



CC timing & results requirements for sanctioned USSA and FIS competitions in the United States

Original by John Aalberg and Ernie Page in 2004
Updated by John Farra in 2009

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Overview

The following document will specify the timing & results requirements for US Ski and Snowboard Association (USSA) and International Ski Federation (FIS) sanctioned competitions in Cross-Country skiing within the United States. The specific requirements will be divided into two main categories according to the USSA Event Certification Pipeline, namely regional events (level 2) and national (including FIS) events (level 3).

The document will not cover USSA sanctioned club events (level 1), which should at least require a print-stopwatch, a regular stop watch as backup, finish order recorders and simple spreadsheet results. International FIS events (level 4) normally have a separate FIS document detailing its requirements and are often accompanied as a part of the event contract.

This document will reference USSA or FIS International Competition Rules (FIS ICR) where applicable, include a list of required and recommended equipment and procedures, give technical specifications where needed, as well as suggest solutions for organization, layout and setup of timing & results services.

The goal of this document is to assist organizers of regional and national USSA and FIS events in obtaining or providing timely and accurate timing and results services that meet the requirements of USSA and FIS. This goal has become more important with the inception of the national and international points ranking system, which are based on points calculated from each skier's individual race time.

Update Summer 2009

- Seed lists must have USSA & FIS #'s on them for athletes & coaches to review
- Timers are encouraged to discuss OC's all responsibilities that are included in "timing" of an event. Contracts may include that full payment may be withheld until all aspects of "timing" and submission of the results to USSA in the appropriate format is completed.
- Software must be able to utilize the latest USSA points lists upon making entries for USSA scored races. This ensures the most current data.
- Software must be able to utilize the latest FIS points lists (and USSA points lists) upon making entries for any FIS scored races. This ensures the most current data.
- When creating start lists and entering athletes for FIS level races – if you must choose from one list at a time, pick USSA data first, then check for FIS members secondly (USSA points list will list FIS #'s of US athletes, but not foreign members, even if they have a USSA license, as they generally must register via their home nation).
- Using the most current points lists to create start lists means the most critical data (license #'s, name spellings, birth dates, etc) will be less likely to have errors. (manual entry of critical data opens up chances for error)
- The challenge here will be affiliation, but this is not critical data and can be added manually by the timer or race secretary.
- Manual entry is possible for all those not on the USSA or FIS lists, but please do not manually enter a FIS # or USSA # without confirming on the USSA/FIS websites (this is a burden no longer required of OC or timers). See next point.
- **NEW USSA RULE:** if someone is not on the most recent USSA or FIS points list they may not be scored. (This removes the burden to "look up" someone who does not show up on the most current USSA or FIS lists. If OC or timer chooses to do this, they are taking a risk.... please be extra cautious to enter the correct data, as this is when errors occur by adding a wrong #, or adding the # of a person with the same name, **when in doubt, do not manually enter someone's USSA or FIS #'s**).
- If multiple spreadsheets are used to create entries; one from race secretary with entries, FIS list, and USSA lists for instance... some method to auto check for duplicates via birthdates, last name spelling, gender, FIS & USSA #'s etc., is necessary.
- Submit results immediately following the conclusion of the events in preferred .xml format or on the USSA submission template with all critical columns filled in, all header info and penalty calculations completed (use of .xml format needs to be approved by Alice Anderson in advance). The event is not complete until the proper results are forwarded to USSA in the template or in XML format for those who have proven they can produce flawless XML results.

- In addition to submission of results, timer must send in a pdf of USSA results and a pdf of FIS results (FIS results may include only FIS licensed competitors of course).
- Results must be received within 3 days after the race or processing delays may occur.
- USSA will send a group entry template to all USSA coaches that can be updated in the fall with each Teams/Clubs athletes, checking that spelling, license #'s etc are correct when sending in to the race secretaries. This entry template can be used and updated throughout the season hopefully improving the accuracy of information that race secretaries receive on the front end.

