Functional Specification of the United States Masters Swimming Registration, Meet Management and Top Ten Software Project

USMS *Ad Hoc* Computerization Committee

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I Introduction

United States Masters Swimming (USMS) is an organization of approximately 27,000 swimmers who are joined together by a common desire to use swimming as a means to maintain conditioning. These swimmers register through a local registrar and compete in local and national swim meets. The local registrar sends information concerning each registered swimmer to the national registrar who compiles the national information for various purposes. The results of the local and national meets are also collected at the local level and reported annually for each venue to a national recorder for the purpose of compiling national "Top Ten" lists for each event in each age group. The purpose of this project is to provide the local officials with software which can assist them in doing the various jobs in a more efficient manner and to allow the national offices to improve accuracy and efficiency from the efficiencies introduced at the local level. While it is the intention of USMS to provide these programs to the local committees, it should be noted that it is not the intention of USMS to force any of these local committees to use any part of this system. It is, however, hoped that this system will be of sufficient utility that a majority of the local committees will use the system.

I.A Purpose of This Document

This document is meant to define the scope and functions of a software project sponsored by USMS whose purpose is to produce one or more programs to ease the job of the local volunteers. These jobs include registration, meet management, and Top Ten reporting.

I.B Organization of this Document

This document is organized is several sections. The contents of these sections is outlined below.

1. Section I (this section) contains the introduction and discusses the document.
2. Section II provides an overview of the software project as a whole. It includes a discussion of the justification of this project as well as the intended hardware and underlying software to be used in this project.
3. Section III details the functions of the registration program.
4. Section IV provides the details of a meet management program.
5. Section V discusses the details of a Top Ten reporting program.
6. Section VI briefly describes the documentation to be provided to USMS.
7. Section VII briefly details certain property issues related to this project.

II Overview

II.A Current Practices

USMS is a national organization of over 27,000 registered swimmers in over 50 local masters swim committees (LMSC). Each LMSC is responsible for registering teams within its geographic area. It is also responsible for registering all of the members of each of these teams as well as any unattached swimmers who wish to affiliate with USMS. Each swimmer receives a membership card, good for the current year, which bears the swimmers unique registration number. The LMSC registrar must then report the assigned registration number along with the pertinent biographical data to the national registrar. Currently this process is being performed with varying degrees of automation. These range from those who do the process entirely by hand to those who have relatively sophisticated computer programs to organize the data. The national registrar is computerized. The data is currently sent to the national registrar in a printed form and not electronically. No single registration program is used by more than a couple of LMSC's and therefore data transfer is difficult at best.

Organizations within the boundary of an LMSC will, from time to time, sponsor a swim meet. These meets gather swimmers from both within and without the LMSC. Swimmers compete within age groups (19-24, 25-29, and so forth in 5 year age groups up to 90 and over) in individual events as well as in relays. For each age group, up to 18 official individual events can be contested during a meet. Additionally, up to 10 official relays can be held. Certain meets may also include other "novice" or "fun" events. The conduct of these meets varies from one LMSC to another. Some LMSC's pre-seed the meet while others deck-seed the meet. Still others will pre-seed certain events and deck-seed others. USMS has a prescribed format for the reporting of meet results. Again, the various LMSC's range, as mentioned above, in their sophistication in accomplishing this task.

At the completion of each venue (currently three each year), the LMSC Top Ten chairman is responsible for reporting the top ten times recorded within his LMSC to the national Top Ten Chairman for the purpose of compiling the national list. The methods used to collect this list range from keeping a deck of index cards, to using a word processor to keep a list through maintaining a database using a DBMS. For a large LMSC, even using a DBMS while hand entering the data from individual meets can be a very time consuming task and one that is prone to errors.

This project is intended to produce software which will assist those local volunteers who take advantage of the software in doing their job. It will also decrease the work load of the national registrar and Top Ten recorder which should assist in containing costs in those areas. The final product of this project will be a series of programs which will hopefully be usable by even those who have never used computers. While the software will be based upon a database management system, the

user will interact with the program via menus and prompts. The user will not have to learn any database management system commands nor will he or she even have to know what one is.

