

NAVAL POSTGRADUATE SCHOOL

Monterey, California



THESIS

DEVELOPING A WATERFRONT INTRANET

by
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September, 1997

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DEVELOPING A WATERFRONT INTRANET

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Lieutenant, United States Navy
B.B.A. University of Oklahoma, 1989

Submitted in partial fulfillment of the
requirements for the degree of

**MASTER OF SCIENCE IN
INFORMATION TECHNOLOGY MANAGEMENT**


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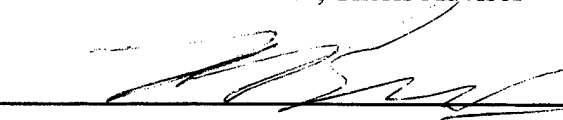
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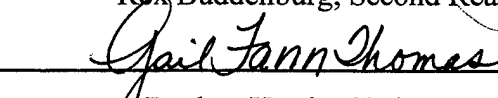
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I. INTRODUCTION

A. GOALS OF THE THESIS

The goal of this thesis is to describe in detail the justification and development of a Waterfront Intranet, a computer based network communication tool which will serve the Destroyer Squadron staff and its numerous and geographically dispersed ships. This thesis provides both the justification and the detailed requirements for an organization to successfully implement the Waterfront Intranet concept presented here.

B. INTRANET DEFINED

An Intranet is simply the use of World Wide Web technology within an organization to enhance communication, collaboration, and information distribution. Web browsers are employed as "universal clients" that access data and information stored on organizational computers. (King and Mizerak, 1996) An example of a web browser is the *Netscape Navigator* or *Microsoft Explorer* browser. Web servers are the medium through which information travels. A Web server is software that provides information to clients in Hyper Text Mark-up Language (HTML) format. The implementation of this technology has been recent, swift and broad, as organizations have quickly recognized the benefits to be realized from this new organizational 'network'. Presently, two-thirds of all large corporations

either have an internal Web server installed, or are considering installing one (King and Mizerak, 1996).

C. ASSUMPTIONS

1. Assumption #1 - This thesis proposes establishing a Waterfront Intranet which is meant to support ships that are in-port. This thesis will not address Internet/Intranet support for ships at sea. For more information on important work that is being done with regard to "Internet to Sea" the reader can visit "<http://dubhe.cc.nps.navy.mil/~seanet/>" on the World Wide Web.

2. Assumption #2 - For the present, assume that each ship has basic Internet access while in-port. The most practical method for doing so is addressed in Chapter V.

3. Assumption #3 - The Local Area Network at the Destroyer Squadron headquarters is an unclassified LAN with Internet Access. The current status of the COMDESRON SIX LAN is discussed further in Chapter II.

4. Assumption #4 - The Waterfront Intranet will be used for unclassified data only.

D. JUSTIFICATION FOR A WATERFRONT INTRANET

1. Waterfront Intranet

A Waterfront Intranet which provides access to all of the in-port ships and staff members in the form of a web browser will provide more open communication in the Squadron, quicker and more consistent information

flows (service) to the ships, and reduce the amount of time staff members must spend on the telephone handling repetitive and often simple information exchanges. This intranet will be a Squadron information clearinghouse, providing all key staff members with a 24-hour a day forum. While Chapter III addresses specific Intranet design, the remainder of this chapter provides justification for and explains the benefits of implementing the Waterfront Intranet.

2. "Push" VS "Pull"

Intranet technology represents a paradigm shift and a fundamental change in organizational culture. This is because the directional control of the information flow has shifted from the information creator to the user. If users are able to easily retrieve the information they need when they need it, there is no need for information to be sent to them just-in-case by the information creator. (Telleen,1995). The following example illustrates the point. Each morning aboard the ships, the officers line up at the "message trough" to read what new information they have been given. This occurs daily, despite the fact that, for the most part, the officers know their jobs and responsibilities. When they discover that they need more information, they are likely to ask the squadron staff for guidance. This request may be in the form of radio message traffic or a telephone call. If message traffic is chosen, it must be approved at all levels of the chain-of-command before transmittal. When the staff receives this request, it is once again digested at each level of the chain-of-command and passed "down" to the appropriate "system owner"

on the staff. Needless to say, the staff receives countless redundant requests for information. In an attempt by the staff to overcome this barrage of information requests, they send their response to everyone who might be even remotely interested, with interesting results. The initial requester gets the appropriate answer, while others receive the information as “good to know”, and others strenuously ponder how to respond to the unexpected bit of information. This is all an example of the failings of a “push mentality”. The Waterfront Intranet helps to create a shift in communications from “publisher push” to “user pull”. Some description of “Push” VS “Pull” is provided below (Telleen, 1996).

Content Providers

Push Mentality

- I know what you need - and I'll send it!
- I don't know what you need - so I'll send it all!
- I don't care if you need it - I'll send it anyway!
-

Pull Mentality

- I know my mission and audience
- I make information available on demand
- I measure and improve information usefulness.

Knowledge Workers

Push Mentality

- Someone needs to tickle me
- Someone needs to tell me what information is available
- Someone needs to tell me what information I need

Pull Mentality

- A set up my own ticklers
- I know how to find information when I need it
- My job is to determine what information I need

The Waterfront Intranet will allow the ships to search the staff's information base and "pull" the desired information at the exact time that they need it. Therefore, this is not a system that a Department Head on the ship would need to "check" on a daily basis (unlike message traffic). The information contained on the Waterfront Intranet should only need to be accessed when the user has a perceived need to gather information. (This is an important aspect to be considered with regard to content management, which is further discussed in Chapter III.) "Pulling" the desired information when needed is a much better method than "filing" message traffic at the ship "just-in-case" someone might need the information at a later date. Even if the information is found at a later date, its currency will be questionable and will probably need to be verified by a telephone call to the staff. The Waterfront Intranet will contain accurate and up-to-date information. This is not at all to suggest that the Waterfront Intranet is a wholesale replacement for message traffic. This is not the intent. The Waterfront Intranet should be viewed as an alternative choice when determining how best to communicate with the ships in-port and should be considered as a new communication alternative when reviewing processes for improvement.

Creators must retrain themselves to publish material without distributing it. Users must retrain themselves and take more initiative in determining their information needs. They must also play a more active role in satisfying these needs by learning to efficiently acquire information for themselves. (Telleen, 1995)

3. Quality and Consistency of Information

As discussed in greater detail in Chapter II, the squadron staff members are relied upon to provide timely and accurate guidance to the ships. The quality and consistency of this information will increase significantly when the Waterfront Intranet is implemented. In a sometimes hectic environment, the staff members are called upon to give quick answers to the ships' requests via the telephone or face-to-face conversation. The staff members, therefore, sometimes give answers that vary in their degree of accuracy or completeness. In those cases where a ship requests a "hard-copy" response via message traffic, the staff member is more likely to thoroughly research the area of interest and provide a better answer. This is because the message must contain the reference information, and the entire chain-of-command will review the message. This is not to say that the staff members intentionally perform sub-par when not being observed, but to say that when they try to answer the same question nine times over the course of a month, they may leave out a bit of information, or the answer may have changed during that time frame. When a staff member prepares the information to publish on the intranet, he will be publishing the Squadron Commander's position on whatever issue is being addressed. Therefore, instead of answering the same question nine times, he is spending more time initially to prepare a thorough document which accurately states the squadron's position and provides all relevant data and references. As a result, the ships can benefit equally from the knowledge of the staff member,

and the information remains on the intranet for the ship to discover, or "pull" when needed. Additionally, the Commodore or Chief Staff Officer has the capability of viewing the staffs' material on the intranet at their leisure, ensuring that the positions stated are in-line with the top leadership's view. An example of this information could range from providing direction to the ships on current Lube-Oil Policy or Ammunition Handling guidance to providing access to a database of Inspections and Assist Visits or CASREP parts requisition status.