Registration

Athletes' entries and registration has in the past normally been done by the event's Race Secretary through paper-forms (forms through postal mail or by fax). However, today's Internet capabilities make it fairly easy to do registration electronically. In either case, the important components of registration are similar – sufficient and complete athlete information as well as compatibility with the electronic timing system software.

The timing and results provider should be able to include the following fields of information in their software registration system:

Registration Information:

Information

First Name
Last Name
Full Name
Bib Number

Age/Sex/Class Information:

Gender
Birth Date
Birth Year
Age for this Race
Class
Sub-Class

USSA/FIS Information:

USSA Number (with region letter)
USSA Points
FIS Number
FIS Points

Personal Information:

Address
City
State
Country
Zip
Phone Number
Email Address

Affiliation Information:

Region (two letters)
Division
Club
Team
School
College
Affiliation

Relay Team Information:

Relay Team Name

Relay Leg

Start Information:

Start Wave Number
Seed Group
Start Order Field
Scheduled Start Time

Miscellaneous Information:

Handicap Field
Non-Scorer
Event Entered
Racer Bio Information
Comment Field

Registration Notes

- 1) Need first name and last name in two separate columns.
- 2) Need either class for each racer, or gender and birth date to calculate class. I strongly prefer having the computer calculate class based on gender and birth date. Can use birth year instead of birth date. Can also use age for this race instead of birth date.

Use birth date for several reasons:

- 1) Many entry forms have a space for age, but no mention of "age as of this date". Rather than adding a discussion of the issue, and having to deal with entry errors because racers did not read and understand, why not just ask for birth date and let the computer calculate the class?
- 2) The birth-date for an individual never changes, whereas age changes every year (or so) Everyone knows his or her birth-date without hesitation.
- 3) Different governing bodies have different "age as of" dates. USSA specifies age as of 12/31 whereas USBA (biathlon) specifies age as 11/1. Informal races may want to use the age on race day. If birth date is entered into the registration database, the same database can be used for different sports.
- 4) If there are duplications in the registration database (eg Bill Smith and William Smith) birth date can be used to resolve the issue. Birth-date is 365 times more specific than birth year or age.
- 5) If you have to look up a FIS or USSA number from another database, it is very useful to have the birth date, to make sure that you are looking up the data for the right athlete.

Equipment

The following equipment is required for proper timing services. The Event Organizer and the Timing Company/Provider being contracted must agree on who provides the equipment listed below.

Equipment	Required for regional events	Required for National events	Who provides (Timing Provider or Organizer)
Primary timer system - with battery backup	X	X	Timing Company
Backup timer system (electronic or manual)	X	X	Either
Electronic start wand	X *	X	Either
Electronic finish eye	X *	X	Either
Second set of electronic finish eye		X	Either
Push-button for start		X	Either
Push- button for finish		X	Either
communication between start, pre-finish, finish and timing room		X	Either
Push-button for intermediate timing/lapping		X	Either
Start clock w/audio	X	X	Either
Stadium clock with time of day		X	Organizer
Electronic display for finish times - minimum: bib number, rank and athlete time		X	Either
Primary result system PC incl. printer	X	X	Timing Company
Backup result system PC incl. printer		X	Timing Company
“photo-finish” camera (with trained operator)		X	Either
Video Camera capable of 30 frames/sec with frame by frame advance	X	X	Either
Software for generation of start list (draw)	X	X	Timing Company
“Live” announcer information system monitor		X	Timing Company
Cables, wiring and connections from timing room to all equipment	X	X	Organizer (to within 30 ft of equipment)
Uninterrupted power supply (UPS)		X	Organizer
Power to equipment	X	X	Organizer
Internet posting of results - maximum 1 hr after end of race	X	X	Timing Company

*interval start only

The primary timing and results systems and accompanying software may be proprietary or one of the standard timing and results software packages available. The system must be able to handle or provide