II.B Justification of this Project

The reasons for undertaking this project are many and are derived from the needs of both the national and local operations. At the national level functions as important as registration of members and recording of national lists should be done as efficiently and accurately as humanly possible. With the availability of substantial computing power at prices affordable to either the organization or its employees, computerization of these operations is the method of choice for both of these functions. Additionally, it is in the interest of USMS to maintain control of these functions by owning its own software to perform these functions. This is true for several reasons. The first is that it allows the organization to change registrar without disruption. Since the organization owns the program, the data from the old registrar will be available to the new registrar. There are many different scenarios which would require the use of a second or new registrar. Ultimately, though, the organization should not suffer major interruption should the registrar change under normal or emergency circumstances. A second reason is related to the first in that having the data in a format which is readable by a USMS owned program allows the corporation to require the registrar to send backup copies of the database to a second site so that the data is secure should the primary data be lost (ie. fire, tornado, or other natural or unnatural disaster). A third reason for undertaking this project is to maintain control of the cost of registration. If USMS maintains the program used for registration, for example, then that is a cost for which the registrar cannot charge USMS. Also, if this system is used by many of the LMSC's, most of the work will be done automatically which in turn will give USMS a better bargaining position in contracting with the registrar. (The above discussion has, basically ignored the job of Top Ten recorder when the topic involved finances since the position is currently volunteer. However, most of the arguments still apply except the financial aspects would be replaced by the likelihood of finding and retaining a volunteer.)

At the local level, there are many LMSC's which have requested help in simplifying and therefore easing the burden of their volunteers. The survey conducted for this project and one previously undertaken has shown that while many LMSC's have computerized some of their functions, most are not taking full advantage of what is possible. Most respondents indicated that they would use the programs discussed in this proposal. The reasons for their abandoning what they currently have are varied and some of them as obscure. Some which come to mind include the fact that many of these programs are associated with a single person and using the program means involving that person in the particular function which is not always

possible. Others have developed programs on computers owned by their employers. This is a tenuous situation at best as it is dependent upon continued employment and also falls under the previous category of the program being associated with a single person. Many LMSC's have computerized their registration and slightly fewer have done so in some sort of meet management area. Considerably fewer have, however, done so in the area of Top Ten reporting. (Those respondents which indicated that they use a word processor to maintain their lists were not considered to be computerized.) Thus there is a considerable need among the LMSC's for assistance. By developing a series of programs at the national level, the cost can be born by the organization as a whole and not a similar cost born many times by the individual LMSC's

An additional area of justification for this project is the synergism of the availability of USMS sponsored programs at both the national and local levels. If the programs available to both of these organizations were correctly designed and implemented, then the reporting of information by the local organization and the maintenance of that information at the national level should be more efficient and accurate. This project is designed to allow one to conduct the business of registration, meet management and Top Ten reporting in such a manner that specific information need only be entered once. For example, when entering a swimmer into a meet, that swimmer's biographical data can come from the LMSC's registration database thus minimizing both the time required to enter the information and decrease the likelihood of errors. At the completion of the meet, the times are entered, the result printed and the data from that meet would feed directly into the LMSC's Top Ten program whose output would then feed directly into the national Top Ten program. This again increases efficiency and accuracy.

One alternative to this project is the publishing of a common "data format". This would allow those organizations who have the resources to already have a program to modify their programs so that the national registrar could, for example, accept their registration data or the national Top Ten recorder accept their Top Ten data. This option was considered and thought to be inappropriate for two reasons. First, there would be no guarantee that the data would be prepared in the correct manner. If data were delivered in an incorrect format, the national registrar, for example, would end up debugging these programs which is not the job he or she is paid to do. Additionally, delays would be introduced in maintaining the national database which might cause problems with insurance carriers for example. Second, this approach does not assist those LMSC's who do not have the resources (either financial or intellectual) to already own or to develop programs similar to those described in this document.

II.C Scope of This Project

This project is intended to produce software which will ease the job of those persons involved with registration, meet management and Top Ten reporting. While these are the primary goals of the project, several added benefits are expected to be realized in the process. These include improved accuracy in reporting and, possibly, an increase in the reporting of top ten times. Additionally, whenever possible, the chance to provide additional functions such as automatic checking against national and/or local records will be incorporated. These are included for several reasons. Some LMSC have requested such functions. Also, by adding these functions, it is hoped that they will make the entire package of programs more appealing to the various LMSC's and thus more likely to adopt the use of these programs.

The details of this project are stated below. They have been prepared based upon a survey of the LMSC's conducted during July of 1987. The functions included in this project by and large reflect the results of the survey. Certain functions have been added for reasons necessary for the overall project to function correctly. In no case has any function which was requested by a majority of the respondents been omitted.

The software produced in this project is intended for use on an IBM PC, XT, AT, PS/2 or compatible computer. The software will also use "industry standard" printers for printed output. Since the LMSC's vary considerably in size, the necessary configuration of these computers is difficult to define. A larger LMSC will likely need to need a hard disk drive in order to store the databases while a smaller LMSC may not need to do so. One requirement of this project will be to define the limitations of some of the various storage devices with respect to the number of swimmers registered, the size of the meet and so forth.