The Waterfront Intranet should be implemented because it provides ships with access to high quality and consistent information around the clock. Currently, when the staff members are not in the office, there is very little recourse for a ship needing a specific problem solved or question answered. Because of the specialized structure of the staff, when the staff member is gone, so is the information. The Waterfront Intranet provides a means to keep the information available to all the ships while the staff member is consulting aboard one particular ship. This offers a win-win situation. The individual ship can benefit from the deck-plate level consulting provided by the staff, while the staff can still continue to provide excellent customer service to its ships.

4. Reach, Range Depth and Change

When considering the information flows from the staff to the ships in the squadron, four attributes must be considered. All of these are significantly enhanced with the implementation of the Waterfront Intranet.

The first attribute is *Reach*. *Reach* is defined as the combination of the geographic extent of an information system and the total number of people who have access to it (Hoffman, 1994). By making information available to the ships via the Internet, the information is available most anywhere in the world that the ship can access a telephone line. When the Internet is more readily available at sea, geographic *reach* will be maximized. As increasing numbers of personnel in the squadron are trained and become familiar with the Internet, numerical *reach* will continue to grow.

The second attribute is *range*. *Range* is defined as the extent to which information is shared across systems, across organizational boundaries, and across hierarchical levels (Hoffman, 1994). The Waterfront Intranet makes major contributions to getting good information out of the staff and out to the ships. This is not only accomplished by the employment of the technology, but also by helping the staff members to better organize their information and take more responsibility for its quality. This idea also enables both the staff and the ships to communicate the information easily throughout all hierarchical levels of the chain of command. Onboard the ship, the Chief Petty Officer or Ensign now has access to the same information as the Department Head. This not only encourages leaders aboard the ship to go out and find the information that they need (vice operating only on the information that has been given to them), but also helps to educate all levels of leadership with regards to the function of various departments and billets

at the squadron staff level. With the Waterfront Intranet implemented, a newly reporting Ensign can quickly have a much better grasp on the overall functionality of his chain-of-command.

The third and fourth attributes are *depth* and *change*. *Depth* is defined as the extent to which information penetrates individual business activities and processes. *Change* is defined as the ability of an information system to respond to changes in business and technology. (Hoffman, 1994) In the case of the Destroyer Squadron, this means that the Waterfront Intranet will be most effective when it is implemented and assimilated into the way the squadron does business on a day-to-day basis. This system will not be effective as long as it is a novelty, but only when the processes are adjusted to realize its strengths, weaknesses and the intent of its use. Additionally, as new ideas are generated for its use, and new technology creates new possibilities, the squadron must be willing and prepared to disregard some long standing methods and assumptions to realize the full value of using the Internet as an effective communication path.

5. Alignment

The Waterfront Intranet provides a method by which all of the players in the Destroyer Squadron team can view, with relative ease, the core processes of the entire organization. The Chief Engineer on a ship can readily view the programs and processes of the Combat Systems Department, and may just as easily examine quality of life programs at the Chaplain or

Command Master Chief web pages. This idea is the first step in providing global information access to the entire organization. The whole team now has the capability to start gaining the “bigger picture”. The term *alignment* is discussed in the following excerpt:

(Bill) Russell’s Celtics (winner of eleven world championships in thirteen years) demonstrate a phenomenon we have come to call “alignment,” when a group of people function as a whole. In most teams, the energies of individual members work at cross purposes. If we drew a picture of the team as a collection of individuals with different degrees of “personal power” (ability to accomplish intended results) headed in different directions in their lives, the picture might look something like Figure 1:

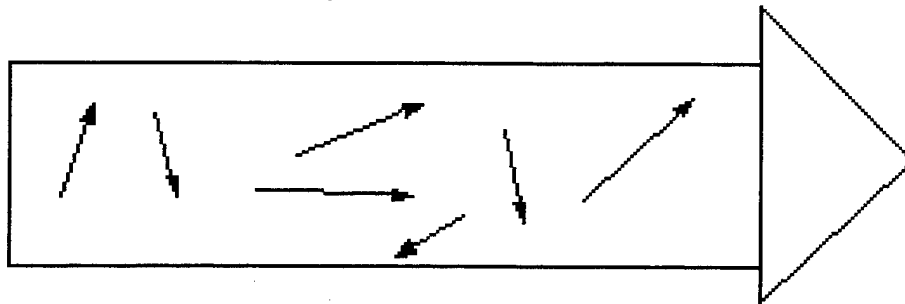


Figure 1. Non-aligned Team.

The fundamental characteristic of the relatively unaligned team is wasted energy. Individuals may work extraordinarily hard, but their effort does not efficiently translate to team effort. By contrast, when a team becomes more aligned, a commonality of direction emerges, and individuals’ energies harmonize, as illustrated in Figure 2. There is less wasted energy. In fact, a resonance or synergy develops, like the “coherent” light of a laser rather than the incoherent and scattered light of a light bulb. There is commonality or purpose, a shared vision and understanding of how to complement one another’s efforts.

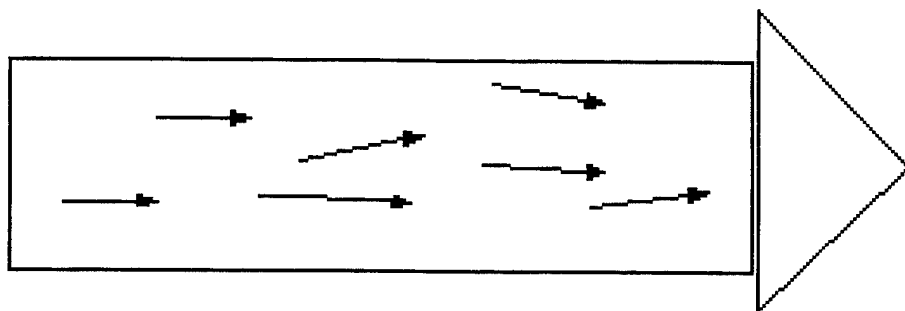


Figure 2. Aligned Team.

Individuals do not sacrifice their personal interests to the larger team vision; rather, the shared vision becomes an extension of their personal visions. In fact, alignment is the *necessary condition* before empowering the individual will empower the whole team. (Senge, 1990).

The Waterfront Intranet will promote alignment on a single ship and among the numerous ships in the squadron.

6. On-ramp to the Internet

The last justification for the Waterfront Intranet concept is professional education. The coming years will bring exciting new uses for the Internet, and those individuals and organizations who do not know how to utilize its capabilities will be at a significant disadvantage to those that do. The Waterfront Intranet can be viewed as the first step for many of the members in the squadron to become familiar with the Internet and its capabilities. While the staff and ships are learning to better organize their data and communicate more effectively utilizing this technology, they will be learning many other new and exciting uses for the Internet. Learning to

communicate effectively via radio message traffic and bridge-to-bridge radio are skills that we have been required to master. We have all been taught proper speaking skills for addressing audiences or just speaking on the telephone. Learning to communicate effectively using today's technology is our new tasking. It cannot be viewed as a novelty or as a luxury. The world of communications is changing and we must teach our organizations to adjust and take advantage of its new capabilities.