- start intervals from 15 to 30 seconds
- accept that skiers start (+-) 3 seconds before or after their official start time
- finish times in 1/10 second (1/100 for Sprint competitions)
- no manual input of start or finish times when calculating results
- automatic update and display to announcer monitor and display board (National level events)
- be able to print interim results during the event (for example for a class that is still racing)

With today’s advanced Internet software and capabilities, it should be the goal of any organizer to provide and post results on the Internet “live”, or at least within minutes of when results are posted at the competition site. Posting PDF files (Adobe Version 3 files recommended) will enable color and graphics, however it is also advisable to post formats that can be downloaded fast and formatted by the recipient if required (i.e. text files, Excel or HTML files)

Operators and Volunteers

In principle, the Timing Provider should provide individuals that are trained in operating critical equipment and timing and results software, for example any PC interface (primary timing software operation and entries, primary results system). If the Timing Provider provides any peripheral equipment (push-button, start-wand etc), he should also be required to train the Organizer's volunteers in operating the equipment. See below for detailed descriptions of a typical Timing organization and tasks.

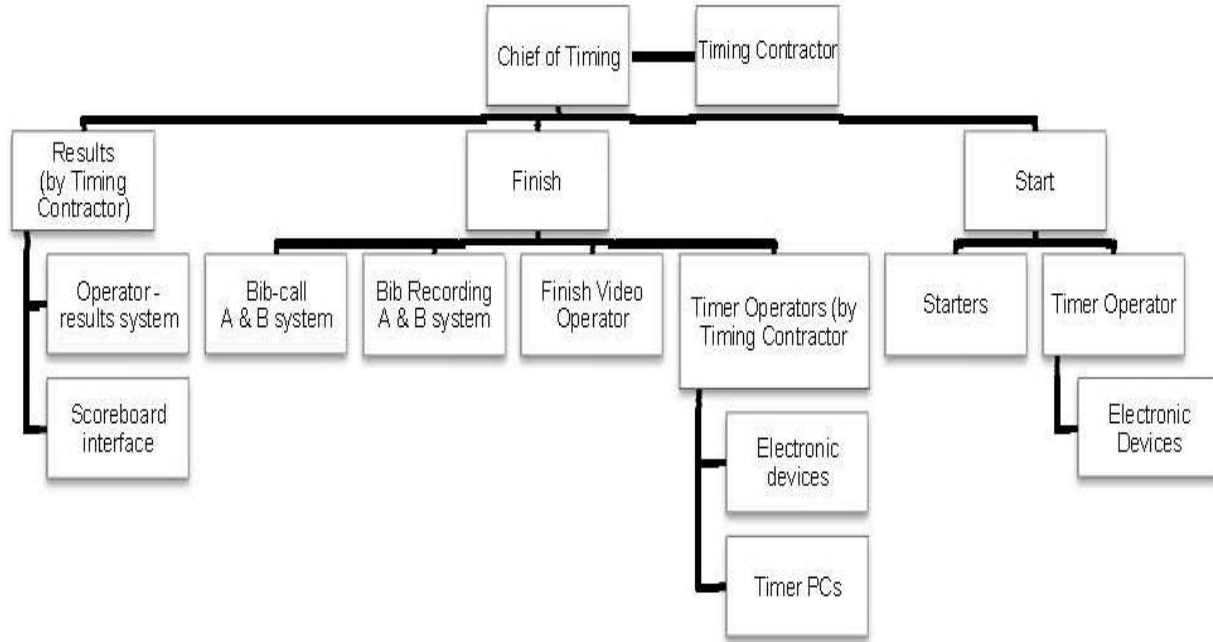
Stadium setup for timing

The primary location for the timing system operation is in a heated room adjacent to the finish line, optimally with a clear view of the finish line and the last 50 – 100 m of the track. It is also very advantageous if a view to the start is possible from this location. All cabling from start (start-wand, plunger, and audio headset), pre-finish (pre-call headset) and finish (electronic eye, plunger, and A&B audio headsets) equipment should terminate in this room. This room should provide power, space and connections for the required printers and the phone line with internet access.