The underlying software for this project should be a database management system. Common, higher level languages, necessary for certain functions not easily or efficiently performed in the database language, will also be acceptable. The database management system should be from a vendor which is stable, which has produced the product for a sufficiently long period of time so that its reliability has been adequately established. In order to minimize the cost to the LMSC's, a database management system which will produce executable versions which would be sent to the LMSC's or which would not require the purchase of an expensive (> $100. each) DBMS for each LMSC is highly desirable.

This software project is divided into three parts, registration, meet management, and Top Ten reporting. It is intended that the project be conducted in a phased approach in that the three packages be developed in the order given and that, where it is deemed appropriate, functions which are not absolutely necessary for the advantageous use of the software may be delayed until after the initial version of the software has been distributed and accepted.

III Registration Program

The registration program will serve two purposes, local registration and national registration. If all possible, these two purposes should be accomplished using the same program. The registrar is responsible for three reporting functions. Two are the registration of organizations, the LMSC and each team in the LMSC. The third is the registration of individual swimmers in the LMSC. All of these local registrations are reported to the national registrar on a regular basis (monthly maximum). It is the intention of this project to provide a means of transferring this information electronically using floppy disks. Several basic functions must be provided to the registrar in order to maintain the database. These include the addition of new members (clubs or individuals), editing, deleting and listing in various formats the members of the LMSC. These functions obviously expand to include all LMSC's for the national registrar.

This section details the information which will be maintained and the functions which must be provided in the registration portion of this project.

III.A Registration Information

The following information will be maintained for each LMSC.

1. LMSC name
2. LMSC Number
3. Registration year
4. For each of the offices of Chair, Registrar, Top Ten recorder and Treasurer the following.
    - Name
    - Street Address
    - City
    - State
    - Zip code
    - Home phone
    - Work phone
5. Cost of individual membership
6. Cost of club membership

The following information will be maintained for each club.

1. LMSC Number
2. Club Name
3. Club Abbreviation
4. Club number
5. Registration year
6. For the official correspondent the following:
    - Name
    - Street Address
    - City
    - State
    - Zip code
    - Home phone
    - Work phone

For each individual the following information will be maintained.

1. Name
2. Street Address
3. City
4. State
5. Zip code
6. Home phone
7. Work phone
8. Date of Birth
9. Sex
10. LMSC number

11. Club affiliation (if applicable)

12. Registration year

13. Swimmer number

14. Previous year's LMSC number (if applicable)

15. Previous year's swimmer number (if applicable)

16. Workout location

The swimmer receives a registration number which is in the form XXY-ZZZZ where XX is the association number, the Y is the last digit of the registration year and ZZZZ is the swimmer number. For the purpose of this document the registration number includes the association number, registration year code and swimmer number and its use should not imply anything about the internal storage of the necessary information.

III.B Database Functions

The DBMS system should interact with the user using a menu/forms fill-out mode whenever possible. Validation of input should occur whenever appropriate, for example, duplication of registration number. Individual functions should be based upon a single screen for information/data entry. The functions required for each of the three classes of information are detailed below. On-line help should be available. The ability to provide help may be a function of the amount of disk space available though.

III.B.1 LMSC Registration

At the local level, each registrar needs only to update this information. This usually occurs on a yearly basis. Therefore, the only function necessary is the ability to edit since adding and deleting an LMSC registration at the local level is meaningless.

At the national level, the usual function is also editing. There is always the possibility of adding or deleting LMSC's. Therefore, the national registrar will also need the ability to add or delete LMSC registration entries. The means of selecting the appropriate LMSC for editing/deleting should be based upon LMSC number or name. The user should be required to confirm any deletions. Deletions and additions should be acknowledged by a printed summary of the changes made. Validation of data input should be included. For LMSC registration, the LMSC name and/or number should not be duplicated.

The reporting (printing) functions required include the ability to print a list of the LMSC information in the following formats. The ability to select a single LMSC, a range of LMSC's or all LMSC's should be provided.

1. A list containing all of the information maintained on each LMSC (see above)
2. A list containing the LMSC name, number and a single officer
3. Mailing labels containing the name and address of any single officer sorted by zip code

III.B.2 Club Registration

At the national and local level, the maintenance functions will include adding and deleting clubs and editing club information. The reporting functions should include the printing of lists for a single club, all clubs in an LMSC and all clubs in USMS (in certain LMSC's the first two options will be redundant and the third is only significant for the national registrar) in the following formats.

