Wright	
5 km	MN 04023 RR	A St. Paul	TCM 5k	0.0	1	D Wright	
21.0975 km	MN 04025 RR	A Detroit Lakes	Beardsley	-0.1	1	D Summers	
5 km	MN 04026 RR	A Detroit Lakes	Beardsley	-0.2	2	D Summers	
10 mi	MN 04027 RR	A White Bear Lake	White Bear	0.0	0	M Machus	
5 km	MN 04028 RR	A Roseville	Grass Lake	-0.2	12	R Recker	
5 km	MN 04029 RR	A St. Paul	East Phalen	0.0	1	R Recker	
5 km	MN 04030 RR	A Burnsville	Burnsville	0.0	2	E Paulson	
5 km	MN 04031 RR	A Minneapolis	Newman	0.0	2	R Recker	
10 km	MN 04032 RR	A Maple Grove	Elm Creek	0.0	3	R Recker	
5 km	MN 04033 RR	A Maple Grove	Elm Creek	0.0	4	R Recker	
5 km	MO 04028 BG	A St. Charles	Barnwell 5km	0.8	3	J Neuschwander	
5 km	MO 04029 BG	A Earth City	St. Louis PACE Race	0.0	0	J Neuschwander	
21.0975 km	MO 04032 BG	A St. Charles	Lewis & Clark Half Marathon	-0.1	0	J Neuschwander	MO 03034 BG
42.195 km	MO 04033 BG	A St. Charles	Lewis & Clark Marathon	-0.1	0	J Neuschwander	MO 03033 BG
5 km	MO 04036 BG	A Platte city	Duck & Run	0.0	0	B Taylor	
10 km	MO 04037 BG	A Platte city	Duck & Run	0.0	0	B Taylor	

