

USFA Technology Proposal

Improving Efficiency Through Technology

I. Introduction

Over the past ten years, the USFA has seen its membership numbers swell to well over 15,000 individuals. This growth is not expected to slow, and it is projected that the membership will exceed 20,000 members within several years. Unfortunately, during this period of growth, the USFA's technical infrastructure has not kept up at the same pace. This has led to a huge burden of work that must be done by the national office staff. Much of this work could be automated or streamlined by updating or adopting new technology. That would free up the staff to focus on more pressing issues, reduce the likelihood of data entry errors, and provide the general membership with services that they have been requesting for several years.

This document will outline a proposed system that can be developed to address the technical issues facing the USFA today. The system will address all aspects of the USFA's operations: processing memberships, tracking fencer ratings and club affiliations, and national tournament operations.

One of the overriding philosophies present in the proposed system is the need for various subsystems to work together. Designing a new system that does not follow industry standards for data exchange would severely hinder the ability to evolve, expand, and improve it, in whole or in part, as the needs of the Association and membership change.

II. Membership Management & the USFA Website

All organizations with a membership must have a robust system for tracking their membership data. Keeping this data current and correct is critical for all aspects of the organization. It is the basis for mailing lists, event eligibility, and the tracking of ratings and point rankings. It is critical that the processes for managing this data are well-defined and controlled in order to maintain the integrity and security of the data. In addition, a subset of the data needs to be available publicly via the web so that tournament organizers can properly run local events.

A. The Current System

Generally, the first experience a fencer has with the USFA is the membership sign-up process. Currently, fencers have two options available to them: (1) Fill out the membership form and send or fax it in, or (2) sign up online.

The first option is the “traditional” route. For years, fencers have been joining or renewing their membership by filling out the form on paper and sending or faxing it in. This approach has a number of problems:

1. Entering the data from the submitted membership forms consumes a lot of time for the national office staff.
2. Data entry errors occasionally occur. A frequent issue is the accidental failure to update a fencer’s club membership when they declare a new affiliation on their renewal form. This is usually discovered at a national event when a pool conflict is discovered.
3. When forms are sent in, there is no official receipt of submission that can be presented to tournament organizers as proof of membership. Instead, organizers either have to trust the fencer is being honest when they say “I sent it in last week”, or make them fill out another membership form.

In 2007, the USFA introduced a second method of processing membership applications: online registration. While this was a step in the right direction, it too had several problems:

1. The registration website is not tied into the master membership database, so it is necessary to replicate data from the website to the actual database. Whether this is a manual or automated process is uncertain.
2. The website charges a \$5.00 “service fee” for its use which is, for most people, a 10% surcharge on the membership fees.
3. The website is in a “beta” state, and it still has problems that lead to occasional service outages.

In addition to the membership sign-up/renewal process, there are several technological problems with the current system that limit its usefulness:

1. The current membership database is housed on an IBM AS/400, which is an antiquated hardware platform that has been far surpassed by current hardware.

2. The layout of the current membership database is inadequate for the current needs of the USFA. For example, rather than having a field to indicate whether a fencer is a foreign national, the current way of doing this is to put an asterisk (“*”) in with the fencer’s name. In addition, the database does not track data such as point rankings, fencer-coach affiliations, etc.
3. The current membership database is poorly organized. It mixes fencers, clubs, schools and vendors together in the same table. This is extremely poor database design because these different entities share few similarities. For example, only fencers need their weapon ratings tracked. However, because of the monolithic design, clubs, schools and vendors all have unnecessary fields for weapon ratings (as well as other things such as birth year) which make no contextual sense. This mixing of different membership types makes working with the data far more complex than it needs to be.
4. The current process for publishing membership data is a manual process. The USFA has gotten better at this in the past year, with (usually) weekly updates of the membership page on the website. However, this should be a completely automated process that doesn’t require any investment in staff time.
5. The naming convention for club abbreviations is inconsistent and therefore is confusing. In addition, division names are limited to 10 letters for some reason.

The USFA website is another area of technology that has posed problems over the years. The website must be a critical part of the technology plan since it is the most visible face of the organization to the public.

The history of the USFA website is a colorful one. The first website was hosted on a server set up and managed by David Sapery for many years. This site, while rather “no-frills”, provided fencers with most of the information they needed. Over the years, the site became outdated in terms of its visual style, and it experienced outages related to the antiquated hardware that it was hosted on.

The USFA eventually moved their website to one created by an independent web design firm run by a prominent fencer. This website was truly abysmal. Not only was the site light on actual useful content, but it experienced frequent outages that would last days at a time.