1. A list containing all of the information maintained on each club (see above)
2. Mailing labels for each club sorted by zip code

The selection of a club for editing or deleting should be based upon the club name and/or association/club number. At the local level the association number should not be necessary. A function which will delete all inactive clubs shall also be provided. Input should be validated to insure that no duplication of club name or association/club number be introduced into the database. Deletions shall require the confirmation of the user. Additions and deletions shall be confirmed with a printed summary of the changes made to the database.

III.B.3 Individual Registration

It is anticipated that the database maintained at both the local and national levels will be carried over from one year to the next. (However a permanent copy of the databases should be made at year end for historical purposes by the user.) Maintaining the database in this manner is designed to accomplish three functions. The first is to minimize the data entry when re-registering swimmers. The second is to maintain a database of recent "dropouts" for the purpose of attempting to register them and the third is for developing meaningful statistics for the turnover rate of members. The latter function may be left as a future enhancement to the system.

Maintenance functions for individual registrations will include editing, deleting and adding. The editing and deleting functions will allow the user to select the

individual swimmer based upon last name and/or registration number. In the case of duplicate names the user should be presented with a list of complete names from which to chose. A delete function for deleting all inactive individuals should also be available. At the user's option, the program will assign the next available registration number. At the local level and for the convenience of the user, a portion of the data entry/edit screen should contain a list of club numbers and the corresponding name or four letter abbreviation. Input should be validated. Validation should include the uniqueness of the registration number, the date of birth (see below), the existence of the team with which the team is affiliated and, when adding a new individual, the fact that an entry does not exist already. The date of birth should be validated to the extent that the year is correct by using the age information which is already included on the current USMS registration form. The age should not be included in the database as it can be calculated from the date of birth.

The reporting functions should include the following. (The list includes functions which are for the national registrar and are noted with a †.)

1. Alphabetical listings of members of USMS†, an LMSC, a club or a range of registration numbers
2. A listing of members added since a given date
3. A listing based upon any combination of one or two items (zip, age, club, sex etc).
4. A list of those individuals not current in their membership in USMS†, an LMSC, or a club.
5. Mailing labels (sorted or unsorted by zip code) of any of the above items in this list
6. A numerical listing of registration numbers and names of members of USMS†, an LMSC, a club, or a range of registration numbers
7. Printing of USMS registration cards for those entered since a given date (with the current date being the default), or range of registration numbers

III.C Other Functions

Several other functions are also required. One is a function which will close out the membership year. This function should delete all swimmers who did not re-register and who may still be in the database and to transfer the current USMS number to the previous year's USMS number and clearing the current USMS number. Several data summary functions will also be provided. The scope of these will

vary from the local to the national registrar but they are basically the same. These functions include the following.

1. List of the number of athletes and clubs in each LMSC
2. List of the total number of athletes and clubs in USMS
3. List of the number of new registrations since a given date

III.C.1 Data transfer

One of the goals in making a unified registration system available to all registrars in USMS is to allow transfers using magnetic media. Thus, the ability to forward additions and corrections to all of the three portions of the registration databases (LMSC, club and individual) in an efficient and simple manner is of prime importance. A necessary function is one which will allow the LMSC user to transfer all of the information which has changed since the last update to an appropriate media (currently floppy disk) for the purpose of sending it to the national registrar. Similarly, it will be necessary for the national registrar to have a function to accept this information. For a number of reasons, psychological as well as quality assurance, these functions should provide a reasonably detailed printed summary of the transfer process on both sides of the transfer. The likely format for both the LMSC and club registrations is the printing of all of the submitted information. For the individual registrations, the listing of name, age, sex, club and registration number would be appropriate. The software used by the national registrar has the additional burdens of attempting to prevent dual registrations, minimizing the size of the database by noting transfers from one association to another which have occurred at registration time and the validation of LMSC and club affiliations. Besides printed summaries similar to those described for the local registrars, printed descriptions of the exceptions noted during validation would also be included.

IV Meet Management Program

IV.A Overview

For the purpose of this document, meet management is meant to include the functions which start at accepting the entries of swimmers through to the printing of final results and making these results available to the Local Top Ten recorder. These functions might include seeding of the meet, that is placing swimmers in specified lanes in specific heats for each event and the printing of interim results as the meet progresses. Additionally, compilation of team scores may also be included. A brief overview of the process along with a summary of the options follows.