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct			REPLACES
				DROF	SEP	MEASURER	
5 km	MO 04038	BG A St. Louis	Jack-O-Lantern Jog	0.2	2	J Neuschwander	
5 km	MO 04039	BG A Springfield	Sunshine Run	3.0	25	R Johnson	
10 km	MO 04040	BG A Springfield	Sunshine Run	1.5	13	R Johnson	
5 km	MO 04041	BG A Chesterfield	Gumbo Flats	0.0	0	J Neuschwander	
10 km	MO 04042	BG A Chesterfield	Gumbo Flats	0.0	0	J Neuschwander	
5 km	MO 04043	BG A Springfield	Phelps Grove	1.6	8	R Johnson	
10 km	NC 04044	PH A Fayetteville	Running of the Bulls 10k	0.0	0	J Ramirez	
20 km	NC 04045	PH A Hickory	Bakers Mountain 20k Challenge	0.0	0	M Surface	
Cal	NC 04046	PH A Emerald Isle	Emerald Drive 1000 ft.	0.0	100	P Hronjak	
5 km	NC 04047	PH A Emerald Isle	Dog Days of Summer Triathlon	0.0	0	P Hronjak	
12 mi	NC 04048	PH A Emerald Isle	Dog Days of Summer Triathlon	0.0	0	P Hronjak	
5 km	NC 04050	PH A Asheville	Belle Cher	-0.9	2	E Mc Ginnis	
5 km	NC 04051	PH A Raleigh	Old Reliable 5k Run	0.0	0	P Hronjak	
5 km	NC 04052	PH A Raleigh	Ready, Set ... Poe	0.0	0	N Wood	NC 02032 PH
0.5 mi	NC 04052	PH A Raleigh	Ready, Set ... Poe	0.0	0	N Wood	NC 02032 PH
5 km	NC 04053	PH A Charlotte	Carolina Panthers Blue Points 5k	-0.2	2	T Rhodes	
10 km	NC 04054	PH A Cary	Inside Out Sports Classic	0.0	0	N Wood	
15 km	NC 04054	PH A Cary	Inside Out Sports Classic	0.9	30	N Wood	
20 km	NC 04054	PH A Cary	Inside Out Sports Classic	0.0	0	N Wood	
21.0975 km	NC 04055	PH A Cary	Inside Out Sports Classic	0.0	0	N Wood	
5 mi	NC 04056	PH A Sunset Beach	Sea Trail 5 Miler	0.0	3	F Guy	
5 km	NC 04058	PH A China Grove	South Rowan YMCA 5k	-0.2	3	D White	
5 km	NC 04059	PH A Raleigh	Feet for the Fight	0.0	1	P Hronjak	NC 03036 PH
5 km	NC 04060	PH A New Bern	Think Pink Bridge Run/Walk 5k	0.0	40	P Hronjak	
10 km	NC 04061	PH A New Bern	Think Pink Bridge Run/Walk 10k	0.0	27	P Hronjak	
5 km	NC 04062	PH A Hillsborough	5k Dash 'N Splash	0.0	0	D Forbis	
5 km	NC 04063	PH A Rocky Mount	Ford's Colony NCWC	0.0	5	P Hronjak	
21.0975 km	NC 04064	PH A Greensboro	Cannonball Run	-0.5	4	P Hronjak	
5 km	NC 04065	PH A Charlotte	Hit The Brixx 5k	0.0	1	T Rhodes	
10 km	NC 04066	PH A Charlotte	Hit The Brixx 10k	0.0	0	T Rhodes	
5 km	NC 04067	PH A Cary	Inside Out Sports Classic	0.0	0	N Wood	
5 km	NC 04067	PH A Cary	NCRN Women's 5k Race	0.0	0	N Wood	NC 94006 WN
15 km	NC 04068	PH A Durham	Coach Bubba's 20km- 15k split	0.9	33	N Wood	
10 km	NC 04069	PH A Asheboro	Fall Festival 10k Run	0.2	2	D Forbis	
5 km	NC 04070	PH A Burnsville	Town Square Scamper	-0.3	2	M Studholme	
Cal	ND 04060	PR A West Fargo	10th. Ave South 300 meters	0.0	100	D Summers	
5 mi	ND 04061	PR A West Fargo	West Fest 5 Mile	0.1	2	D Summers	
42.195 km	NE 04009	KU A Omaha	2004 Omaha Marathon	-0.6	0	G Meyer	NE 03013 KU
21.0975 km	NE 04010	KU A Omaha	2004 Omaha Half Marathon	-1.1	1	G Meyer	NE 03014 KU
10 km	NE 04011	KU A Omaha	2004 Omaha 10k	-2.4	1	G Meyer	NE 01015 KU
5 km	NH 04012	RF A Bedford	Bedford Rotary Memorial 5k #2	-0.2	2	R Fitzpatrick	
12 km	NH 04013	RF A Bedford	Bedford Rotary Memorial 12k #2	0.1	4	R Fitzpatrick	
10 km	NH 04014	RF A Manchester	Bill Kelley Memorial 10k	0.0	0	R Fitzpatrick	
5 km	NH 04015	RF A Portsmouth	St. Charles Children's Home 5k	-0.2	2	D Frye	NH 97004 WN
5 km	NH 04016	RF A Concord	Making Strides - Breast Cancer	0.6	3	R Fitzpatrick	
Cal	NJ 04001	KL A Morristown	Lake Road 1000 ft.	0.0	100	K Lucas	
5 mi	NJ 04026	LMB A Spring Lake	Spring Lake 5 2004	0.0	9	P Hess	
5 km	NJ 04033	LMB A Jersey City	Garden State Games 5k	0.0	4	L Baldasari	
5 km	NJ 04034	LMB A Newark	Newark Corporate Run	0.0	13	J Parks	NJ 89027 DB
5 km	NJ 04035	LMB A Washington Twp.	Joel Spector 5k	0.0	9	J Parks	NJ 00023 GAN
5 km	NJ 04036	LMB A Bayonne	Bayonne Harbor 5k	0.0	11	J Parks	
5 km	NJ 04037	LMB A Summit	Summit Hi 5 5k	0.0	4	J Parks	
5 km	NJ 04038	LMB A Fair Lawn	First Day 5k	0.0	6	J Parks	
5 km	NJ 04039	LMB A Lacey Twp.	Lacey Twp. Municipal Alliance 5k	0.0	0	L Baldasari	
5 km	NJ 04040	LMB A Pennington	3 Alarm Chili Cook-Off 5k	-0.6	9	L Baldasari	
5 km	NJ 04041	LMB A Westhampton	Deerwood Country Club 5k	0.0	7	L Baldasari	
5 km	NJ 04042	LMB A Fairfield	Trick or Treat 5k	0.0	1	J Parks	
5 km	NJ 04043	LMB A Teaneck	George Ohlandt Memorial 5k	0.0	1	L Baldasari	
5 km	NM 04004	DS A Albuquerque	Race for the Cure	0.0	3	D Shepan	
5 km	NY 04021	KL A Rochester	Medved 5km to Cure ALS	0.9	9	K Lucas	NY 99047 AM
5 km	NY 04022	KL A Irondequoit	Sara's Race 5km	6.1	89	K Lucas	
5 km	NY 04023	KL A Penfield	Penfield Challenge 5km	0.0	2	K Lucas	