Eventually, the USFA moved to a new website based on the popular Joomla content management system. Joomla is a free system for hosting websites with various types of content. This site has been relatively successful, and thanks to Joomla’s easy management console, the site has been kept fairly up-to-date. In 2007, the membership lists were added to the site, which was a great help to tournament organizers. However, these lists are disconnected from the actual membership database, and are refreshed with data on a weekly basis.

There is speculation that the USFA website will be undergoing another overhaul in 2008. This overhaul is supposedly required by the US Olympic Committee and is intended to unify the look-and-feel of all US Olympic sport federations. Details on what exactly will be changed, and what the USOC’s actual requirements are for this are sketchy at best.

The switch to the USOC-mandated website has been cited as a problem with moving forward with a more useful USFA website (in terms of membership and tournament registration.) On the surface, this seems to be a poor reason since it is hard to believe that the USOC would care about the membership and tournament registration side of the site. It is critical that, in order to move forward with a new website, that the USOC's exact list of requirements be determined. It is very likely that they only will care about the front pages of the website, while pages related to membership and tournament registration could direct the viewer to a separate site.

B. The Proposed System

Before a new system can be built, the requirements must be specified. The resulting system must meet all of the listed requirements, and should be designed with enough flexibility so that it can be easily adapted to support additional features in the future.

The system described below follows the familiar model used by online retailers, airlines, and other membership-driven groups. These systems are widely in use, and the knowledge of how to create a secure system is readily available.

The proposed new system must meet the following feature requirements:

1. A new database must be created utilizing a modern relational database system. The database should be housed on reliable fault-tolerant servers that offer 100% uptime and nightly backups.
2. All member types, including fencers, coaches, clubs, schools, and vendors, must be represented in the database and logically partitioned based on type.
3. Members should be able to join or renew their membership on a website and have their membership status immediately reflected in the database after credit card payment is verified. If information such as a signature on a waiver is needed, some form of digital signature should be utilized.
4. Current membership data, including fencer name, weapon ratings, and point rankings must be available on a website. The data must come directly from the membership database so that it reflects the live data. Club affiliations should also be available, but with safeguards to protect NCAA fencers.
5. Multiple levels of secure access to the data would need to be provided. Each USFA member would have a password-protected account on the system with an associated access level. A tentative list of access levels would be as follows:
 - a. **Member** – This is the lowest level of access, allowing each USFA member to log in to the account to update personal data such as address, email address, phone numbers, etc. They should not be able to change club affiliation, ratings, or other data that needs approval. However, they should be able to submit a request to have that information changed directly from the website. The request will be forwarded to the appropriate USFA office for approval.
 - b. **Officer** – This level of access is granted to the current officers of each division at the start of each season. Officers would be allowed to download the membership data for

the fencers in their division, but not other divisions. This would be similar to the current practice of requesting division membership lists from the national office. Officers would also have the ability to change weapon ratings for fencers in their division, and notify officers from other divisions that one of their fencers has earned a new rating (for the case where a fencer earns a rating in a division other than their own.)

- c. **Administrator** – This level of access is reserved for the USFA national office. Administrators would have access to all membership data, and can make changes to it as needed.

If additional access levels are needed in order to grant individuals access to specific types of data, more levels can be added as needed.

- 6. The membership database should retain a history of affiliations – fencer/club, fencer/coach, fencer/school, coach/club, and coach/school for use in avoiding conflicts at tournaments.
- 7. All changes made in the database must be logged so that they can be reviewed in case of suspicious activity or if a change must be undone.
- 8. A process for migrating data from the old USFA database to the new one must be devised. This process may require the development of some custom migration tools to assist in the transition and to ensure that the migrated data obeys the new database's business rules.

The crux of the new system is the new database, and therefore the first phase must be the proper design and implementation of this database. Only after that is done can the online membership system be designed. Many of the features discussed below rely on this database.

It needs to be restated that if the new database is not designed properly from the start, it will make the implementation of all of the desired features far more difficult. It is critical that a team of people familiar with the current database, as well as the desired future capabilities, is assembled to guide the design of the new database.

This new system should be housed on a leased server in a datacenter. There are many companies in business of leasing server space. These companies provide the necessary hardware and take care of maintenance and guarantee nearly 100% uptime of the system. The servers can be configured with any software required, and would be completely managed by the USFA. All data stored on these servers would be secure and owned by the USFA.

The technology used on the servers for the database can be one of several options. In general, the choice of database drives the decision of which web server and programming language will be used. The two most common setups include:

- 1. A Microsoft SQL Server database running under the Windows Server operating system. Several flavors of SQL Server are available, ranging from the free SQL Server Express version, to the expensive SQL Server Enterprise version, which is designed for large-scale enterprise systems. When using SQL Server, the web components run under the Microsoft Internet Information

Services web server (provided as part of the operating system). Programming is done using C# and ASP.NET.