The peripheral equipment, such as start wand and finish eye should be installed as required by the USSA and FIS rules (see FIS ICR rule 353.1.2).

Typical Organization of Timing Services

A typical regional or national event's timing and results function may be divided up in the following tasks - start, finish and results (see chart below).



Start

The starter and assistant starter must focus on making sure that each athlete starts according to the start list. It is recommended to use an electronic device to capture each skier's exact start time (start wand or plunger).

Finish

The timing finish team consists of

- one or more two-person teams of bib call and bib recorders
- one or more two-person teams of lane recorders (mass-start races)
- one or more persons operating electronic devices (plungers etc)
- one or more persons operating the timer system (entering bib order of finish, etc)
- one or more persons operating finish video cameras

It is recommended that the information from the bib call/bib/lane recorder teams are checked against the electronic timing and result system several times during the event, and especially before the results are printed.

For Mass-start & sprint races, the finish video cameras should be of as high quality, high speed (30 frames/sec with frame by frame advance). They should be positioned for front and side view.

Results

The result software system must be able to take all data input from the start and finish and perform all required operations. This system usually also drives the scoreboard/display board, and the commentator information system monitor (when used).

Results and other printed documents

The timing and results provider must be able to supply the following documents:

Document	Regional event	National event
Alphabetical list of registered athletes	X	X
Division/district roster (when applicable)		X
Seeding groups (when applicable)		X
Start list	X	X
Unofficial results	X	X
Official results	X	X
Results by class (or age)		X
Results by distance		X
Awards list (top 3 or more per class)		X

The unofficial and official results must be printed according to USSA and FIS requirements (see FIS ICR rule 355.1.2, as well as examples included below). Enclosed are examples of results-formats for the following events:

- Individual competition without intermediate times
- Individual competition with intermediate times
- Pursuit competition
- Mass-start competition
- Relay competitions
- Sprint heat competitions

Technical result requirements

In addition to accuracy, fast and timely results are the most important factor of good result services. Unofficial result should be printed and posted immediately (within 5 minutes) after the class' last competitor has finished. This would be obtainable as long as preliminary results are verified and checked intermittently during the race (by being able to print results while the race is in progress).

Results become official after the protest period expires, with the Jury approval. Official results should be printed and posted asap after the protest period has expired (see FIS ICR 355.1.1). The Jury reviews the official results before they are posted.

Team Captains' (Coaches) Meeting support

The Timing Company (timing & results supplier) must provide the draw software for generation of start lists at the Team Captains' Meeting. The draw program must be designed to do a double random draw as per the USSA and FIS rules (see FIS ICR rule 336.3). Before the meeting, all required documents, such as a list of registered athletes, affiliation, and seeded group lists must be printed and provided to the Team Captains (ideally the seed list will be posted online well in advance of the meeting so coaches can review important information before the coaches meeting). Any changes to these lists must be input immediately, and before the draw program can create the start lists. The Timing Company must therefore be set up with a PC and printer system at the meeting. It is up to the Organizer to provide copying capabilities at the location for distribution of start lists to all team leaders.

Quality Assurance Procedures

From experience it has been determined that the organizer of high level USSA events must provide a separate person, called "Chief of Timing", that oversees the services of the actual Timing Company. The main job of the "Chief of Timing" is to perform quality assurance, and guarantee that the timing & results products meet the requirements of this document and the USSA/FIS rules (see FIS ICR rule 302.3.4). It is strongly discouraged that the person providing the practical and physical timing services also acts as the person signing off on the quality of the final (results) product.

Some of the elements that must be checked during the timing & results process are:

General Issues

Check header, name and distance of competition on all documents

Registration Issues

- Look for invalid classes and class typos
- Look for duplicate bibs in entries
- Look for bib numbers out of range (ie if club has 1-200, and someone is entered with bib 527).
- Correct USSA and FIS license and membership numbers for all athletes
- Look for gaps in the bib order.