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct			REPLACES
				DROF	SEP	MEASURER	
5 km	NY 04024 KL	A Rochester	Labor Day 5km Canal Run	0.6	3	K Lucas	
Cal	NY 04025 KL	A Penfield	Brentwood Drive 1000 ft.	0.0	100	K Lucas	
5 km	NY 04030 KL	A Webster	King's Athletic Club 5km	0.0	2	K Lucas	
Cal	NY 04031 KL	A Hauppauge	Vet's Hwy 1000 ft.	0.0	100	K Lucas	
Cal	NY 04032 KL	A New York	East Drive 1000 ft.	0.0	100	K Lucas	NY 95002-95003
2 km	NY 04033 KL	A Hauppauge	Walter Hawry's 2 km	0.0	0	K Lucas	NY 02031 AM
2.5 km	NY 04034 KL	A Hauppauge	Walter Hawry's 2.5 km	0.0	0	K Lucas	NY 03055 AM
10 km	NY 04035 KL	A Perinton	Barktober Fest 10km	0.0	1	K Lucas	
10 km	NY 04036 KL	A Riga	Freezeroo #6 10km	0.0	0	K Lucas	
7.5 mi	NY 04037 KL	A Mendon	Freezeroo #2 7.5 Mile	0.4	1	K Lucas	
10 km	NY 04038 AM	A New York	NYRRC Nike 10k	-0.3	3	P Hess	
5 km	NY 04039 AM	A New York	NYRRC Nike 5k	-0.6	6	P Hess	
5 km	NY 04040 AM	A Buffalo	Linda Yalem Memorial Run	-0.4	5	J Grandits	NY 93040 AM
5 km	NY 04041 AM	A Buffalo	Veteran's 5k Run/Walk	0.0	5	J Grandits	
21.0975 km	NY 04042 AM	A Liverpool	ARC Half Marathon	0.0	1	D Hughes	
5 km	NY 04043 AM	A Liverpool	ARC 5k	0.1	4	D Hughes	
5 km	NY 04044 AM	A Albany	Sefcu Foundation	0.3	1	J Gilmer	
5 km	NY 04045 AM	A Niagara Falls	YMCA Winterfest Niagara	0.0	8	J John	
5 km	NY 04046 AM	A Rotterdam	Amber TETA 5k	0.0	9	J Gilmer	
5 km	NY 04047 AM	A Buffalo	St. Mary's School for the Deaf 5k	0.0	1	J Grandits	
Cal	NY 04048 AM	A Long Beach	Long Beach Boardwalk 1000 ft.	0.0	100	G Westerfield	
1.25 km	NY 04049 AM	A Long Beach	Long Beach Boardwalk1.25k loop	0.0	0	G Westerfield	
5 mi	OH 04003 MW	A Akron	Labor of Love Run	0.0	1	M Wickiser	
21.0975 km	OH 04004 MW	A Berea	Cleveland Clinic River Run	2.5	88	M Wickiser	
5 km	OH 04005 MW	A Cleveland	Race for the Cure	0.2	2	M Wickiser	OH 03011 MW
5 km	OH 04050 PR	A Cincinnati	Firefighter & Police Memorial 5k	0.0	4	D Connolly	
5 km	OH 04051 PR	A Pandora	Riley Creek Festival 5k	0.0	0	D Standish	
5 km	OH 04052 PR	A Hilliard	Running With the Cats 5k	0.0	1	P Riegel	
10 km	OH 04053 PR	A Alum Creek State Pa	No Limits 10k	0.0	0	P Riegel	
10 km	OH 04062 PR	A Loveland	Loveland River Run 2004 10k	0.0	1	M Moyer	
5 km	OH 04063 PR	A Loveland	Loveland River Run 2004 5k	0.0	2	M Moyer	
20 mi	OH 04064 PR	D Westerville	Home Stretch 20 Mile	0.0	0	P Riegel	OH 04057 PR
20 mi	OH 04065 PR	A Westerville	Home Stretch 20 Mile	0.0	0	P Riegel	OH 04064 PR
5 km	OH 04066 PR	A Cuyahoga Falls	Buckeye 5k	0.0	5	J Fisch	
21.0975 km	OH 04067 PR	A Cuyahoga Falls	Buckeye Half Marathon - Loop	0.1	1	J Fisch	PH 01057 PR
42.195 km	OH 04068 PR	A Columbus	Columbus Marathon	0.1	2	J Glaze	OH 00019 & 02031
42.195 km	OH 04071 PR	A Cuyahoga Heights	Towpath Marathon & Relays	1.3	80	J Wilhelm	OH 00012 MW
5 km	OH 04072 PR	A Cuyahoga Heights	ISG Canal Way 5k	0.1	97	J Wilhelm	OH 00021 MW
5 km	OH 04073 PR	A Logan	A Special Wish 5k Run	0.0	0	P Riegel	
Cal	OH 04074 PR	A Logan	Homer Street 1000 ft.	0.0	100	P Riegel	
5 km	OK 04019 BB	A Edmond	Run for Air	-0.8	2	J Smith	
5 km	OK 04020 BB	A Tulsa	Tulsa Run Alternate 5km	4.0	40	G Lafarlette	
5 km	OK 04021 BB	A Harrah	Harrah Heat wave	0.2	4	J Smith	
5 km	OK 04022 BB	A Oklahoma City	Run With the Stars	0.0	0	J Smith	
5 km	OK 04023 BB	A Oklahoma City	Making Tracks	-0.4	5	J Smith	
10 km	OK 04024 BB	A Anadarko	American Indian Expo Run	-0.1	2	J Smith	
10 km	OK 04025 BB	A Oklahoma City	GEICO Race for Freedom	-0.1	1	J Smith	OK 03035 BB
5 km	OK 04026 BB	A Oklahoma City	GEICO Race for Freedom	-0.2	2	J Smith	OK 03034 BB
5 km	OK 04027 BB	A Norman	Brookhaven Run	0.0	3	G Lafarlette	
Cal	OR 04005 LB	A Bend	Wall St. 300m calibration	0.0	100	C McLatchie	
Cal	OR 04006 LB	A Bend	Bailet/Tumalo Reservoir rd. 300m	0.0	100	C McLatchie	
42.195 km	OR 04007 LB	A Bend	Just Around the Bend Marathon	0.0	3	C McLatchie	
10 km	OR 04008 LB	A Portland	Pints to Pasta 10km	5.3	80	J Spurgeon	
21.0975 km	RI 04004 RN	A Providence	Providence Half Marathon	0.9	3	R Nelson	RI 03005 RN
21.0975 km	SC 04016 BS	A Travelers Rest	New Year's Resolution H'MAR	0.3	1	J Roberts	
5 km	SC 04017 BS	A Travelers Rest	New Year's Resolution 5k	-2.8	2	J Roberts	
5 km	SC 04023 BS	A Pawley's Island	Home Harvest 5k	0.0	2	D White	
12 km	SC 04024 BS	A Goose Creek	Carolina Children Charities	0.0	1	M Chodnicki	
5 km	SC 04025 BS	A Daniel Island	Race for the Cure 5k	0.0	1	M Desrosiers	
5 km	SC 04026 DS	A Travelers Rest	Quest for Your Best 5k	0.0	0	D White	
10 km	SC 04027 BS	A West Columbia	Habitat for Humanity 10k	0.1	0	S Blake	
10 km	SD 04055 PR	A Vermillion	Spirit Mound 10k	0.8	84	A Stockholm	