2. A MySQL database running under the Linux or Windows operating system. MySQL is an open-source database that is available for free. When using MySQL, the web server is usually Apache (also free) and programming is usually done using PHP or Java.

The USFA will need to find a person or group of people who will be responsible for setting up the software on the server and configuring it. They also would be responsible for putting a backup plan in place and doing periodic upgrades of the software. This group of system administrators could be personnel at the server host company, an independent hired team, or a group of volunteers with the necessary experience recruited from the USFA membership community.

As was mentioned earlier, the USFA website is a critical part of the overall technology plan. The exact requirements of the site need to be determined before the new site is created. The requirements need to take into consideration the needs and desires of the USOC, the membership, and the wider public viewing audience.

III. Support for Division Tournaments and Qualifiers

Every week, dozens of tournaments are run by USFA divisions and clubs around the country. In the past five years, thanks to technology developed independently of the USFA, the process of organizing and running local tournaments has been made huge strides. This has, one can surmise, led to more tournaments of higher quality and better fencing opportunities for everyone.

In order to run a USFA sanctioned tournament, the organizer needs to verify the membership status of all participants, as well as their birth year for age-restricted events. The current rating of each fencer needs to be known in order to ensure an accurate seeding. After the tournament is run (assuming it follows all USFA rules), the earned ratings need to be reported to the USFA for updating.

A. The Current System

Most tournaments run at the divisional level are announced on a website that lets fencers register for the event and optionally pre-pay their entry fees. In most cases, the website relies on the fencer themselves to declare their club affiliation and weapon ratings.

On the day of the event, the tournament organizer uses the list of registrations to run the tournament. However, since the data collected on the website is not the official data from the USFA membership database, it may be inaccurate. Some data, such as membership status and weapon ratings, can be verified by looking it up on the USFA website. Other data such as club affiliation and birth year is not available on the website so it can't be independently verified.

After running their event, the tournament organizer posts the results to the website. These results usually include detailed pool and DE scores, which the fencers find quite useful. If ratings were earned at the event, the organizers must get a division officer to sign off on the Classification Change Report form before it is sent to the USFA. A week or two after the USFA receives the form, the updated ratings are published on the USFA website. This involves a manual process at the national office, requiring staff time to enter the data by hand.

Under the current system, there is little verification done by the national office to ensure that ratings were awarded appropriately, or that age limits were observed. The amount of time and effort that would be needed to do this each week would be huge.

When divisions and sections run qualifier events for JOs and Summer Nationals, the division secretary must fill out a spreadsheet listing all of the qualified fencers. This spreadsheet is sent to the USFA, where it is printed out and placed in a huge loose-leaf notebook. When fencers send in their registration for JOs and Summer Nationals, the office staff looks up their name on the printed spreadsheets to verify they qualified.

B. The Proposed System

All of the inefficiencies of the current system can be solved by building a website that has access to the new membership database discussed in Section II-B. This website could be built either as an extension of the new membership database, or as an entirely separate site.

The features of the website, regardless of whether it's hosted by the USFA or some other organization, should handle the listing of events, the collection of event registration and payment, and the displaying of event results.

The key to this new website is to use the official member database as the source of fencer data. When a fencer registers for an event on the site, first their membership status will be verified. If they are not a current USFA member, they can be redirected to the membership sign-up page where they can immediately join. Once their membership has been confirmed, they will be added to the list of registered fencers with the club affiliation and weapon rating that is in the database. This removes the burden of verifying this data from the tournament organizer, and it guarantees that it will be correct. Additionally, fencers who are not eligible to fence based on criteria such as age or weapon rating can be prevented from signing up.

If the new website is hosted by a party other than the USFA, a method for accessing the USFA membership database must be put in place so that the site uses the most up-to-date data. One possible way to do this is to expose a way for the site to send queries to the USFA database in a secure way. A common technology for this purpose is the use of "web services" which can be set up to require a password-protected connection. The USFA can grant access to specific "partner" websites that have entered into an agreement that explicitly states how they can use the data. This approach is commonly used by many websites that need to provide access to a set of authorized users.

The new website must be able to export the registration data in a form that can be imported into the software used to run tournaments. After running the event, the organizer will be required to upload the tournament results to the website for verification and publication.

A number of checks can be done automatically when the results are uploaded. These checks include:

1. Verification that the initial ratings of fencers match the ratings the USFA has on record.
2. Verification that all fencers meet the minimum and maximum birth year requirements.
3. Verification of the event rating level (A1, B1, C1, etc.) and the ratings that should be awarded.
4. For qualifier events, verification that the proper qualification rules were applied and that the correct qualifications were awarded.