Timing Issues

- Read off bib order of finish sheets after the race has completed
- Look for duplicate bibs at start
- Look for duplicate bibs at finish
- Check for any bibs not in the entries list. This may be caused by a registration problem, or a wrong bib number written down.
- Check photo finishes or close finishes. It may be necessary to adjust times to a tie plus a tenth. Plunger cannot go fast enough to accurately record the time difference between two skiers who finish nearly simultaneously.

Interval Start Timing Issues

- For interval start races, must look at missing photo beam impulses. Make sure that these do not affect place.
- Review start list. Review start times for first racer and last racer in each class. Make sure that there are no overlaps and no gaps (unless gaps are desired).

Results Issues

- Correct alignment and fields on results
- Print results report with start times, and times behind. Do a sanity check on starts and finishes. Check the first and last in each class.

- Check time behind for second place finisher in each class. Unusually large time difference between first and second might indicate a problem. Perhaps someone is in the wrong class, or perhaps someone started in the wrong wave.
- Check time behind for last place finisher in each class compared to the next to the last place finisher in every class. An unusually large difference might indicate a problem.
- Verify number of entries.
- Verify number of starters.
- Verify number of finishers.
- Look for any racers that did not start (ie DNS)
- Look for any starters that did not finish (ie DNF)
- Look for any finish bibs that did not start (this could be caused by writing down the wrong bib at the finish, or perhaps someone was handed the wrong bib at registration).
- Verify that DNS, DNF, DSQ racers are properly shown in results.
- Verify that the last finisher shows up in the results. Perhaps timers stopped collecting data before last finisher crossed the line. Perhaps last racer was not totally processed.
- Examine Ties very closely. For pursuit and sprint races, this affects bib assignments for the next race. Check order in results. Various governing bodies have rules regarding who should be listed first in results in case of a tie.

USSA/FIS Points Races

- Check FIS header information:
 - Correct header, name and distance of competition on all documents
 - Correct format and names of Jury Members
 - Correct technical information in header (TC, HD and MC)
- Check Codex for men and women.
- Check F-Value (800 for individual start, 1200 for sprints, 1400 for mass starts & Pursuit no break)
- Check FIS discipline and category.
- Double check minimum penalties
- Check that points list is the most current.
- Double check penalty points calculations for FIS and USSA. Make sure top 5 all have FIS points and USSA points from list otherwise it messes up penalty points calculations.
- In FIS race, all skiers without an active FIS license must be removed from the results, including those in the top 5 of the results for penalty calculation.

Sprints:

- Double check that timers are configured for 0.01 second resolution. Verify that all timing and results software is configured for 0.01-second resolution.
- For sprint heats, check that bib order of finish from timing software agrees with official bib order of finish for each heat.

Pursuit Races:

- Make sure start times are truncated properly.
- Make sure total times are added properly.
- Check wave starts.
- Check start lists. How many lanes?

Other Quality Assurance Tasks:

- Correct pursuit competition calculations (reference USSA/FIS rules)
- Set computer time and check for proper time zone

USSA and FIS points calculations

Penalty Calculation for FIS competitions

The race penalty is calculated by adding the three best values of the top five finishers discipline FIS points and dividing by 3.75. If any of the best five competitors are without an active FIS license then they must be removed from the penalty calculations (as they are not considered to have been in the race). If any of the best 5 competitors are on the current FIS points list without points (ie. 999) they will be given 160 points for the purpose of calculations. Do NOT use USSA points as a substitute for FIS points for any athlete. Please make sure the latest FIS point list is used for the calculations (provided by USSA or downloaded from FIS web site).