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct		DROF SEP	MEASURER	REPLACES
Cal	TX 04011 WG	A Mission	Bentsen Palm Dr. 1000 ft.	0.0	100	B	Grass	
20 km	TX 04012 WG	A Mission	Correcaminos 20k	0.0	0	B	Grass	
10 km	TX 04016 WG	A Port Isabel	Annual Longest Causeway Run	0.0	44	B	Grass	TX 98061 ETM
5 km	TX 04018 JF	A Westlake Hills	Cornerstone 5k	0.0	1	J	Ferguson	
3.1 mi	TX 04019 JF	A Austin	Town Lake Loop - Pfluger Bridge	0.0	0	J	Ferguson	
4.23 mi	TX 04020 JF	A Austin	Town Lake Loop-S. 1st St. Bridge	0.0	0	J	Ferguson	
4.82 mi	TX 04021 JF	A Austin	Town Lake Loop-Congress Bridge	0.0	0	J	Ferguson	
5 km	TX 04022 JF	A Austin	Keep Austin Weird 5k	0.0	6	J	Ferguson	TX 03019 JF
6.9 mi	TX 04023 JF	A Austin	Town Lake Loop-IH35 Bridge	0.0	0	J	Ferguson	
21.0975 km	TX 04024 JF	A Austin	Motive Bison Stampede H'MAR	0.0	0	J	Ferguson	TX 02018 JF
20 km	TX 04025 JF	A Austin	Decker Challenge	0.0	0	J	Ferguson	TX 02026 JF
5 km	TX 04026 JF	A Austin	Brown Santa 5k	0.0	0	J	Ferguson	
5 mi	TX 04027 JF	A Austin	Austin Turkey Trot	0.0	1	J	Ferguson	
10 km	TX 04028 JF	A La Grange	Best Little 10k in Texas	0.0	0	J	Ferguson	
5 km	TX 04029 JF	A La Grange	Best Little 5k in Texas	0.0	0	J	Ferguson	
10 km	TX 04030 JF	A Austin	Texas Twister 10k	0.0	0	J	Ferguson	
30 km	TX 04058 ETM	A Dallas	Big D 2004 30k	0.0	0	K	Ashby	TX 03104 ETM
5 km	TX 04058 ETM	A Dallas	Big D 2004 5k	0.0	0	K	Ashby	TX 03104 ETM
15 km	TX 04059 ETM	A Dallas	Too Hot-Cold/CCCD 15k	0.0	0	K	Ashby	TX 02058 ETM
5 km	TX 04059 ETM	A Dallas	Too Hot-Cold/CCCD 5k	0.0	0	K	Ashby	TX 02058 ETM
20 km	TX 04060 ETM	A Dallas	Lost Dog 2004	0.2	1	K	Ashby	TX 01088 ETM
10 km	TX 04060 ETM	A Dallas	Lost Dog 2004	0.4	1	K	Ashby	TX 01088 ETM
5 km	TX 04060 ETM	A Dallas	Lost Dog 2004	0.8	2	K	Ashby	TX 01088 ETM
1 km	TX 04060 ETM	A Dallas	Lost Dog 2004	4.0	10	K	Ashby	TX 01088 ETM
15 km	TX 04061 ETM	A Dallas	Autumn Equinox	0.0	0	K	Ashby	TX 03083 ETM
5 km	TX 04061 ETM	A Dallas	Autumn Equinox	0.0	1	K	Ashby	TX 03083 ETM
25 km	TX 04062 ETM	A Dallas	Waterworks 2004	0.0	0	K	Ashby	TX 03094 ETM
5 km	TX 04062 ETM	A Dallas	Waterworks 2004	0.0	1	K	Ashby	TX 03094 ETM
Trck	TX 04064 ETM	A Addison	Greenhill School Track 400.861m	0.0	0	S	Eppleman	TX 00081 ETM
15 km	TX 04065 ETM	A Dallas	Summer Bath 15km	0.3	1	K	Ashby	
5 km	TX 04066 ETM	A Houston	1st Annual Cancer Survivor's	0.0	0	E	McBrayer	
1 mi	TX 04066 ETM	A Houston	1st Annual Cancer Survivor's	0.0	0	E	McBrayer	
5 km	TX 04067 ETM	A Frisco	Gary Burns 5k	0.0	0	C	Clines	TX 01089 ETM