If any of the above checks fail, the organizer can be notified immediately and instructed to notify the affected fencers of the error. If all of the checks pass, the results can be posted and displayed on the website.

If an event awards ratings and/or qualifications, a division officer needs to certify the results before they are updated in the membership database. This can be accomplished by granting the division officers (or just the secretary) a special account on the website. This account would be valid only while the person is on record as being a division officer and would automatically expire at their end of their tenure.

When an organizer uploads results from an event, the division officer is automatically notified via email that they have results to certify. The officer logs into the website and can view the event results in need of certification. If the event was run properly and had USFA sanction, they mark the results as certified on the website. This is effectively the same as their signature on the current Classification Change Report form. Once they mark the results as certified, the new ratings are immediately updated in the membership database and are considered official.

Since all of these steps are done electronically, every transaction can be logged so that a complete history is saved showing who approved each event's earned ratings. If any suspicious activity is detected (such as an abnormal number of tournaments run on the same day, suggesting falsified results) the system will have tracked who is responsible and the proper steps can be taken to rectify the situation.

The advantages of this system are numerous:

1. All tournament results are verified without creating work for the national office staff. Currently, only a small percentage of results get the necessary scrutiny by the staff.
2. Rating changes can be made official in a matter of hours, thus allowing the fencer to compete with their earned rating sooner. Fencers no longer have to wait for up to two weeks for the national office to enter their rating before it is official.
3. The office staff does not need to waste time each Monday processing all of the rating changes faxed in over the weekend. This frees up their time to do more useful work.
4. Qualification status can be tracked in the database, removing the need for division officers to send in spreadsheets. With this information in the database, it will be possible to verify a fencer's qualification status automatically when they sign up for JOs or Summer Nationals online. No national office staff time needs to be wasted verifying the thousands of entries.
5. There is no manual data entry in the process, thus reducing the chance of errors.
6. If the proper monitors are put in place, the system can automatically notify the USFA of suspicious activity before it becomes a bigger problem.

The new website should also include a component that displays event results. Detailed results, including pool and DE bout scores, can be displayed if those details are provided by the software used to run the tournament. Having complete results stored in the database enables many possible applications of that information. For example, fencers and coaches could search the data for a fencer's individual results over the course of a season to look for trends and to chart improvement. Another possible application of the results data would be to experiment with alternative systems of fencer ratings – by using actual event results, new rating systems can be tested with real data and compared against one another.

One frequently mentioned problem with displaying results online is the issue of exposing club affiliations of fencers that have NCAA affiliation. With a properly designed membership database, this issue can easily be solved. The simplest way to do this is to mark every fencer in the database as either an NCAA fencer or not. When results are displayed, those NCAA fencers are automatically listed as “Unattached” and non-NCAA fencers are shown with their club affiliation unchanged.

The new website can also be programmed to track point lists. These point lists are often used by clubs, divisions, and sections for internal competitions and team member selection. When tournament results are uploaded, they can be used to automatically update the point standings for the appropriate point list. This eliminates the manual tracking of points that is very commonly done using spreadsheets. In addition, once the “rules” for how points are computed have been codified into the website and verified, the possibility for erroneous computation of points is virtually eliminated.

IV. National Tournament Management

The management of national events is a huge undertaking that is repeated virtually every month. The organizational effort behind each event is huge, and any time savings gained from process improvements will be multiplied across the entire season.

There are three areas to focus on when discussing national tournament management:

1. Pre-tournament activities such as registration and payment.
2. On-site operations such as check-in, tournament software, and information display.
3. Post-tournament processing including the posting of results, updating of ratings, and updating of NRPS standings.

A. The Current System

A fencer's experience with national events starts by filling out the entry form for the event. This form, which usually contains information already on file with the USFA (such as address and weapon ratings), is mailed or faxed to the USFA before the deadline. If the fencer includes a return fax sheet, it will be returned with a stamp indicating that the USFA received the form.

Upon receiving the registration form, the national office staff needs to add the fencer to the registration list in their database. If payment is being made using a credit card, the card must be processed manually using the card number listed on the entry form. If the fencer included a return fax, it is stamped "received" and faxed back within 24 hours. The event information packet is eventually mailed to the fencer, including a form showing their registration status.

In the case of Summer Nationals and JOs, an additional step must be done when the entry form is received: the fencer's qualification status must be verified by locating their name on the printed list of qualifiers from each division.

After the registration deadline passes, the list of registered fencers is posted on the USFA website.