Meets vary in size from about a dozen to well over 2000 competitors. Besides this large variation is size, the conduct of the meet also varies considerably. The basic course of events in sponsoring and running a meet are as follows. After having received a sanction, defined the order of events and located a pool, the team will advertise the meet and accept entries. In accepting these entries, the sponsoring organization needs to collect the necessary biographical data about each entrant (name, address, age, sex) as well as their USMS registration number and the events they wish to enter. Usually, although not always (see below), the entrant also includes a seed time for each event they wish to enter. Using these seed times the meet will be seeded and the event swum. (Note that the proximity in time of the seeding process and the event has not been specified.) After the meet is complete, the results are generated using a standard format to be sent to the participants and the Top Ten recorder.

The operation of the meet management program can be broken into several functions. The first function includes the definition of location and type of meet. The second function is the acceptance of entries. The third is the seeding of the meet using one or more standard formats (for some meets, this step will actually be done by hand just prior to the actual event). The next function is the acceptance of results and the final step is the reporting of these results. Several different methods of seeding and the entry of results will be available.

IV.B Defining Basic Meet Parameters

The user of the meet management needs to define certain parameters which will identify the meet and define the manner in which the meet will be conducted. The following information will be used to "identify" and "define" a meet.

1. Sanction Number
2. Name of the meet
3. Date(s) of meet
4. Location of meet
5. Meet director
6. Length of pool
7. Number of lanes used
8. Order of events to be swum (see below)
9. Seeding method(s) to be used (by event, see below)
10. Maximum number of individual events each swimmer is allowed to swim

11. Is this a Deck-entered meet? (see below)

An additional list of clubs entered and their four letter abbreviation for the name will also be maintained.

The ability to print a report which contains the above information will be provided.

USMS currently swims events using three venues, one in 25 yard pools (short course yards), 25 meter pools (short course meters) and 50 meter pools (long course meters). The official events differ slightly from one venue to the next and are listed in the table below.

List of Individual Events

Short Course Yards	Short Course Meters	Long Course Meters
50 Yd Freestyle	50 M Freestyle	50 M Freestyle
100 Yd Freestyle	100 M Freestyle	100 M Freestyle
200 Yd Freestyle	200 M Freestyle	200 M Freestyle
500 Yd Freestyle	400 M Freestyle	400 M Freestyle
1000 Yd Freestyle	800 M Freestyle	800 M Freestyle
1650 Yd Freestyle	1500 M Freestyle	1500 M Freestyle
50 Yd Backstroke	50 M Backstroke	50 M Backstroke
100 Yd Backstroke	100 M Backstroke	100 M Backstroke
200 Yd Backstroke	200 M Backstroke	200 M Backstroke
50 Yd Breaststroke	50 M Breaststroke	50 M Breaststroke
100 Yd Breaststroke	100 M Breaststroke	100 M Breaststroke
200 Yd Breaststroke	200 M Breaststroke	200 M Breaststroke
50 Yd Butterfly	50 M Butterfly	50 M Butterfly
100 Yd Butterfly	100 M Butterfly	100 M Butterfly
200 Yd Butterfly	200 M Butterfly	200 M Butterfly
100 Yd IM	100 M IM	
200 Yd IM	200 M IM	200 M IM
400 Yd IM	400 M IM	400 M IM

At certain local meets, additional events are also swum. These might include either "novice" events or "fun" events. In addition, relays can also be contested during the meet. These include relays which contain either four men, four women or two men and two women and are known respectively as mens, womens and mixed relays. The events include 200 Yard/Meter, 400 Yard/Meter and 800 Yard/Meter Freestyle relays and 200 Yard/Meter and 400 Yard/Meter medley relays.

As part of defining the format of the meet, the meet director should include the order of events (eg. the 50 Yard free is the 10^{th} event, the 100 Yard free is the

4^{th} event, etc.). This ordering will be used in entering the individual data about a swimmer, printing the heat sheet and event cards and entering results.

The events may be seeded in several different manners. *Currently*, the USMS rules allow the events to be seeded with the slowest swimmers in the first heat and the set of next slowest swimmers in the second heat and so forth. (The emphasis is placed on currently as this rules are, of course, subject to change.) The USMS rules states that swimming the men and women separately whenever possible is preferred but in small meets, men and women often swim together. Some meets are "deck-seeded", which means that the final heats are determine after identifying who is actually present to swim the event. This minimizes the time it takes to swim the event as no lanes are wasted on "no-shows". Other events are seeded prior to the meet and follow the seeding independent of who is present. Still others use a combination of the two methods. The usual combination is one which has all of the events except the longer events pre-seeded while the longer events are deck-seeded. Therefore, the process of defining the format of the meet must include the manner by which the event will be seeded.