Penalty Calculation for USSA competitions

The race penalty is calculated by adding the three best values of the top five finishers overall USSA points and dividing by 3.75. The result is rounded to two decimal points. For the purpose of calculation, any U.S. competitors in the top five without USSA points, or a current USSA competitor membership, will receive 200 points for men or 250 points for women. If a foreign competitor is in the top five their active FIS points, in discipline, will be used. If they have no FIS points, 160 points will be used for the purpose of calculation. If two or more competitors in the top five are tied, the athletes with the best current available points will be used in the calculation of the penalty. If the calculated penalty is higher than the minimum penalty for the race, the calculated penalty is applied. If not, the minimum penalty is applied. Please make sure the latest USSA point's list is used for the calculations.

Point Calculation

The following formula is used to calculate **race points** for all FIS and USSA NRL races:

$$P = ((Tx - To) / To) \times F \quad \text{or} \quad P = ((Tx / To) - 1) \times F$$

P = Race Points

To = Time of winner in seconds (including tenths of seconds)

Tx = Time of the classified competitor in seconds (including tenths of seconds)

F = The F-Value

The F-value is assigned as follows:

Mass Start Competitions	1400
Pursuit (pursuit w/no break)	1400
Old Pursuit (pursuit w/ break)	1200
Sprint Competitions	1200
Interval start Competitions	800

The **final FIS or NRL points** are calculated by adding the Race Penalty to the Race Points for each competitor. This point value should be included in the final results.

Please look up the minimum penalties as noted in the Cross-Country Rankings section of the USSA Competition Guide, which should be used **ONLY** if the calculated race penalty is lower than the minimum penalty set for these specific competitions.

SPECIAL NOTE: If any junior classes are skiing the same distance as the senior classes, and under similar conditions, the penalty and race calculations for the junior classes should use the values from the senior class (i.e. as if they were skiing in the same race). This would also include using a junior skier in the calculation of penalty if the junior skier is in the top-5 overall.

Timing & Results provider's Contract - examples

For US Championships and many other large USSA/FIS events, it is normal that the timing & results services are contracted. This document should be used to create a "Timing & results services Contract" for an Organizer. In addition to the below suggested requirements, elements of this contract may also include:

- Airfare
- Auto rental
- Housing
- Meal allowance

Examples of elements of Timing Contracts

Basic Race - \$......

Mass start or wave start

Up to 300 racers

Results posted to Internet same day

Color logo on results

All necessary equipment provided by timing contractor

Volunteers provided by race organizer

Racers are entered into spreadsheet/database by race organizer or race secretary

Finish times only, no intermediate times

Standard reports only, no custom reports

Race duration less than 3 hours

Race within 1 hour of travel

Professional person for registration, timing, results, and supervision

Attractive Printed Results

Time Estimate for Basic race:

Planning discussions with race organizer

1.0 hour

Logo

0.5 hours

Packing and testing equipment

2.0 hours

On site setup

1.5 hours

Race

2.0 hours

Results

0.5 hours

Fixing registration errors

0.5 hours

Posting internet results

0.5 hours

Unpacking

1.0 hour

Travel

1.0 hours

Total Time

10.5 hours

Optional Registration, Timing, and Results Services:

The following options raise the cost from the basic race. The price of each additional service needs to be negotiated.

- Racer registration (\$1.00 per racer)
- Design of website for registration
- Large number of racers (greater than 300)
- Additional paid timing personnel (required for extra reliability, for complex races, for large fields, or for illness insurance)
- Unusual race formats requiring custom software
- Custom reports
- Races that last all day (or longer)
- "Real Time" internet updating during the race
- Scoreboard support
- Announcer support
- Interval start (using start wand)
- Photo beam for finish
- Relay races
- Intermediate times (ie split times)
- Team Points calculations (for team races)
- USSA/FIS points calculations
- Points calculation other than FIS or USSA
- Travel Costs (travel time, travel costs, lodging costs, meal costs)
- Web Cam
- Photos posted in "real time"
- Photo finish video cameras
- Video camera(s) required for finish order
- Custom web site for results

Typical USSA/FIS Race - \$.