On the day of the event, the fencer gets in line at the registration desk to check in for their event. As fencers check in, their names are crossed off on the registration form. If any of the fencer's information is incorrect (such as club affiliation), hopefully the fencer will report the change at the check-in desk.

On the computer side of the tournament, a download of the registration list is obtained from the database and is used to create events in the XSeed software package. Setting up the events in XSeed takes a bit of time and must be done prior to the tournament starting.

After registration closes on the day of an event, the no-show fencers are removed from the event in XSeed. Any fencers that reported incorrect data at check-in are updated with the proper information. This process is usually done by using 3x5 index cards to represent each fencer to be removed.

After the no-shows are removed, the updated seeding list is printed in a small font and posted in several locations at the venue. The pools are generated and the strip assignments are posted. Fencers report to their strip and fencing commences.

Sometimes, fencers fail to notice that their information is incorrect (such as club affiliation) when they check in, and only notice when they arrive at their pool and discover that they are in the same pool as a teammate. Depending on the issue, this may force a re-seed and the re-generation of the pools, which is a huge hassle and time sink.

After the event is finished, the results are usually posted to the USFA website within 24 hours. These results are only the final standings – no detailed scores are provided. In the weeks following the event, the pool sheets are sometimes scanned and made available to download as a PDF file.

In the week following the event, the national office staff manually enters the ratings earned at the event into the USFA database. If the event is a point event, the appropriate NRPS is updated and the new standings are eventually posted to the USFA website.

It should be obvious that there is a lot of room for improvement in this process. The area most in need of automation is the processing of registrations and payment. Converting this to a computerized process would save the national office staff hundreds of hours of time each year. The results post-processing also can benefit from automation for similar reasons.

The XSeed software used to run the actual events is dated and is being pushed to its limits. There are many features that it can't provide that would enhance the tournament experience for the competitors. In addition, because of XSeed's complexity, training new bout committee computer staff is a process that requires time and some mentoring.

B. The Proposed System

The first step of the national tournament process – registration and payment – is the area that will benefit the most from automation. In a world where people buy airline tickets, pay bills, and order prescription medication online, there is no reason why something as simple as registering for a fencing tournament should be more complicated. In fact, it is more of a hassle to fax or mail in a form, both for the fencer and the national office that has to process it on the receiving end.

Much of the registration and payment process can be improved by implementing the system described in Section III-B, which describes an online registration and payment system that automatically verifies a fencer's membership and eligibility to fence each event they register for. This system is done entirely online using a website designed for this purpose. The website has access to the USFA membership database and uses it to perform all verification steps.

If the USFA database were to collect the list of qualified fencers for events such as JOs and Summer Nationals, as was mentioned in Section III-B, the system can verify that a fencer has qualified for an

event when they attempt to register. Removing the “look up names in the big notebook” step alone will save the national office staff hours of time.

Another benefit of utilizing an online system is the automated processing of credit cards. This too will save the staff time since they won't need to manually process the hundreds or thousands of credit cards listed on the entry forms.

When a fencer registers, the website can direct them to print out a receipt showing the events they are registered for. An email confirmation could also be sent to the fencer as a second confirmation step. Either of these methods removes the need to fax back a confirmation form to the fencer. Again, this will save the office staff time and money.

With an online system, all fencers will have an email address on file. All tournament documents currently sent via US mail in the registration packet can be sent via email. This is currently being done by the USFA, so phasing out the printed packet of documents is the natural next step. Switching to an email-only delivery system will eliminate the costs associated with the copying and mailing of these documents to thousands of fencers each year.

Another benefit of an online system is that it is easier to enforce deadlines. The website can be programmed to automatically charge fencers the triple fee after the first deadline. After the final deadline, the site can refuse to accept any entries. Cancellations and refunds can also be processed automatically if a fencer has paid using a credit card.

Under the current system, there is a deadline for rating changes for each event. This deadline was put in place to eliminate the need to update ratings on the day of the event (for ratings that were earned after the registration deadline.) Using an online system, this deadline can be moved to the day prior to the event. Under the proposed system, earned ratings are updated online by the division officer that certified the event results. Since these rating changes take place immediately in the membership database, when the registration list is downloaded to the tournament software on the day prior to the event, the ratings will be up-to-date.

A key component in the new system is replacing XSeed with the Fencing Time software. While XSeed has served the USFA well over the years, it is beginning to show its age and its limitations. XSeed also is a fairly complex program, which requires a significant training period for new bout committee members. Fencing Time, by comparison, is a modern program that uses the latest technology and runs on newer operating systems such as Microsoft Vista. It has been in use by over 300 clubs and divisions around the country for nearly six years. There are hundreds of people in the fencing community that are experienced with its use, which would make training new national bout committee members much easier.