II. COMMANDER, DESTROYER SQUADRON SIX (COMDESRON SIX)

A. ORGANIZATION

1. Mission

DESRON SIX is a Destroyer Squadron with its headquarters ashore at Naval Station Pascagoula, Mississippi. The headquarters consists of the Commodore (Commander, Destroyer Squadron Six or COMDESRON SIX) and his staff of approximately 30 Officers and Enlisted personnel.

COMDESRON SIX is the ISIC (Immediate Superior in Command) for Naval Reserve Force FFGs home ported in Norfolk, VA, Mayport, FL and Pascagoula, MS. COMDESRON SIX is also designated Commander, Regional Support Group, Pascagoula (RSG Pascagoula).

The mission of COMDESRON SIX in the role of RSG Pascagoula is as follows:

...to ensure readiness of all surface ships assigned within the geographical area, in support of their capability to perform prompt, sustained combat operations at sea as dictated by national policy. RSGs, serving as the Type Commander's direct waterfront representative will: Direct, assign and monitor accomplishment of emergent depot level industrial repairs; screen ship maintenance requests to determine when and where maintenance will be performed based on availability of resources; provide coordination, support and direction to Group and Squadron Commanders and assigned ships as the focal point for port-related administrative and material readiness issues. This includes: logistics, training, readiness, manpower and personnel readiness, medical, legal and retention program oversight. Also, RSG will provide oversight for performance of subordinate maintenance activities including SIMAs and Dry-

dock facilities and other support units which may be assigned. Further, recognizing the many hardships associated with shipboard operations, RSG will provide pastoral support, counseling, resource coordination and information conduits to family program/quality of life managers. (Commander, Naval Surface Force, Atlantic, 1996.)

As an ISIC, COMDESRON SIX is also intimately responsible for those activities and programs which typically require close supervision and coordination in the following areas: Administrative, Operations, Material, and Training/Readiness. The ships rely on the COMDESRON SIX staff for timely and accurate guidance in achieving and maintaining readiness. The Commodore uses the expertise and experience of his staff to help formulate his guidance. In most cases, the staff members have recently been assigned to a similar position to the one that they are advising. For example, the Engineer Officers on DESRON SIX ships are "first-tour" department heads. The staff Engineer Officer was most likely in a similar position just before assuming his/her current duties on the staff. In the process of assisting and inspecting the ships, the staff members act as consultants aboard the ships as much as possible. While bringing the staff members face-to-face with their counterparts on the ships is ideal, much administrative work remains at the headquarters proper. The staff members' expertise is valuable onboard the ship, but the staff member can also be of great assistance at the headquarters where he/she has better access to resource data and Fleet Support activities (especially when the ship is operating at sea). While onboard the ship, the staff member can be thought of as a consultant, and

back at headquarters he can act as a “dragon slayer”, working to solve problems for the ship while the ship is at sea performing its mission.

The staff is limited with regards to the number of personnel available. The Waterfront Intranet is one idea that can help to stretch these resources and help to keep more staff members out on the ships “consulting”. The intranet achieves this by providing a forum for the staff to provide information to the ships on a continuous basis.

2. Structure

The COMDESRON SIX organizational structure is illustrated in Figure 3.

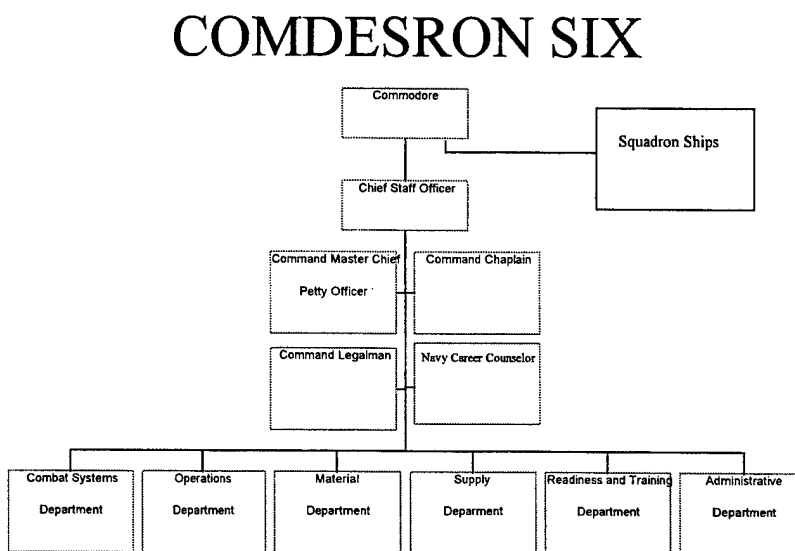


Figure 3. COMDESRON Organizational Structure.

B. INFORMATION FLOWS

1. Current Staff Automated Data Processing

The COMDESRON SIX staff uses a 10baseT LAN with 30 users. The LAN server is a DEC Computer with a 486 processor, 16MB of RAM and a 700MB Hard Drive. The LAN is classified Confidential High, and external connectivity via telephone is not authorized. The LAN is not Firewall equipped. Interconnection is provided to a gateway server with Commander, Naval Surface Force, Atlantic (COMNAVSURFLANT) Norfolk VA via a SDD (Secure Data Device).

The staff ADP Security Officer has investigated the feasibility of adding firewall protection to the Confidential LAN in order to provide Internet access to the staff, but found the firewall protection cost prohibitive. Based on estimates provided by NISE EAST Charleston SC, the cost would be approximately \$80,000.

Because of the low volume of Confidential data processing, the evolution of the Defense Messaging System (DMS) and the newly launched "Smart Base" project at Pascagoula, Mississippi, the COMDESRON SIX staff is planning to reconfigure to an UNCLASSIFIED LAN by Summer/Early Fall of 1997. This will allow affordable security and Internet access. As an interim measure, the staff has achieved access to email and the Internet by setting up an America Online account using stand-alone equipment. This has proven inexpensive and effective, however there is simply not enough

access. The staff is considering changing to an alternate Internet Service Provider.

Currently, there is no command-wide database in use. A Microsoft Access database is being developed to track the myriad of Inspections and Assist Visits which all of the ships must complete on a periodic basis. This database is a replacement for an old database that was written about three years ago and is no longer in use.

2. Current Information Flows

Currently, the majority of the information flows between the staff and the ships in-port are handled via telephone or radio message traffic.

COMDESRON SIX spends approximately \$1800.00 per month on Long Distance calls, based on recent representative data provided by the staff Supply Officer.

Based on the author's personal experience, a staff member working in the office can expect to spend 40-50% of his time on the telephone. At least half of that time on the telephone is spent answering incoming calls from ships requesting information such as approval, policy, or procedure. In many cases, the telephone call is simply a predecessor to the ultimate transmission of radio message traffic. The caller wants to "get a feel" for how the message will be received, what to write, etc. The reason for "calling and massaging" prior to sending a radio message can be understood by examining the high number of participants and visibility in Figure 4. In many cases this is wasteful in terms of the cost of the messaging, the time spent by the various

personnel and the additional information processing burden to each individual in the chain of command.