IV.C Individual Entries

After the meet director has defined the conduct of the meet, information concerning who has entered the meet will have to be obtained. Usually, this will occur before the meet is held. However, most meets allow swimmers to enter the meet on the day of the meet and others run meets which are entirely deck entered. Therefore the entry of individual information may actually occur after the meet has been swum. The information required at the time of accepting a swimmer's entry is listed below.

1. Name (as given at time of registration)
2. Address (street, city, state, zip code)
3. USMS registration number
4. Club affiliation
5. Sex
6. Age as of last day of the meet
7. Events to be swum with seed times

For those swimmers who are in any registration database available to the meet director (typically the local registration database but potentially the national database also), the preferred method of obtaining the biographical portion of the above

list is by specifying either the swimmer's registration number or last name. (An option to reject the biographical information should also be available since masters swimmers do not always know their correct number.) This function also allows one to verify that the swimmer is currently a member of USMS and is officially affiliated with the specified team. Those not in any available registration database all of the data will have to be entered entirely by hand.

Most, if not all, local meets allow a swimmer to enter "No Time" as a seed time. Therefore, provisions for accepting such entries must be provided. The format of the entry should be event number and seed time. An entry with an event number and no seed time will be used to signify "No Time". The seed time will be accepted in two formats, one with a colon between the minutes and seconds and one without. For example, 1:03.7 and 103.7 should stand for one minute 3.7 seconds. The validation of entry data should include range checking of the event number. A possible future enhancement might include range checking on the seed time.

An edit function will also be provided which will allow one to modify the entry of an individual. The selection individual to be edited will be based upon the swimmer's USMS number or last name.

IV.D Relay Entries

Some meets pre-enter relays while others do not. In order to accommodate those that do, the meet management software will accept and seed relays. The data required for each relay will include the following

1. Team Name
2. Age Group
3. Relay teams designation ("A", "B", etc)
4. Event

Relays are currently contested using two different age formats based upon which venue is being swum. The short course yard meets have relays based upon the age of the youngest swimmer. The age groups are 19+over, 25+over, 35+over, 45+over, etc. Both of the meter venues use the sum of the ages format which are 76+over, 100+over, 120+over, 160+over, 200+over, 240+over and 280+over. The actual swimmers in the relay are not entered until the results are compiled. The relay team designation of "A", "B", etc is used to distinguish among the several relay teams a single club may enter in a meet. The name of the relay, for the purpose of seeding and reporting, then becomes Team Name - "designation" (eg. LONE-A or LINC-C).

IV.E Seeding of the Meet

Due to the variation in the way meets are seeded, several options will have to be supported for the seeding of the meet. Under the current rules the following options must be included for each event.

1. Deck- or pre-seeded
2. Separate by sex or combined
3. Separate by age groups or combined

Thus, there are eight (2^3) different ways to seed the meet. Currently, the meets are seeded with the slowest swimmers in the first heat and the fastest swimmers in the last heat. The following is a brief outline of the rules governing the seeding of meets.

1. A heat must contain at least three swimmers.
2. When ages are seeded separately, swimmers "left over" from complete heats may be combined with swimmers of other age groups.
3. The top seed in an age group must not be in an outside lane.
4. The lanes are assigned based upon seed times and the number of lanes being used for the meet. (Eg, in a six lane pool the lanes are assigned from fastest to slowest in the order 3,4,2,5,1,6.)
5. "No Time" is considered the slowest time possible.

The program will allow meets to be seeded using four to sixteen lanes.
The report function of seeding will include the following.

1. A heat sheet which includes the following
   - A heading which includes the name of the meet, the date, location, course and Sanction number.
   - A listing of the heats (or ordered listing of swimmers by time) for each event in the order in which they will be swum
2. Event cards or labels for each event which includes the following
   - Name of swimmer
   - Age of swimmer
   - registration number of swimmer

- Event name and number
- Sex of swimmer
- Seed time of swimmer
- Heat and lane assignment if appropriate

Possible future enhancements might include a printout of the events with heat and lane assignments for each swimmer.

IV.F Entering Meet Results

The method used to enter meet results is, possibly, the single aspect of this entire system which is subject to a diverse range of personal preferences. Several methods of entering the results from the many heats of the various events are quite reasonable. While we will probably not be able to support all of them initially, a brief discussion of the major requests is presented.