Fencing Time was given a trial run at three NACs in late 2007. While some issues were found, overall, Fencing Time proved to be a quite capable replacement for XSeed. Development on Fencing Time is

actively underway, and the missing features and other requested changes made by the USFA are being addressed.

Currently, Fencing Time is a single-user program. Plans are underway to convert it to a client/server system, which will enable a whole host of new capabilities at national events. In a client/server system, the state of the tournament is stored on a database on a server that can be accessed from multiple client computers. These clients can all access the data at the same time and can act on it in a variety of ways.

The on-site check-in process is the first thing that will benefit from the client/server system. At the check-in desk, a computer will be set up for each line. At the front of each line, a screen and barcode scanner will face the fencer at the front of the line. The fencer will be instructed to scan their bar-coded membership card under the scanner. The software running on the computer will use the fencer's member ID number read from the barcode to locate their event entry. The fencer's name, club affiliation, and rating will be displayed on the screen facing them. The staff member manning the desk will ask the fencer to confirm that the data on the screen is correct. If there is a mistake, the data can be corrected on the spot, and the change will automatically be made to the fencer's data in every event that they are participating in over the course of the tournament.

By presenting the fencer with their information on-screen, it will remove the problem of fencers being seeded into the event with incorrect data. It should be the policy of the USFA that if the fencer acknowledges the on-screen information as correct, no changes can be made after the event starts under any circumstances.

As fencers scan themselves in, they will be marked as present in the event. This information will be updated in real-time on the server at the bout committee. After the close of registration, the fencers who have not checked in will be displayed so that they can be paged over the PA system. After the page, those fencers still not present will be automatically scratched from the event.

The advantage of this system is clear – by removing the “cross names off of a list” step, it reduces the chance that a no-show will be overlooked and accidentally seeded into the event. Also, the addition of the confirmation step by the fencers will eliminate the potential problems caused by incorrect club affiliations.

One of the major features in Fencing Time is the ability to output information to a secondary display such as a projection screen. Information such as seeding lists, pool strip assignments, and the DE tableau can be shown for any number of desired events. These items can be displayed in a large font that is easy to read by a large number of fencers from a distance. The ability to display information on a screen will help alleviate the crowding that frequently occurs around the printed documents posted on the bulletin boards. Additionally, Fencing Time's ability to alphabetically list the fencer's strip assignments for the DEs will make it a lot easier for the fencers than the current practice of scanning the entire DE tableau for their name.

Currently, Fencing Time will only display information to a single projection screen. When Fencing Time has been converted to a full client/server system, it will be possible to set up multiple screens around the venue, each displaying different information.

Another possible enhancement to the running of national events would be the use of personal digital assistants (PDAs) for tracking pool scores. Currently, Fencing Time has the ability to export pool sheets to the Pocket Fencing Time program, which runs on PocketPC-based PDAs running the Windows Mobile 5 operating system. Pocket Fencing Time lets referees run an entire pool using the PDA without the need for a paper score sheet. The PDA tracks scores, time, penalty cards, and all other pertinent bout information. The bout order is handled automatically and bouts are called in the proper order. When priority needs to be determined, a virtual coin-flip can be done.

After entering all the scores into Pocket Fencing Time, all totals are computed, eliminating the need for the referee to do the time-consuming math. The pool results are then sent back to Fencing Time running at the bout committee, eliminating the need to transcribe the results from the pool sheets.

Another potential use of the client/server system would be the use of informational kiosks. Inexpensive kiosks could be set up around the venue and would feature a touch-screen interface that lets the users view event information at their leisure. Possible information that could be available for viewing could include:

- Seeding and registration lists for all events.
- Final results from the prior days' events.
- Detailed pool score sheets from any event (completed and underway.)
- Fencer information – Look up a fencer's strip assignment, pool scores, DE scores, etc.

After each event completes, the final results can be uploaded to the USFA website. This would include complete pool and DE scores. For point events, the results would automatically be used to update the pertinent NRPS list, and the updated standings would be immediately available for viewing on the website. This would eliminate the need for the manual updating and posting of results and point lists on the USFA website, saving yet more time at the national office.

It should be clear by now that a tremendous amount of time and effort can be saved by switching to a more modern, automated system. The overall efficiency of national events would dramatically increase, providing the fencers and organizers with a better overall experience.