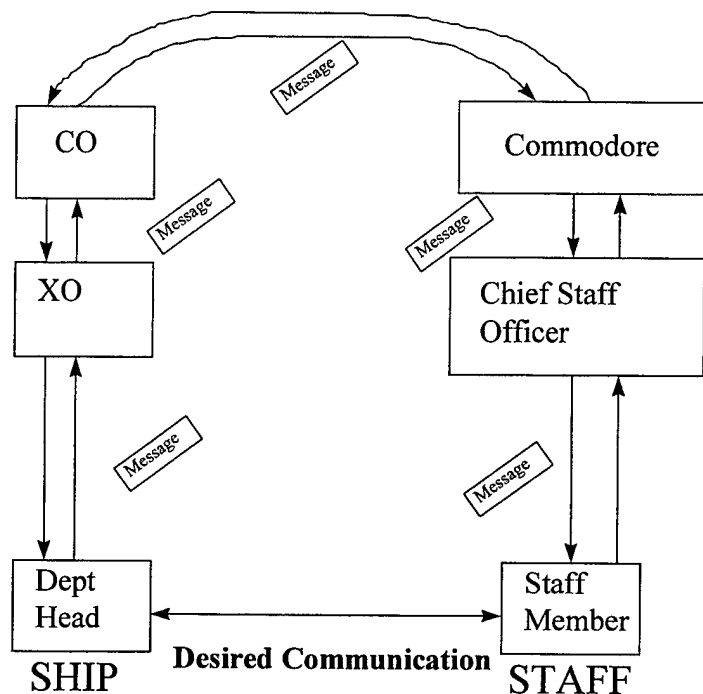


Figure 4. Actual Message Path VS. Desired Communications.

Although not exhaustive, the following is a list of representative information (by functional department) that is exchanged among the staff, ships and other support commands. All of these information exchanges are currently handled via radio message traffic or telephone. Some guidance is also published in the *Greyhound Express*, the quarterly newsletter of COMDESRON SIX. Much of the information exchanges noted below can benefit from Intranet implementation. These are indicated with an (*). Some of these, due to their secure or mission critical nature, are not considered candidates for Intranet usage.

MEDICAL:

- *Due dates of all ship's medical related inspections and assistance visits, such as Medical Readiness Evaluation, Industrial Hygiene Survey, Environmental Health Surveys, etc.
- *Information/guidance for Independent Duty Corpsmen (on the ships), clinic information, monthly Quality Assurance (QA) schedule, etc.
- *Current references to pertinent information
- *Dental Readiness data

COMMAND MASTER CHIEF PETTY OFFICER (CMC):

- *Changes to CMC instructions
- *Schedule for submission of awards packages, such as Sailor of the Year, Silver Cutlass, etc.
- *ESWS information
- *Meeting Schedules
- *Ombudsmen updates
- *Navy Relief information
- *Command Advancement Program information
- *Helpful phone references for various CMC activities

NCC (Career Counselor)

- *Various program updates
- *Career Information Training schedules
- *Changes to Reenlistment Bonuses and CREO groups
- *TERA information
- *Golden Anchor submission coordination

CHAPLAIN

- *Worship Service schedules
- *Special Events coordination
- *Selected Quality of Life issues

ADMIN

- *Coordination of various recurring reports
- *Inspection schedules and historical data
- *List of effective and available instructions
- *Commodores itinerary

READINESS AND TRAINING

- *Quarterly schools quotas coordination
- *All Surface Rescue Swimmer information (training, testing, references, etc.)
- *Ships' homecoming coordination

- *Various inspection coordination
- *Ships berthing coordination/Ships movements
- *Navigation Check-Ride coordination/references/data
- *Surface Force Training Manual guidance
- *SORTS (Status of Resources and Training) guidance
- *Casualty Reporting (CASREP) guidance
- *Aviation Certification guidance/references

COMBAT SYSTEMS

- *Required inspections and assistance visits information
- *Explosive Handling Program notes/guidance
- *Ammunition notes/guidance/references
- *Close-In Weapons System (CIWS) notes
- *Communications issues notes
- *Sonar Systems notes
- *Decommissioning information
- *Command Assessment of Readiness and Training (CART), Total Ship Training Availability (TSTA) and Final Evaluation Period (FEP) information, coordination, references and current check-sheets
- *General Claims Data requests
- *NARS Data requests
- *Magazine Sprinkler notes

OPERATIONS

- *Scheduling guidance
- Interactive Fleet Training planning/coordination
- Tactical Operations planning
- *Fuel Management coordination
- *Communications guidance and reference

MATERIAL

- *Casualty Report tracking and resolution
- *Repair Parts expedition
- *Cannibalization coordination
- *Engineering Training Group guidance and checklists
- *Engineering Department Administrative programs guidance

3. Proposed Information Flows

Wherever possible and feasible, the Intranet should be looked to as an alternate communication path for communicating with DESRON SIX entities

located in-port. The information flows indicated with a (*) above are examples of the types which are good candidates for Intranet communication. Some of these could be implemented by providing WEB-based documents on the Intranet, while others would best be implemented by providing Intranet access to a COMDESRON SIX maintained database. See Chapter III for a more detailed discussion regarding the actual implementation of this communication medium.

III. PROPOSED INTRANET

A. OVERVIEW

The Waterfront Intranet is a hybrid intranet; the staff members will gain access to the internal web via the Local Area Network, and the primary customers (the ships) will access the internal web via the Internet. A basic overview is provided here, and a more detailed discussion is provided in the sections that follow. These sections are entitled Hardware Considerations, Software Considerations, Content and Security Considerations.

The basic system can be described in two sections: the staff or server side (service and content) and the customer or client side (ships and staff members). In the case of the Waterfront Intranet, the individual staff members are both content providers and users, while the ships are primarily content users. A basic illustration of the system is provided in Figure 5.

The staff side can be further broken into two sections: the server side and the content side. With regard to the server side, at the staff headquarters, web server software will be installed on either the computer where the Local Area Network (LAN) server resides or on a separate computer that also resides on the LAN. As discussed in Chapter I, the purpose of this web server is to provide (serve) information to clients in Hyper Text Mark-up Language (HTML). The web server answers requests for information by transmitting the appropriate web page to the customer. The web server also provides security features which are discussed later in

this chapter. The computer which contains the web server software will also contain CGI (Common Gateway Interface) software which enables the web server to communicate with selected databases that reside on the Local Area Network. An example of such a database at COMDESRON SIX is the Inspections and Assist Visit Database. New databases are easily connected once they are developed. The computer containing the Web server will be assigned a permanent IP address (its Internet identification) and will maintain a constant Internet connection. With regard to the content side, staff members will provide content via various existing software on the LAN. Documents can be provided from basic word processing software such as Wordperfect and Microsoft Word, presentation slide-shows can be provided via existing graphics programs such as Microsoft Powerpoint, and if desired, users can design Web pages using software that is available free on the Internet or with an easy to use software package such as Microsoft FrontPage.

The customer side can be broken down into the staff members and the ships. The only thing that the staff members need to enable them to access the internal web from their node on the LAN is a web browser. A web browser is a software application that provides a graphical interface to the Internet or Intranet. A familiar example of a browser is the Netscape Navigator browser or Microsoft Internet Explorer. The ships will require three things to communicate with the Waterfront Intranet: a computer (network or stand-alone) which has a web browser, a reliable, dedicated

telephone line, and dial-up access to the Internet via an Internet Service Provider.