- Wave start race, or interval start race with start wand and photo beam
- Up to 200 racer
- Attendance at planning meetings if necessary
- Attendance at team captains or coaches meeting if necessary
- Random draw software for assigning start order, for assigning bibs, and for assigning start times based on seed groups
- Attractive start lists with color logos
- Attractive results with color logos
- USSA/FIS points calculations
- Team points calculations (for team races)
- "Real Time" internet updating during the race if phone service is available
- Official results posted to internet within 2 hours if phone service is available
- Scoreboard if available
- Announcer support
- Racers are entered into a spreadsheet by race organizer/race secretary
- Intermediate times as racers pass through stadium
- Standard reports only, no custom reports
- Volunteers provided by race organizer
- All necessary equipment provided by timing contractor
- Race duration less than 3 hours
- Race within 1 hour of travel

The Timing Contractor Will Provide the Following:

(unless clearly specified in timing contract)

Necessary computer(s), for timing, results, and backup
Printer(s) for results
Electronic timers for primary timing and for backup timing
All necessary wiring for primary timing and for backup timing

The Timing Contractor May Also Provide the Following:

Digital video cameras
Start wand
Finish photo beam
Start clock with audible tone (for interval start race)
Radios, cell phones, or headsets, for communicating with timing crew
Uninterruptible power supply (UPS) and/or battery backup

The Timing Contractor Will Perform the Following Tasks:

(unless clearly specified in the timing contract)

Adhere to all governing body rules (unless agreed upon with race director)
Generate printed results in a timely manner
Post results to internet in attractive format (PDF, HTML, Excel, or text) the same day, or within 1 hour if phone service is available at the venue.
Send results to newspaper

The Timing Contractor May Perform the Following Tasks:

(if clearly specified in timing contract)

Attend planning meetings (if necessary)
Attend coaches/captains meeting (if necessary)
Perform random draw for assigning start order, for assigning bibs, and for assigning start times based on seed groups (if required)
Prepare start lists with bib numbers and start times
Post start lists to the internet in attractive format (PDF, HTML, Excel, or text)
Acquire intermediate times
Provide announcer support
Drive scoreboard
Perform USSA/FIS points calculations
Perform team points calculations (for team races)
Submission of USSA & FIS results in approved format
Update Internet in "real time" during the race

Note: Relay races, sprint races, and pursuit races have special requirements that must be negotiated.

The Timing Contractor Will Not Perform the Following Tasks:

(unless clearly specified in timing contract)

Generate copies of results for all teams and/or competitors
Post photographs to the internet
Design and construct a custom website
Generate custom reports
Enter racers into registration database or spreadsheet

The Race Organizer Will Provide the Following Items

(unless clearly specified in timing contract)

Early disclosure of "house rules", so there are no surprises on race day. Non-standard practices include dual starts, using assigned start times, handicapping etc.

Early disclosure of ALL report requirements (including logo requirements), so there are no surprises on race day.

A list of class definitions and rules

Enough volunteers necessary to perform all routine timing tasks

Bibs

Bibs need to be **readable** from the front.

All bibs must have **unique** numbers (unless negotiated with timing contractor)

If there are any **missing bibs**, this needs to be communicated to the timing contractor well ahead of time.

Computer for announcer (if required)

Scoreboard (if required)

Time of day clock (if required)

Warm, dry facility for timing, preferably close to the finish area

Power (negotiable)

Internet connection for updating (if required)

Photo finish video camera(s) (if required)

Logos for results in high quality format (if required)

Copy machine (if required)

Fax machine (if required)

Backup printer (with print drivers if required)

Newspaper email addresses and fax numbers for results

Website details for posting of start lists and results

Weather information (if required for results)

FIS codex, and USSA race code

Technical Delegate Information (USSA Number, etc)

Result header information (race name, race location)

Names of sponsors (for scoreboard, and for internet)

Names of people to thank (for scoreboard and for results)

Bio information for racers for scoreboard and announcer (if available)

The Race Organizer Will Perform the Following Tasks:

(unless clearly specified in timing contract)

Entering all racers into a registration database or spreadsheet

Providing **complete and accurate** USSA numbers and FIS numbers for **all racers by the start of race** (if required)