One method of entering results is to enter them by heat as they are swum. This method is attractive to those who wish to compile results as they are generated. Additionally, this method lends itself to possible future direct input from timing devices. This method's shortcomings lie in the fact that often the results are not entered until some later date and maintaining the results in the order in which they were swum is often difficult in the understaffed, confused atmosphere of many of our local meets. Additionally, this method suffers from the problems that arise when a swimmer scratches and another swimmer replaces him in the given heat. It also requires that all deck entries be assigned heats and lanes for their events and this information be entered into the database.

Another method used or suggest by survey respondents was to enter the results on a form which contains the names of all swimmers who have entered the event. This method does not have the problems associated with the heat based method when dealing with deck entries as they can be entered into the database at the meet recorder's leisure if final results are not to be presented immediately. However, this method does suffer from the problem that in presenting the swimmer's names for entering their times an order is place upon entry of the data (practically speaking this is true since the alternative is to scroll up and down the screen as one enters the data). Ordering the individual cards while not overly time consuming in a small meet becomes the rate limiting step as the meet increases in size.

A third method involves entering the results in a random fashion for each event using some sort of code to identify the swimmer (eg. the swimmer's registration number). This method solves the problems of the two previously discussed methods but introduces another. The problem lies in the fact that often a swimmer does not know their correct USMS number. This problem could be solved in several ways. The first rests upon the fact that we should be requiring the swimmer's

USMS number to enter the meet and use of the registration database in entering data for a meet should decrease the problem. Additionally, the meet management program could assign a unique swimmer number to any swimmer which did not have their USMS number. Having printed the USMS number (or unique swimmer number where applicable) on the event card, entry of the results should be simplified. Additionally, the ability to optionally use the swimmer number portion of the USMS number (the last four digits) should be allowed to minimize the number of keystrokes used to enter the data. One possible enhancement would be the optional use of the swimmer's last name instead of the USMS number.

While several additional methods could be discussed, the number of supporters for them were substantially smaller than the above three. The first method discussed seems appropriate for meets which are very organized and which are not likely to have a large number of substitutions such as regional or national meets. The third method is probably the simplest method for those who assemble the results at a later date. It also can serve as a simple way to enter the results from a swimmer who deck entered or did not swim in the assigned lane. It is therefore proposed that the initial implementation of the meet management software include only these two methods.

The meet manager program will allow one to select the event for which results will be entered and proceed to accept the data. Validation of the input is most easily done with the third method (random order with USMS numbers entered). Validation of the data should include checking of the USMS number to insure that the swimmer has entered the meet. If the swimmer has entered the meet but was not seeded in the event, the user will be required to verify the entry. The format for the time entry will be identical to that discussed in the section on individual entries. Possible future enhancements include additional methods for entering the results and range checking of the times entered for each swim.

IV.G Entering Meet Results from Deck Entered Meets

Some meets are conducted such that all entries are taken on the day of the meet and no pre-entering or seeding of the meet occurs. The meet management program will be able to generate meet results for these meets in an efficient manner. The method used to do so will be based upon variations of the methods used to generate the results in a seeded meet. After defining the meet (see above) and indicating that it is a deck-entered meet, the biographical information (name, address, USMS number, etc) for each swimmer would then be entered without entering any events or seed times. The next step would then be to enter the results of each event as described above using the random order/USMS number based method. Obviously, this will require that each card has the person's USMS number written on it for this method to be effective.

IV.H Entry of Relay Results

The entry of relay results entails more than just entering the times achieved by the relay. Since the team does not have to disclose the members of the relay team until they swim the event, the names of the swimmers in the relay must be entered at this time. This can be accomplished by entering either the swimmer's USMS number or their last name. If duplicate names which also fit the sex and team specified for the relay are present, then the user will be asked to pick the correct one. Validation will include team affiliation, sex and the age group (either sum of the ages or the lowest age as appropriate).

IV.I Reporting of Meet Results

The final product of the meet management program will be a report of the meet results. This will take two forms, written and electronic. The written report will be used by the sponsoring organization to disseminate the final results while the electronic form will be used to transfer the results of the meet to the local Top Ten recorder.

The written report will follow the format specified in the USMS procedures. A header describing the meet will be included. This will include the title of the meet, the dates, location, sanction number, length of the pool and name of the meet director. The procedures call for the events to be reported as follows. Women's individual events are reported first in order of increasing age groups. The order of individual events is that used in the list of events above. Womens relays follow the individual events. Mixed relays follow the womens relays. Men follow the women. At the option of the user, the results of team scoring will be printed. The allocation of points will be based upon the size of the pool. For example, in a six lane pool the points given for first through sixth would be 7,5,4,3,2,1 and the relays would be double that of the individual events.