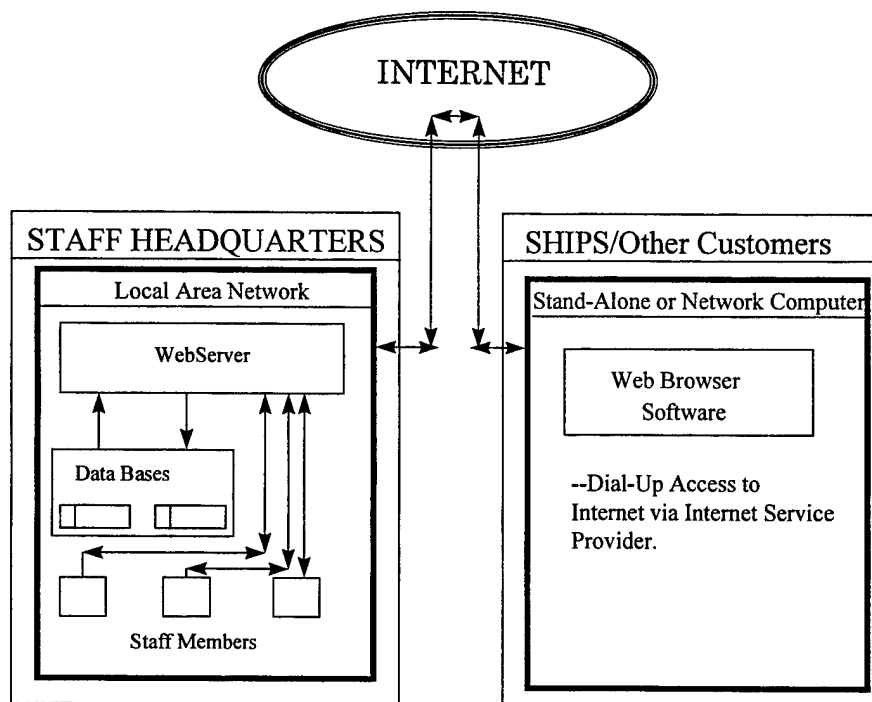


Figure 5. COMDESRON SIX Intranet.

B. HARDWARE CONSIDERATIONS

When determining which computer to install the web server on, if possible select the highest performance computer possible, specifically with regard to the amount of memory (RAM). The RAM requirement for web server software is discussed in the Software Considerations section of this chapter. It is advisable to install your web server software on a computer which will not be used as a full-time workstation, as this would significantly

degrade the server performance. Additionally, installing the web server on the same computer as the Network Server is not advisable, as this may degrade network performance. Considering the computer assets available at COMDESRON SIX and the relatively small size of the proposed Waterfront Intranet, initial installation of the web server software on a computer with a Pentium 75 MHz processor and 32 MB of RAM will be sufficient, provided the computer is not also the network server and the machine is not used as a workstation, but only used to serve and administer the Waterfront Intranet.

Although this would be sufficient initially, as the Waterfront Intranet gains popularity, a faster computer will be needed. Therefore, selection of the best machine possible at this time will keep performance high as usage grows, thereby not discouraging users from utilizing the Waterfront Intranet because of poor performance.

Besides the computer where the web server software resides, the only remaining requirement for the staff is a dedicated Internet connection to the Local Area Network. This is accomplished by installing a router, purchasing the appropriate telephone line service from the local telephone provider, and contracting with an Internet Service Provider (ISP) for an Internet connection. A router is a device used to connect two networks that may or may not be similar. The router employs an internet protocol present in each router and each host of the Internet. (Stallings and Slyke, 1994) Figure 6 illustrates the router's function.

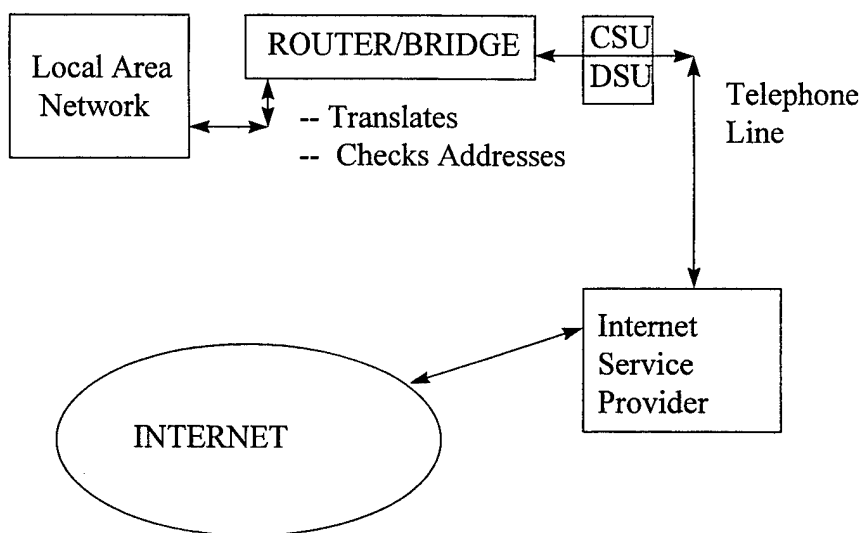


Figure 6. Router Function.

The specific type of router equipment purchased depends on the type of telephone line that will be selected. A basic telephone line connected via modem will only support, at present, about 28.8 to 33.6 kilobits per second (kbps) of data. While this is adequate for a single user, it is wholly inadequate for the entire staff to gain Internet access and to serve the external customers of the Waterfront Intranet. Therefore it is recommended that a Frame Relay Connection be established with an Internet Service Provider (ISP). Frame Relay connections are available in a wide range of speeds, such as 56 Kbps, or fractional T1 (128 Kbps, 384 Kbps, etc.). The amount of bandwidth required depends on the amount of activity between the router and the ISP. It is easy to upgrade the telephone line service as access

needs grow. A good starting place for the Waterfront Intranet would be a fractional T1 at 128 Kbps. A Frame Relay Line requires the installation of a CSU/DSU between the router end and the ISP, as indicated in Figure 6. The service provider can normally provide or recommend the proper equipment.

Having selected the type and capacity of the telephone line and an appropriate router, a permanent IP address and dedicated service must be established with an Internet Service Provider.

Although discretionary, installing an uninterruptible power supply is also encouraged.

The cost of these various services and related periphery equipment are addressed in detail in Chapter V.

C. SOFTWARE CONSIDERATIONS

1. Introduction

There are four primary software selections that must be made: The web browser, the web server, the database applications, and the method by which content will be created. Although various products were considered for these software choices, Microsoft products are recommended in the following paragraphs. As of 30 Mar 1997, Microsoft Windows NT network software has been designated as the baseline requirement for the fleet. This guidance was promulgated in a joint CINCLANT/CINCPAC message concerning the development and implementation of IT-21 (Appendix A). This guidance was promulgated in advance of DON-wide guidance from the DON Chief Information Officer (CIO) which will establish baseline standards DON-wide.

Therefore, software products that were designed to operate with Microsoft Windows NT are recommended below. In Chapter IV, the software tools used to develop the prototype are discussed.