Stadium layout, including the start and finish areas

Setting the course, and for adequately marking the course

Web site design and construction

Keys to Successful Race Timing

General Tips

- Warn the crew about thinking too much. Sometimes thinking too much can lead to errors.
- Encourage the crew to ask questions.
- Ask questions. Tell us your mistakes before we CATCH YOU.
- When in doubt, capture the data. This is especially true for those with plungers. It is very easy to eliminate data, but it is quite difficult to generate accurate data from nothing.
- Everyone on the team should work at 65% of capacity. This way, everyone is able to maintain focus, without being overloaded.
- Find the right job for each person; everybody has a different strength. Keep in mind that some people are better with proofreading (i.e. results) than others.
- Be sure to assign important tasks to more than one person. If one person is performing a crucial task, make sure that you assign a second person to perform the same task. However, there is no need to assign seven people to the same task. That's just a waste of manpower. This "Intelligent Redundancy" will help protect your data, and provide you with a potential backup. For example, if someone were to sneeze at the exact moment they needed to trigger the plunger, you wouldn't have to stress, because you would have assigned that task to an additional person.

Nobody turns off the timer without permission from the Chief of Timing!!!!

A few days before the race

Test, Practice, Test, Practice!!!

Have a port that something *should not* be plugged into? Tape over the port. This won't prevent something from being plugged in, but it will serve as a reminder that *nothing should be inserted!!!!*

Make sure your bibs are useful for the race! They should be:

- In good condition
- A good size. Keep in mind the distance that you will have to be reading these from.
- In some type of order that would make distribution easy (e.g. numerical)
- No duplicates!

Double Check that you have extra's of the following items:

- Printer paper
- Batteries

Make it a goal to set up the race the night before it takes place. One option is to hook up all of the equipment, and don't change it afterwards.

Try to get all possible typing and setup (filenames, paths, directories, etc) done the night before the race. This way, during the race, you will only have to click your mouse button. You don't want to be worrying about typing a filename incorrectly...or having fumbly fingers..

The recorder will need a RED pen.

Several times race results have been delayed excessively, only because of a slow printer. That is because you want to print bib order of finish for checking, and then sometimes you need to print several results reports.

*****Race Day! (BEFORE Race starts, though)*****

Set up early, and test the equipment before the race starts.

Set your wristwatch to the Atomic Clock (why not, it is fun).

Synchronize your computer to your wristwatch (which has been synchronized to the Atomic Clock, right?)

Do not leave any critical task to memory. For example, if the photo beam gets turned off before the race, don't assume that you will remember to turn the photo beam back on. There is a huge risk that you will forget!!!

No changing hardware during a race!

You don't want to switch a plunger during an event. It is worth the money to buy an extra. One time, someone forgot to switch the plunger from Channel One (i.e. the start time), to Channel Two (i.e. the finish time). So, when the racers crossed the finish line, the time they finished would have been recorded as a Start time! Luckily, this was caught *before* the racers approached the finish line.

****During the Race****

Post the first finisher, and the last finisher.

- It is *extremely* embarrassing to miss the first finisher - keep your eyes open!

Check the first few starters AND finishers. Make sure that the start/finish times captured by the computer are correct. Finding the errors sooner (i.e. the start time), rather than later (i.e. the finish times), is so much better!

You can use finish timing crew for starts, but only IF starts and Finishes are NOT happening at the same time!!!!

When in doubt, capture the data. This is especially true for those with plungers. It is very easy to eliminate data, but it is quite difficult to generate accurate data from nothing.

*****After the Race*****

It is *strongly* recommended to back up files in the directory immediately after race, especially if more than one race will be run within same day.

Double Check the first and last finisher to make sure that their times are in the results.

Check A, B, C Times (both start and finish) against results.

Communicate any mistakes to the Chief of Timing.

Not everyone is cut out for every job, so one key to successful crew performance is to find the best job for each person.