The results will also be used to compile the Top Ten lists at the end of each season. The meet management program will be able to produce a file which will be readable by the Top Ten program which will be described below. The format of the database to be transferred to the Top Ten program can be condensed. The database should contain all of the information used to identify the meet. The information about individuals need only contain the name, age, sex and USMS registration number of each swimmer. The results of each event should, of course, be included.

The results generator should also check the final results against the various list of records which may optionally be maintained. The national database could be sent from USMS to each LMSC for each venue. At the option of the LMSC, they could also maintain an LMSC record database. The times which break one or more records would be noted in the results. One option that could be implemented would be a function which would print out the necessary forms for submitting the record

to the National Records chairman.

If records are to be checked, then a method of maintaining the list of records is required. A forms fill-out method will be included. The form should contain all events for a single age group and sex. One future enhancement would be to allow record databases other than the national and one local.

V Top Ten Program

At the end of each venue, a list is compiled of the top ten USMS swimmers in the country in each event within each age group. The national list is compiled from a list submitted from each LMSC. It is the responsibility of each LMSC to compile the top swims from all of the meets held within its jurisdiction. This task can be very time consuming at both the local and national levels. The purpose of the Top Ten Program is to simplify the procedures used to compile the list.

Data from the local meets will come to the LMSC Top Ten Chair or the national Top Ten recorder in two forms, written and electronic. This program will accommodate either form. If possible, the LMSC Top Ten Chair and the national Top Ten recorder will use the same program. (The possible exception is noted below.) The details of the program follow. It is understood that the results for men and women are compiled separately.

V.A Electronic Transfer of Meet Results

A meet manager will be able to transfer the results of a meet on a floppy disk. The format of the database has been discussed in the Meet Management program. The Top Ten program will request the necessary information to identify the meet (ie. the name of the database) and automatically update the LMSC's database.

V.B Entering Top Ten Data by Hand

The Top Ten program will also accept data which is typed in by the user. The form of this data will be as follows. The user will first identify the meet by entering the following data.

1. Date of meet
2. Location of meet
3. Sanction number
4. Length of pool
5. Name of Meet Director

After having identified the meet (or after re-entering the program, picking a previously entered meet), the user will be able to pick the age group and event for which data will be entered. The user will then be presented with the list of up to fifteen swimmers with their USMS numbers and times for the events. The user will then be able to enter new swimmers with their USMS number, age and time or update the time of a swimmer who is already on the list. The USMS number is included for several reasons. It can be used to identify a swimmer in case of a misspelling of a name and it is a requirement that all swimmers on the USMS Top Ten list be members of USMS.

Relays will also be included in the Top Ten listings. The entry of data for relays will be similar to that above except that the names of the swimmers on that relay will have to be entered.

V.C Database Functions

The Top Ten program will perform the following functions.

1. Maintain a list of up to fifteen swimmers who have the fastest times in each event in each age group. The program must be able to detect the fact that a swimmer can compete in two different age groups if the person has a birthday during one of the seasons. An individual can have only one swim per event per age group in the list of fifteen. A relay with the same four swimmers, without respect to the order of swimming, can only take one place on the list.

2. Allow the user to delete swimmers in cases where, through typographical or other error, a duplicate entry is present.

V.D Reporting of Top Ten

The data from the Top Ten program will be reported in both a written and electronic form for sending the LMSC's Top Ten to the national recorder. The electronic form should, if possible, be identical to that used to transfer data from individual meets to the Top Ten program. If it is not, then the program used by the national recorder must be able to accept this additional format. The written format is similar to that used to report the results of meets except for the fact that a listing of the meets included in the report is to follow the events. Additionally, a listing of all swimmers with their USMS registration numbers should follow the list of meets. Only the top ten times will be listed or transferred electronically.

VI Documentation

The developer of this program will provide a user's manual which details the use of these programs and includes descriptions of all functions. It will include

sufficient examples to allow a "novice" user to use the program. On-line help should be provided if at all possible. The availability of this help may be a function of available disk space and may be included at the option of the user.

The documentation of the source code shall conform to currently accepted standards and shall at a minimum include a description of the function of each procedure, function or subroutine including the expected input, output and any error conditions returned or signaled. Major blocks of code shall also be documented as to their function when they are not already described in sufficient detail by the documentation for the given routine.

VII Property Issues

It is the intention of USMS to contract for the development of these programs. All rights to the documentation, source code and executable code shall be the property of USMS. It is anticipated that any contract will include some period of time during which the developer will provide fixes to any bugs which are found and that the cost of these fixes will be include in the initial contract. At the option of USMS, a contract for providing upgrades, improvements and enhancements may also be extended to the developer.