Cal	TX 04068 ETM	A Sheppard AFB	Sheppard AFB Ave F 351.508m	0.0	100	E	Miller	
5 km	TX 04069 ETM	A Sheppard AFB	Sheppard 5k	0.0	3	E	Miller	
5 km	TX 04070 ETM	A Houston	Houston Press 5k	0.0	5	E	McBrayer	TX 03072 ETM
21.0975 km	TX 04071 ETM	A Houston	Aramco Houston Half Marathon	0.0	2	E	McBrayer	TX 03073 ETM
42.195 km	TX 04072 ETM	A Houston	HP Houston Marathon	0.0	1	E	McBrayer	TX 02111 ETM
Cal	TX 04073 ETM	A San Antonio	San Antonio Ave B .25 mile	0.0	100	D	Blick	TX 90062 ETM
5 km	TX 04074 ETM	A Houston	Runway Race for Life 2004	0.0	0	R	Barnhill	TX 03063 ETM
3.5 mi	TX 04075 ETM	D Houston	JPMorgan Chase Corp Challenge	0.0	0	E	McBrayer	
5 km	TX 04076 ETM	A Rockwall	Rock & Run 5k	0.0	0	C	Clines	
5 km	TX 04077 ETM	A Jersey Village	Beat the Heat 5k Run/Walk	0.0	1	R	Barnhill	
42.195 km	TX 04078 ETM	D Waco	Miracle Match Marathon	0.0	1	K	Vierzba	
5 km	TX 04079 ETM	A Houston	Rockets Run 5k	2.0	2	R	Barnhill	
21.0975 km	TX 04080 ETM	A San Antonio	San Antonio Half Marathon	-0.3	1	D	Blick	
3.5 mi	TX 04081 ETM	A Houston	JPMorgan Chase Corp Challenge	0.0	0	E	McBrayer	TX 04075 ETM
5 km	TX 04082 ETM	A Houston	Big Red Run	0.0	4	R	Barnhill	
42.195 km	TX 04083 ETM	A Waco	Miracle Match Marathon II	0.0	1	K	Vierzba	TX 04078 ETM
30 km	TX 04084 ETM	A Sugar Land	Houstonian Lite 30k	0.0	0	E	McBrayer	TX 03105 ETM
5 km	TX 04085 ETM	A Irving	Pumpkin Dash 5k	0.0	6	M	Polanksy	TX 03093 ETM
5 km	TX 04086 ETM	A San Antonio	RAW Alamo Dome 5k	0.0	0	M	Johnson	
1 mi	VA 04022 RT	A Bethel	Schoolhouse Mile Too	2.5	14	M	Studholme	
8 km	VA 04023 RT	A Fairfax	Kit Callahans Miracle Mile 8k	0.3	1	R	Thurston	
5 km	VA 04024 RT	A Arlington	Bluemont Park 5k	0.0	0	R	Thurston	
Cal	VA 04025 RT	A Franklin	Camp Parkway 500 meters	0.0	100	E	Weston	
5 km	VA 04026 RT	A Williamsburg	Vineyards of Williamsburg 5k	0.0	1	S	Bartram	
21.0975 km	VA 04029 RT	A Fredericksburg	Blue Gray Half Marathon	0.0	3	V	Culp	
10 km	VA 04030 RT	A Fort Hunt	Fort Hunt 10k	0.4	1	R	Thurston	
12 km	VA 04030 RT	A Fort Hunt	Fort Hunt 12k	0.0	0	R	Thurston	
5 km	VA 04031 RT	A Abington	Creeper Classic 5k	0.0	0	M	Studholme	VA 97032 RT
10 km	WA 04007 BL	A Vancouver	New Heights Summer Festival	0.0	0	K	Goheen	
21.0975 km	WI 04040 JW	A Green Bay	Cell Com Green Bay H'MAR	-0.4	18	D	Moore	WI 03123 JW
21.0975 km	WI 04073 JW	A Hayward	Hayward Half Marathon	0.0	0	D	Quigley	
Cal	WI 04084 JW	A Waunakee	Moravian Valley Rd. 1000 ft.	0.0	100	M	Hensgen	
10 mi	WI 04085 JW	A Waunakee	Waunafest Run - const. Alt.	0.0	1	M	Hensgen	