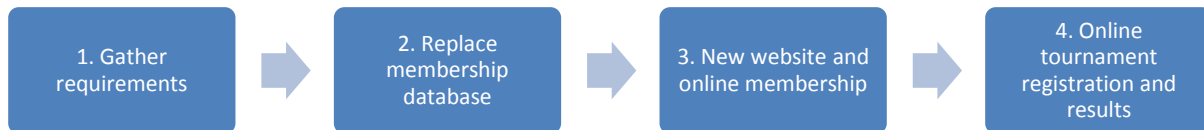
V. Phased Implementation Plan

The proposed system cannot be implemented all at once. Instead, it must be adopted in a phased approach. This gradual approach to change will ensure that the system is functioning properly at each step of the way and that it is easy to use and meets the needs of the organization.

The phased implementation can be broken into two major feature areas: (1) the membership database and online capabilities, and (2) the on-site tournament management software. Both of these feature areas can be implemented in parallel because they have limited dependency on one another.

A proposed implementation plan for each feature area is discussed below with a description of what should be done at each phase.

A. Membership database and online capabilities



Phase 1: Gather Requirements

The first phase in the implementation of the new system is to gather the complete requirements. This document serves as a starting point, but the plan needs to be worked out in more detail.

The requirements for the system need to be determined by people who are intimately involved with the current technology used by the USFA. This group must include people who have used the current system for years and are well-versed with its strengths and shortcomings. In addition to these experts, it is critical to include people that have built technology that seeks to solve some of the USFA's problems. These individuals offer a new perspective on the problems, and have experience with the issues that will arise during the construction of the new system.

A recommended group of individuals could include Sheryl Eberhardt and Marc Courtney (experts on the running of the computers at national events and knowledge of the national database), Dan McCormick (author of XSeed), Peet Sasaki (author of AskFRED.net) and Dan Berke (author of Fencing Time.)

The group of people assembled to determine the requirements of the system will need to fully understand how the different users of the system will need to be supported. A tentative list of users whose needs should be addressed includes:

- The national office staff that manages membership data and dues payment.
- The tournament committee that manages national tournament registrations and interfaces this data with on-site tournament software.

- The division officers that need access to their division's membership lists and current fencer data for running tournaments. They are also responsible for sanctioning events and submitting rating changes.
- The FOC, who may want to use the system to track referee ratings and development.
- The general membership that will visit the USFA website seeking current information on the USFA and national events. They will also want to join or renew their membership, register for national events, and view event results.
- The public at-large, seeking general information on the sport of fencing and how to get involved with the sport at their local level.

Use cases for each of the above user scenarios should be developed, and the general system requirements should be distilled from those cases. It will be essential to consult with representatives from each group to assist in determining what their specific needs are.

This first phase should take approximately two or three months to complete, depending on the availability of the persons involved. The cost for this phase should include any communication costs (conference calls, etc.) and potential travel needed for meetings with each other and representatives of each user group.

Phase 2: Replace the Membership Database

The backbone of the new system is the new membership database. This database will serve as the data source for tracking membership, ratings, tournament registrations, and results. Because it is so important to so many parts of the system, it must be designed properly and with an eye towards future growth.

Building on the information collected in Phase 1, the technical experts will need to define the database schema. It is critical that the schema is designed by people with a deep understanding of the needs of the overall system. If the schema is not designed with the entire system in mind, it will almost certainly fall short and make the addition of desired features more difficult if not impossible.

The first step in replacing the old database with a new one is the selection of a hosting service. The hosting service will provide the servers and software needed for the database. The USFA will be responsible for configuring the software and maintaining it once it has been set up. The cost for this service usually runs in the neighborhood of \$300/month, and varies depending on what kind of hardware is used.

After the server is set up at the datacenter, the new database must be created. This can be a quick one-time process if all of the requirements have been defined beforehand.

Once the database is set up, the existing membership data will need to be migrated from the old database to the new one. In some cases, the data will need to be modified in order to fit with the new schema. For example, club name abbreviations should follow a well-defined naming convention. While migrating club data to the new database, it may necessary to change club abbreviations to meet this

new convention. As a result, it may be necessary to develop some custom tools to aid in the transfer of the data.

A key component of the new database is the interface needed to update membership data. This interface will be used by the national office and no one else, and will most likely be accessed via a password-protected webpage. In this phase, the functionality of this webpage should mimic the existing tools used by the national office when updating member data and ratings.

This phase will take approximately three months to complete. The costs associated with it include the price of the server hosting, communication costs (conference calls between the design team), and possible travel for the design team to meet in person. Another cost will be the rate charged by the individual or company that actually implements the new database and writes the tools needed to aid in the transfer of data.

Phase 3: New USFA Website and Online Membership

Once the new membership database is online, work can begin on the core features of the USFA's online presence. The core task in this phase will be the design and implementation of the new USFA website along with all of its required features.