2. The Browser

An enormous advantage of the Waterfront Intranet over standard Local Area Networks and proprietary work collaboration packages is platform independence. Because of the Internet Protocols used, it does not matter if a customer is using an IBM compatible PC, an Apple Macintosh, or a UNIX based platform. The only requirement for the client is that they are using a Worldwide Web Browser. These come in a variety of styles, but the two most popular are Netscape Navigator and Microsoft Internet Explorer. The latest versions of each match one another feature for feature, with one offering no apparent advantage over the other. They both offer the same basic functionality, and both offer the ability to add "features" or "plug-ins" to enhance their performance. This is desired because compliance with present (and even future) HTML standards is important as Web designers build more interactivity and richer multimedia content into their sites. Also, support for a variety of security protocols is important. Microsoft Internet Explorer is a standard feature in Microsoft's Windows 95 and NT operating systems but can also be downloaded at no cost from [<http://www.microsoft.com>]. The Microsoft Internet Explorer will become even more integrated into the Windows environment in future versions, making it appear less like a large application and more like part of the desktop. The Netscape Navigator

browser has all the functionality of MS Internet Explorer, but does not promise the level of desktop integration offered by Microsoft Internet Explorer. (Needleman, 1996) An additional incentive to choose Microsoft Internet Explorer over Netscape Navigator is that the government purchase of a user license for 40 copies of Netscape Navigator costs approximately \$1500, while Microsoft Internet Explorer is free. In July 1996, DOD purchased 180,000 license copies of Netscape Navigator for the Defense Information Systems Agency (DISA). DISA planned to use the World Wide Web browser to help plan, manage and execute military operations worldwide, placing the Navigator at the heart of the U.S. military communications system. (Balderston, 1996) Based on recent decisions to standardize on Microsoft, this no longer appears to be true. It would be wise to standardize the browser used throughout the destroyer squadron in order to facilitate more efficient guidance and technical assistance from the staff. Therefore, standardizing on the Microsoft Internet Explorer browser is recommended.

3. The Web Server

The most important aspects of consideration when recommending the web server are performance, security features, remote management and ease-of-use. Although several web servers were evaluated, two clearly stand out as the current leaders in the marketplace. These two are O'Reilly Software's WebSite Professional, and Microsoft IIS (Internet Information Server). In industry testing, both servers showed excellent performance levels. The web

servers were evaluated on speed (with up to 130 simultaneous users), bundled software features, ease of set-up, documentation, usage tracking and security features. Overall, O'Reilly's WebSite came out on top. Although MS IIS outperformed WebSite in speed, WebSite offers the greatest flexibility in setup and the best documentation of its features, including many tutorials on topics like setting up indexing and tracking visitors. WebSite also comes with the most impressive set of tools for keeping track of links and allowing visitors to search the contents of the web site. Microsoft IIS received good marks for its simplicity and speed but received low marks in overall features offered. (Needleman, 1996)

One drawback of Microsoft IIS is that it requires Windows NT Server software. WebSite Professional requires Windows 95 or NT Workstation (a much cheaper and less complicated alternative). Both servers offer remote management capabilities (the capability to monitor system performance and security, and also the ability to edit the current configuration). This is an excellent feature in the case of COMDESRON SIX. The responsible person could manage the web server from home or even from a squadron ship that the staff member is visiting. Although O'Reilly's WebSite Professional appears to be the better web server (slightly) for the implementation of the Waterfront Intranet, now that the fleet is standardizing on Microsoft server software, the best overall choice is Microsoft IIS. Microsoft IIS is already in use at COMNAVSURFLANT (a higher headquarters for COMDESRON SIX). Choosing a common server throughout the fleet will ensure future

interoperability and common support. The vast array of features and functionality of both servers can be reviewed in their most current form on the Internet at [<http://website.ora.com>] and [<http://www.microsoft.com>].

4. Database Applications

The IT-21 fleet standard (Appendix A) specifies that only relational databases that can support Web technology in accordance with the Defense Information Infrastructure Common Operating Environment (DII COE) will be used. Microsoft Access 97 has been designated as the standard database software for PCs. MS Access is a near industrial strength relational database that is relatively easy to learn and uses extensive Graphical User Interface (GUI) for both database design and application development (creating the "front-end", IE. menus, forms, queries, etc.). The Microsoft IIS Web Server includes built-in CGI tools which allow the integration of MS Access databases into Internet/Intranet applications. In the case of COMDESRON SIX, this means that the ships will be able to query selected databases for information such as CASREP Parts Requisition Status, information on Inspections and Assist Visits, etc. Additional CGI software is not required with Microsoft IIS. Microsoft Access 97 is a part of the Microsoft Office 97 Professional software suite which is an IT-21 standard for the PC.

5. Content Creation

Because the following section discusses content creation and management in more detail, this section only describes the necessary software. The word processing software specified for IT-21 is Microsoft Word

97. This word processing software includes the capability to save both existing and new files in HTML format for Web publishing. Most of the information provided by the Waterfront Intranet can be created using MS Word 97. In addition to creating text files for publishing on the Intranet, users may want to create graphical Web pages. Microsoft FrontPage Web publishing software is recommended for this function. FrontPage is a powerful Web publishing tool which allows users to create pages without any actual HTML coding skills. The entire page is created using a Graphical User Interface. FrontPage also displays heirarchical and graphical representations of the Web site showing all paths to and from any page. Finally, Microsoft Powerpoint 97 is a presentation software package that includes the ability to publish presentations in HTML format for the Internet/Intranet. These three packages (Word 97, FrontPage and Powerpoint 97) provide the staff members the software capabilities to create virtually all of the content for the Waterfront Intranet (with the exception of database information, which was discussed in the previous section).

D. CONTENT

1. Introduction

The content of the Waterfront Intranet is its sole reason for being. Ensuring that the content is of high quality and accurate (not out-of-date) is important to ensuring the usefulness of the Waterfront Intranet. This section discusses the physical method which will be employed for publishing

information on the Intranet and some policy considerations which will determine the quality and accuracy of the content.

2. Physical Method

The ability for individual staff members to quickly and easily publish information on the Waterfront Intranet is one of its many strong points. The first step in determining the various publishing processes and policies that must be established at COMDESRON SIX is to understand physically how the information is published. Figure 7 illustrates.

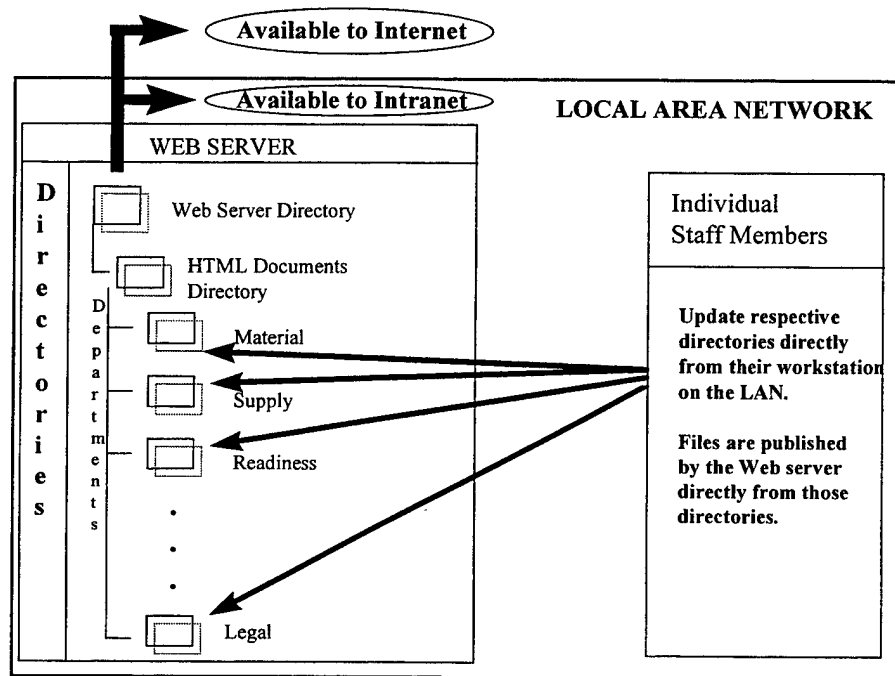


Figure 7. Notional Publishing Scheme.