DISTANCE	COURSE ID	ST/LOCATION	COURSE NAME/RACE	m/km pct		MEASURER	REPLACES
				DR	SEP		
Cal	WI 04088 JW	A Waterford	Dover Line rd. 1000 meter	0.0	100	J McFadden	
4 mi	WI 04089 JW	A Waterford	Full Moon Four Miler	0.0	6	J McFadden	
21.0975 km	WI 04100 RR	A Hudson	St. Croix	2.4	40	R Recker	
10 km	WI 04100 JW	A Green Bay	Schneider National 10 km Run	0.0	1	D Moore	WI 98016 WG
Cal	WV 04001 RT	A Huntington	HHO 385.823 meter Calibration	0.0	100	T Dannals	
42.195 km	WV 04002 RT	A Hunt	Healthy Huntington.Org Marathon	0.1	1	T Dannals	
Cal	WV 04003 RT	A Parkersburg	Sumner School 1100 ft.	0.0	100	J Corra	
21.0975 km	WV 04004 RT	A Parkersburg	Parkersburg Half Marathon	-0.3	2	J Corra	
2 mi	WV 04006 RT	A Parkersburg	Parkersburg 2 Mile Run	-1.9	11	J Corra	
5 km	WV 04007 RT	A Ranson	Jefferson Health Care Foundation	0.0	0	N Riemenschneider	WV 03017 RT
RENEWED							
42.195 km	CA 91024 CW	A02 Burney	1991 Burney Classic Marathon	0.0	95	C Wisser	
5 km	CA 91025 CW	A02 Burney	1991 Burney Classic 5km	0.0	0	C Wisser	
10 km	CA 91026 CW	A02 Burney	1991 Burney Classic10km	0.0	0	C Wisser	
21.0975 km	CA 91027 CW	A02 Burney	199 Burney Classic 1/2 Marathon	2.6	95	C Wisser	
10 km	CA 91081 RS	A02 Santa Barbara	McConnells Endurance Event	0.0	0	P Gilbert	
5 km	CA 93001 WN	V0 Carlsbad	Carlsbad 5000	0.7	7	W Nicoll	CA 86068 PR
5 km	CT 93013 DR	A02 West Hartford	Reservoir Winter 5k	-0.5	6	D Reik	
Cal	FL 90024 DL	A02 Tallahassee	Messer Field 1950 ft. Calibration	0.0	100	B McGuire	
5 km	FL 94005 DL	A02 Melbourne	Melbourne Downtown 5k	0.0	1	F Chmielewicz	
5 km	FL 94047 DL	A02 Delray Beach	City of Delray Beach A1A 5k	0.0	0	B Halford	
5 km	IL 91022 JW	A02 Tinley Park	Stars & Stripes 5k	0.5	2	J Knoedel	
3.5 mi	MA 93017 RN	A02 Boston	Chemical Bank Corp. Challenge	0.0	1	S Vaitones	
10 km	MA 94001 RN	A02 Groton	Groton Road race	-0.1	1	P Morrison	
5 mi	ME 92019 WN	A02 Portland	Peaks Island ME 5 Mile	0.8	1	D Rines	
21.0975 km	NC 92046 ACL	A02 Camp Lejune	Marine Corps Half Marathon	0.0	2	A Linnerud	
Cal	NE 91001 KU	A02 Omaha	69th Street 1000 ft.	0.0	100	G Meyer	
5 km	NY 92024 AM	A02 Buffalo	Buffalo Police Chase 5k	0.5	2	J Felix	
5 mi	NY 92031 AM	A02 Hilton	Hilton Apple Derby 5 Mile Run	-0.8	9	G Tillson	
2.3 mi	NY 95024 AM	A02 Grand Island	Dick Bessel Independence Day	-1.5	3	J Felix	
5 km	OK 93031 BB	A02 Watonga	Great Rat Race 5km (alt)	0.0	1	G Lafarlette	
10 km	OK 93032 BB	A02 Watonga	Great Rat Race 10k (alt)	0.0	0	G Lafarlette	
5 km	OK 94032 BB	A02 Perry	Pioneer Spirit 5 km Run	0.0	1	G Lafarlette	
5 km	OK 94036 BB	A02 Anadarko	American Indian Expo 5 km	0.0	3	K Hardwick	