The requirements of the new website must be determined prior to its implementation. A key factor in this is the USOC. If the USOC imposes specific requirements for the website, the exact extent of their involvement will need to be understood.

If the USOC does not provide the software for hosting the USFA website, the first step will be to identify which one of the many free content management systems (CMS) to use for the site. After this has been determined, the site should first be set up with the content and functionality of the current USFA website. The site, in this scenario, will be hosted on the servers at the datacenter where the membership database resides.

If the USOC hosts the website, it will be necessary to provide an interface to the membership database running on the USFA's servers. This is usually done through by exposing web methods that provide data via a SOAP interface. By providing these interfaces, the USOC-hosted website can be built to access the USFA membership database.

Once the basic site is running, the features that interface with the new membership database should be added. These features include:

- Viewing live membership data (provided by the membership database.) The data can be made available to download in csv format to authorized individuals.
- Online membership, including payment processing. Payments can be handled by any number of credit-card processing services.
- The ability to query the website programmatically (via a SOAP interface) for membership validation of specific users. This interface would be used by external websites or software for validating membership status, birth year verification, etc.

The costs for this phase of implementation would primarily be payments to the individual or company that implements the website. The software needed for the website will either be provided by the USOC or as part of the package provided by the service hosting the USFA's servers. This phase should take approximately two months to implement.

Phase 4: *Online Tournament Registration and Results*

The next phase of implementation is the construction of an online tournament registration system that also includes results display. There are two distinct approaches that can be taken during this phase.

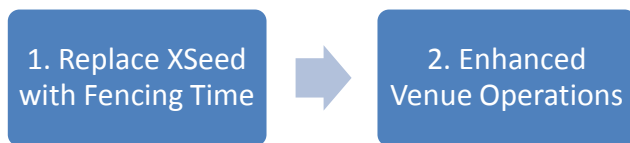
The first approach would be to license the AskFRED website and enhance it by giving it access to the USFA membership database. This would have the benefit of being a system that has already been widely accepted by the membership. In addition, AskFRED has been running for over five years, so it has evolved into a high-functioning website that has proven its stability and flexibility.

The second approach would be to build a registration service on the USFA website from scratch. A simple service could be implemented fairly quickly, but it would lack many of the advanced features that AskFRED provides. Results processing, in particular, would be a large undertaking in a new system.

Adapting AskFRED for the USFA's use would take approximately two months. The cost would need to be negotiated with Acetylene Solutions, the owner of AskFRED.

Creation of a new service that includes tournament registration and results would take approximately six months. Costs would primarily be the fees charged by the person or company hired to implement the service.

B. On-site tournament management software



Phase 1: *Replace XSeed with Fencing Time*

The first phase in upgrading the on-site tournament systems is replacing the aging XSeed program with the next version of Fencing Time. Fencing Time v2.2 will include the following changes requested by the USFA:

- Multiple club affiliations per fencer.
- Proper seeding of team events using new formula from the Athlete's Handbook.
- Better club/division separation when laying out pools.
- Proper handling of protected fencers when laying out pools.
- Allow manual swapping of fencers in the DE table.
- Proper handling of withdrawals in repechage rounds.

- Referee tracking by pool and bout.
- Referee usage reports.

Each laptop running Fencing Time can be set to display information on an external display such as a projector or LCD screen. In this phase, the USFA should consider purchasing three large LCD screens and station them around the venue near the traditional "bulletin board" locations. Each screen can be set to display information for the daily events in a specific weapon (one screen per weapon.) Depending on the logistics, VGA-to-Cat-5 converters (single or multiplex) may be needed to route cables to these screens.

Fencing Time v2.2 is scheduled to be complete by late 2008. A phased plan should be put in place to begin the adoption of Fencing Time and the phase-out of XSeed.

The costs associated with this phase mainly center around hardware purchases (LCD screens, storage cases for the screens, new laptops, etc.) Additionally, there may be costs associated with ongoing development of Fencing Time.

Phase2: Enhanced Venue Operations using Fencing Time Professional

The long-term plan for venue operations centers around the development of a client-server version of Fencing Time. This version will be fully networkable and utilize a database server that can be used by multiple client computers at a time.

Fencing Time Professional, as this version will be called, will allow the following capabilities:

- Multiple laptops can be used to run events simultaneously.
- Remote check-in of fencers that automatically updates the registration list on the server.
- Barcode scanners used to speed up check-in.
- Kiosks that can be placed around the venue for fencers and spectators to use to browse results, look up strip assignments, etc.

Fencing Time Professional will require a significant time investment in development. It is estimated that it will be ready in mid-to-late 2009.

Costs associated with this phase include hardware costs, as well as development costs for Fencing Time.