The basic premise of the web server is that it contains a number of directories that contain files which are saved in HTML format ready to be

transmitted (served) upon a request from a client browser. If the web server is contacted by a client browser using only the web server's basic URL or Domain Name (without specifying a specific file or directory name), the Web server defaults to the directory and file that the administrator has specified during set-up of the server. This file would contain a "home page" for the organization or department and might show a web directory or listing of other pages/files available. From this page, the user would be able to click on various "hypertext" that would link the user to the requested directory or file. As indicated in Figure 7, the client might want to view a file or "page" in the Material department's directory, or they might want to go to that department's "home page" which would provide basic information and further direction. When a specific file contains some "hypertext" that allows a client to jump directly to a new file, that file is said to be "linked", or "hot-linked". Regardless of the method by which the desired file is reached, the important aspect to understand is that the file is never moved from one location to another. When created, a file will initially be saved in a specific location (directory), and will be accessed and updated by the content provider in the location where it resides. If the file is inadvertently moved to a new location in the directory structure, many if not all of the links to that page from other pages will not function properly. This is one reason why a graphical representation of the web provided by the web server software is very helpful.

Content Creation/Update Example: The Material Officer wants to publish some guidance concerning a new Lubricating Oil instruction that was

just published. The officer opens Microsoft Word on his desktop workstation and creates a new file. He then prepares a basic text document describing the new reference, specific pointers and possibly lessons learned about the Lubricating Oil program. Once the content is complete to his satisfaction (and others, depending on local policy), he saves the file by selecting "Save As HTML" from the Microsoft Word menu. When the desired location of the file is requested, he would then enter the appropriate location. An example of the location might be [D:/Webserver/Htdocs/Material/lubeoil.htm]. He might then access the "Material Department Home Page" by opening the document in MS Word or MS FrontPage. The location of the home page in this example would probably be [D:/Webserver/Htdocs/Material/home.htm]. Once accessed, he would add a link to the new document by creating a string of "hypertext", adding a linked GIF (an image), or updating an image map, depending on the design of his homepage. In any case, a link will be established directly to [D:/Webserver/Htdocs/Material/lubeoil.htm]. In the future, if he wanted to make a change to this document, he would just open the file directly in MS Word, modify it and save it. The file would never change locations.

This example describes all that is involved in physically creating/updating content. It requires no copying of files to disks or reloading them to another computer. Nor does it require any recreation of data or "retyping" to make the information "fit". Creation of content for the Waterfront Intranet is as easy or easier that creating a GENADMIN message

for transmission. Most of the skills required are already possessed by all of the squadron staff members. Today's software is designed with Web interoperability in mind. If new software does not support this "up-to-date" function, it should remain on the shelf.

3. Policy Considerations

This section discusses various questions that need to be considered while designing appropriate policy for the creation and maintenance of the Waterfront Intranet content.

a. Question 1

Should a standard format be established for the creation of all Web pages? Answer: There are three considerations that come to mind here. The first is ease of creation. The second is user familiarity. The third is Web server performance.

Ease of Creation - A big advantage to requiring a standard format is the ability to create "boilerplates" that allow each content provider or the administrator to create their home pages quickly and without undue struggle. The purpose of the Waterfront Intranet is information, not a competition in creativity. The "boilerplate" method also allows the administrator to ensure that all of the home pages will be of acceptable viewing quality (IE. Proper font size, no excessive use of animation, etc.) Establishing a method that allows quick development and adequate oversight promotes concentration on content quality, as opposed to creative genius.

Much of this creativity could be put to better use finding new information and better uses for it.

User Familiarity - the various pages of the intranet should be kept as consistent as possible. Information that logically belongs together should be consistently grouped together and information should be located in the same area each time a new home page is accessed. (Kendall and Kendall, 1995) Examples: If clicking on a GIF (image) of a small blue house on one page takes the user back to a certain location of the Web, then that image should do the same thing in each place it is seen. If the name and phone number of the Department Head is shown in the top center of one homepage, that information should be located in the same spot on other pages. These methods allow the user to spend more time concentrating on the content and less time on navigation.

Web Server Performance - The performance of the Web server could be degraded if users choose to overpopulate their pages with animated images, visitor counters, full screen photographs, etc. Creating policy with regards to standards in design could limit these "performance robbers".

Based on these three areas of discussion, developing a standard, at least to a certain level, is recommended. This policy may be just to establish a common look and feel for the COMDESRON SIX home page, and each department's home page. Levels below these could allow more creativity, within the guidelines of limited animation, criteria for the use of images, etc.

A primary concern to the policy maker should be the effect on the end user. Creating content that decreases performance or desirability may lead the intended users to ignore the system entirely. Not only should standards be established, but they should be established at the very beginning of the life of the intranet.

In a case study of a large engineering group that embarked on a major intranet building project in the private sector, the group found that imposing structure on the Intranet after the fact is much harder than setting standards in advance. People developing pages for an intranet will not waste their time creating sites that eventually have to be redone. This case study also reinforces the idea that a consistent look and feel across the Intranet makes it easier for employees to find and use information. (Callaway, 1996)

b. Question 2

How do we ensure that information is of high quality and remains current? Answer: Maintaining the quality, accuracy and currency of the information is extremely important. The idea of the Waterfront Intranet is to allow end users to access quality, up-to-date information when they want it . If this information content can not be relied upon, the system will be useless. The first step is to ensure the accuracy and completeness of the information at the time of creation. The hope is that simply publishing information and answers in a formal fashion will lead to more accurate and consistent flows of information to the ships. Therefore, policy should be

established to detail what review is required for different types of information and also for different authors.

For example, an individual may be assigned to regularly update a database, such as CASREP Parts Requisition Status. This data would be publishable immediately without any further requirement for review. Additionally, the various Department heads may be allowed to publish information relevant to their specialties, much as they answer questions and provide guidance over the telephone or on the deck plates of the ships each day. On the other hand, a designated individual may be appointed to review important subjects which, by their nature, imply "commander's intent", and should therefore be subject to the approval of higher authority.

As important as the quality of the information that is published is the proper type of information. This is where the purpose of the Waterfront Intranet should be kept in mind. The Waterfront Intranet is hinged on the idea of "information pull". The customers (ships) should not have to check the Intranet each day for new information (the way they check message traffic now). Information published should be of a nature that when a ship has a need for information, they can turn to the Waterfront Intranet to find that information waiting for them. This is the opposite of the "information push" involved with record message traffic. Therefore, the Waterfront Intranet should not be used to task ships or provide them with time sensitive information. This is the purpose of record message traffic.

Another good indicator that information should be published on the Intranet is by taking note of telephone calls that the staff member recognizes as an information exchange that could have best been handled via the Intranet. If a ship calls requesting specific information, it is possible that this information could be published on the Intranet for all to retrieve at their leisure, vice sending out a general "for your information" message to all of the ships.