Mike Wickiser - Course Registrar
2939 Vincent Road
Silver Lake, OH 44224-2916
Phone 330-929-1605
FAX 509-351-5383
Mikewickiser@neo.rr.com

PUBLICATIONS AVAILABLE FROM RRTC

Printed Course Lists - A list of certified courses for any state is \$2.00. (Free to RRTC certifiers). You will receive a list that is current as of the last published Measurement News. Courses can be sorted in a special way; otherwise it will be sorted by distance as it appears in MN. Other specially-sorted lists can be done - for instance, you might want to have all the 5k's in IL, IN, and MO. If you are online, lists can be sent that way. Contact Mike Wickiser at MikeWickiser@neo.rrc.com

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**, i.e: 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), in Adobe Acrobat format. 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 to 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.

Historical/Technical Material Available on CD

Measurement News Archive - Every issue of Measurement News from #1 (1982) to #115 (2002). Full of material describing

measurement techniques, technical articles, and history, written by numerous people worldwide. Set of 2 CD's in pdf (Adobe Acrobat 5.0) format. Cost \$10.00, postpaid.

Historical Archive - A collection of technical articles, measurement reports, seminars spanning the period 1963 to present. Includes detailed full reports of several group rides of Olympic Marathon courses. All on one CD in pdf format. Cost \$5.00, postpaid.

The above two items are available from:
Pete Riegel, 3354 Kirkham Road, Columbus, OH 43221
email: riegelpete@aol.com

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 - 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. Advance payment is required.

RunScore - The flagship of IBM-style finish line programs. For information contact: Alan Jones - 3717 Wildwood Dr - Endwell, NY 13760. Online at: www.runscore.com

Apple Raceberry JaM - Race management software for Macintosh and Windows. Online 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 approx. 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 USA from the above - it's a seamless street map of the whole USA at 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

Phone/fax: 330-929-1605 email: MikeWickiser@neo.rr.com

REGIONAL CERTIFIERS - CONTACT THESE PEOPLE FOR CERTIFICATION INFORMATION

	Telephone	Email address
AK - Frederic Wilson - 2420 Glenwood - Anchorage, AK 99508	907-279-2773	uphere@alaska.net
AL - John DeHaye - 824 Annlau Ave - Huntsville, AL 35802	256 881-9326	jjdehaye@yahoo.com
AR - Don Potter - 440 Lower Ridge Rd - Conway, AR 72032	501-514-4370	donp@tcworks.net
AZ - Gene Newman – 920 N. Night Heron Dr - Green Valley, AZ 85614	520-648-3353	newmangc@cox.net
CA - Ron Scardera - 5660 Valley Oak Dr - Los Angeles, CA 90068	323-467-7750	rscar@pacbell.net
CO - Dave Poppers - 5938 S Franklin St - Centennial, CO 80121	303-795-9743	dpoppers@comcast.net
CT - Paul Hronjak - 4413 Pinehurst Drive, Wilson, NC 27896	252-237-8218	hronjak@simflex.com
DC - Robert Thurston - 13 Kennedy St NE - Washington, DC 20011	202-726-1518	Thurret@aol.com
DE - Larry Baldasari – 3448 Nottingham Way – Hamilton Square, NJ 08690	609-890-8343	larsurf@aol.com
FL - Doug Loeffler - 1399 W. Royal Palm Rd - Boca Raton, FL 33486	561-391-2880	doug@rail-tech.net
GA - Woody Cornwell - 1724 Brighton Way - Dalton, GA. 30721	706-226-5207	ewcornwell@cs.com
HI - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com
IA - Michael Franke - 3824 51st St - Des Moines, IA 50310	515-276-3140	Mfranke@worldnet.att.net
ID - Len Andersen - 5243 E.Understory Ave. - Boise, ID 83716	208-340-0472	information@spondoro.com
IL - Jay Wight - 4556 Opal Drive - Hoffman Estates, IL 60195-1185	847-359-4598	Jaywight@earthlink.net
IN - Mike Wickiser – 2939 Vincent Rd – Silver Lake, OH 44224	330-929-1605	MikeWickiser@neo.rr.com
KS - Bill Glauz - 2704 W. 137th St. - Leawood, KS 66224-4529	913-402-1501	wglauz@kcnet.com
KY - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com
LA - John Ferguson - 3026 Sesbania - Austin, TX 78748-1912	512-282-4175	fergusonj@haycisid.net
MA - Ray Nelson - 49 Weber Ave. - Warwick, RI 02886	401-737-2416	ride6887@ride.ri.net
MD - John Sissala - 120 Evans St - Rockville, MD 20850	301-340-8107	jsissala@comcast.net
ME - Ron Fitzpatrick - 33 Rand Rd - Center Barnstead, NH 03225	603-776-1999	rjfitz@worldpath.net
MI - Scott Hubbard - 200 Trealout Dr #11 - Fenton, MI 48430	810-629-8963	Runningshorts@aol.com
MN - Rick Recker - 19 South 1st Street #2203 - Minneapolis, MN 55401	612-375-0805	rick_recker@hotmail.com
MO - Bill Glauz - 2704 W. 137th St. - Leawood, KS 66224-4529	913-402-1501	wglauz@kcnet.com
MS - Bob Harrison - 1736 Meadow Oak Court - Montgomery, AL 36117-6830	334-279-5517	nikon@knology.net
MT - Michael Franke - 3824 51st St - Des Moines, IA 50310	515-276-3140	Mfranke@worldnet.att.net
NC - Paul Hronjak - 4413 Pinehurst Drive, Wilson, NC 27896	252-237-8218	hronjak@simflex.com
ND - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com
NE - Karl Ungurean - 203 E. Denison - Davenport, IA 52803	563-324-2250	UngureanK@aol.com
NH - Ron Fitzpatrick - 33 Rand Rd - Center Barnstead, NH 03225	603-776-1999	rjfitz@worldpath.net
NJ - Larry Baldasari – 3448 Nottingham Way – Hamilton Square, NJ 08690	609-890-8343	larsurf@aol.com
NM - Don Shepan - 3007 Ronna Dr - Las Cruces, NM 88001	505-524-7824	Drshepan@aol.com
NV - Bill Callanan - 5209 Copper River Ave - Las Vegas, NV 89130	702-656-3741	bill_callanan@cox.net
NY - Amy Morss - 4 Laurel St - Peterborough, NH 03458	603-924-8604	amymorss@yahoo.com
OH - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com
OK - Bob Baumel - 129 Warwick Road - Ponca City, OK 74601-7424	580-765-0050	bobbau@earthlink.net
OR - Lee Barrett - 3027 NE 20th Ave - Portland, OR 97212	503-284-2809	cudapdx@comcast.net
PA - Bill Belleville - 2902 Morris Road - Ardmore, PA 19003	610-649-4278	Wjbellevil@aol.com
RI - Ray Nelson - 49 Weber Ave. - Warwick, RI 02886	401-737-2416	ride6887@ride.ri.net
SC - Brian N. Smith - 1465 Winton Rd - Mount Pleasant, SC 29464-3921	843 881 5566	clocker@charleston.net
SD - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com
TN - Dave Rogers - 275 Grandview Ct - Kingsport, TN 37664	423-323-0501	dave_carla@chartern.net
TX - E. T. McBrayer - 4021 Montrose - Houston, TX 77006-4956	713-523-5679	mametm@sbcglobal.net
UT - Dave Poppers - 5938 S Franklin St - Centennial, CO 80121	303-795-9743	dpoppers@comcast.net
VA - Robert Thurston - 13 Kennedy St NE - Washington, DC 20011	202-726-1518	Thurret@aol.com
VT - Ron Fitzpatrick - 33 Rand Rd - Center Barnstead, NH 03225	603-776-1999	rjfitz@worldpath.net
WA - Bob Langenbach – 4261 South 184th St – SeaTac, WA 98188	206-433-8868	boblang@wolfenet.com
WI - Jay Wight - 4556 Opal Drive - Hoffman Estates, IL 60195-1185	847-359-4598	Jaywight@earthlink.net
WV - Robert Thurston - 13 Kennedy St NE - Washington, DC 20011	202-726-1518	Thurret@aol.com
WY - Tom Knight - 307 Dartmouth Ave - San Carlos, CA 94070	650-594-9406	Tdk@stanford.edu
PUR Pedro Zapata - PO Box 2780 - Carolina, Puerto Rico 00984-2780	787-767-9191	pzapata@puentetmoscoso.com
FOREIGN - Peter Riegel - 3354 Kirkham Rd - Columbus, OH 43221-1368	614-451-5617	Riegelpete@aol.com

CERTIFIERS - Please check this listing to be sure we have your data correct.

November 7, 2004