With regards to maintaining the currency of information content on the Intranet, a policy should be developed that ensures a periodic and systematic review of each page of information by the author or cognizant staff member. One method is to provide "date of last review" or "this page is scheduled for review on date..." on each page. This would allow each cognizant staff member to ensure that their pages are reviewed regularly. An additional method would be to establish an appropriate feedback system via email with the ships. The Waterfront Intranet could provide "hot-links" that would allow the client to easily provide email feedback if they find obviously out-of-date information.

c. Question 3

Who will maintain the web server software and the organization of the Waterfront Intranet? Answer: This individual is normally called the "Webmaster". These duties should be assigned to both a primary individual and an assistant. These individuals should be familiar with the Local Area Network hardware and software, and of course have a detailed

understanding of all of the functions of the web server. The Webmaster should be responsible for providing some training to the other staff members with regards to publishing content and home pages and some basic procedures for Staff Duty Officers (even though the Webmaster can administer the web server remotely). The Webmaster is also responsible for maintaining the security features of the Intranet as well as providing some basic content review and oversight (to monitor performance). COMDESRON SIX may consider subscribing to one or more periodicals to assist the staff members and the Webmaster in their duties. Many electronic periodicals are available on-line on the Internet. Lots of good ideas about Intranet applications and management can be gleaned from these publications. Intranets are hot news in the private sector and there is no shortage of new ideas.

d. Question 4

Should we establish policy to eliminate personal "web-surfing" not directly related to the performance of staff duties? Answer: This is a controversial subject, and may best be addressed by deferring to the IT policy established by the higher commander regarding proper use of government property. That aside, introducing staff members to the Internet and allowing some "web-surfing" is much like on-the-job training. Staff members must become increasingly used to accessing information via the web browser. As Microsoft Windows was once positioned as the universal interface to all applications residing on one's PC, today, the browser is becoming the

universal interface to all information types, whether that information resides on the Internet, on one's PC or on the Local Area Network or Intranet (Process Software Corp., 1996). Staff members should be encouraged to seek out information on the Internet. Rampant "web-surfing" is most likely self-regulating, much like anything that is new. Once the "newness" wears off, visits to the Internet will most likely become more specific in nature. Instead of "surfing", the users will be "searching" for a specific piece of information.

There is no way to positively identify every policy requirement, but any policy decision should include the following questions:

- Does this policy enhance the product for the customer?
- Does this policy reinforce the proper and intended use of the Intranet?
- Would this policy possibly cause the Intranet to be ignored or undermined?

Finally, a method must be established to allow feedback from the customers which includes both new applications for the intranet and better ways to conduct current processes. Feedback on proposed policy decisions should also be strongly considered.

E. SECURITY CONSIDERATIONS

1. Security Basics

A popular conception of computer security is that its only goal is secrecy. Secrecy can be a very important aspect of computer security, but it is not the whole story. There are three distinct aspects of computer security:

secrecy (sometimes called confidentiality), accuracy (sometimes called integrity), and availability (Russell and Gangemi, 1991). Depending on an organization's systems and environment, one aspect of security may be more important than others.

Secrecy ensures that users access only the information they're allowed to access. It also prevents unauthorized users to access information.

Password protection and encryption are some examples of enforcing secrecy.

Accuracy means that the system must not corrupt the information or allow any unauthorized malicious or accidental changes to it. Accuracy can be enforced in a number of ways, to include limiting "write" access to important files, developing adequate policy and through authentication, a method that ensures that the information is received in exactly the form in which it was sent.

Availability means that the computer system's hardware and software keeps working efficiently and that the system is able to recover quickly and completely if a disaster occurs. The degree of availability is a function of proper implementation, administration and training.

Because significant resources can be expended on computer and network security, it is necessary to consider the value of the information and system that you are trying to protect. Additionally, you must consider which aspect of security is most important, and how important. A good place to start is by examining some of the basic vulnerabilities to computers listed below:

- Physical - Buildings and computer rooms are vulnerable to intruders.
- Natural - Natural disasters and environmental conditions threaten systems. Fire, flood, earthquakes, lightning, power loss, dust and humidity can destroy data.
- Media - Disks can be damaged by ball-point pens, poor handling, etc. Additionally, an "erased" disk may still contain sensitive data.
- Communications - Messages can be intercepted, misrouted and forged.
- Human - People who administer and use the system are the greatest threat. A poorly trained administrator, poor enforcement of policy or careless users can bring the system to its knees (Russell and Gangemi, 1991).

Once you consider the vulnerabilities, the value of the information and the criticality of its availability, you can determine what controls you are willing to pay for in regard to computer security. In some cases, this may be less of a decision because of a policy created at a higher level in your organization.

2. Firewalls

A firewall is a computer, router or other communications device which filters access to a protected network. It allows you to protect your computer network from unwarranted intrusion from the Internet whilst allowing people inside the company to get access to Internet services. They can also be used as an access control measure to allow only certain people within the organization access to the Internet. Many firewalls now contain features to control, authenticate and secure a user who may want to access a company's

internal data from the Internet or from another company. These services are becoming more and more in demand. (Carleton, 1996)

Firewall implementations can cost \$50,000 to \$100,000 and more. Therefore, the implementation of a firewall must be well justified with regards to the value of the information it protects.

3. Web Server Security Features

Many popular web servers offer a variety of excellent security features which may include encrypted transmission methods, URL selectivity and password protection. These are discussed below.

There are several products on the market used for encrypting information. These include Pretty Good Privacy (PGP) and Verisign™ products, which both use the Rivest, Shamir, and Adleman (RSA) public key encryption algorithm. (Mizerak and King, 1995) The web server must be able to transmit and receive this encrypted information over the Internet. Secure Sockets Layer (SSL) and Secure HTTP (S-HTTP) are protocols that enable them to do so.

SSL is a protocol developed by Netscape Communications. It provides a secure layer ("socket") just above the network layer of the OSI reference model as indicated in Figure 8.

SSL: Connection-level Security

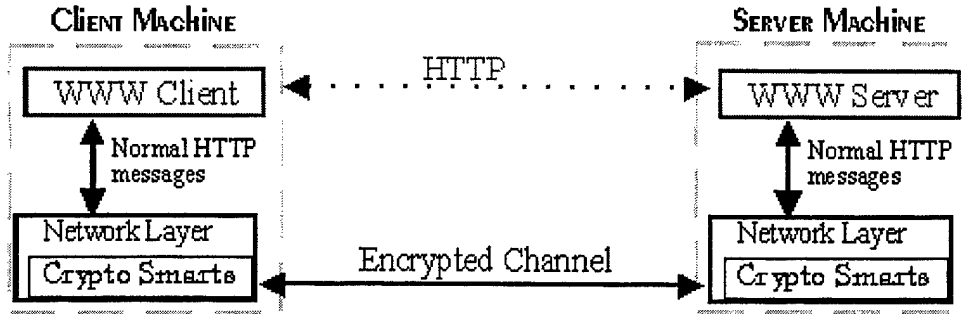


Figure 8. SSL.

The advantage of the SSL Protocol is that it is application protocol independent. A "higher level" application protocol (e.g. HTTP, FTP, TELNET, etc.) can layer on top of the SSL Protocol transparently. The SSL Protocol can negotiate an encryption algorithm and session key as well as authenticate a server before the application protocol transmits or receives its first byte of data. All of the application protocol data is transmitted encrypted, ensuring privacy. (Netscape Communications, 1996) SSL can assure transactions are private and that information has not been altered during transmission.

S-HTTP provides a secure layer at the application layer of the OSI reference model, as shown in Figure 9.

S-HTTP: Application-level Security

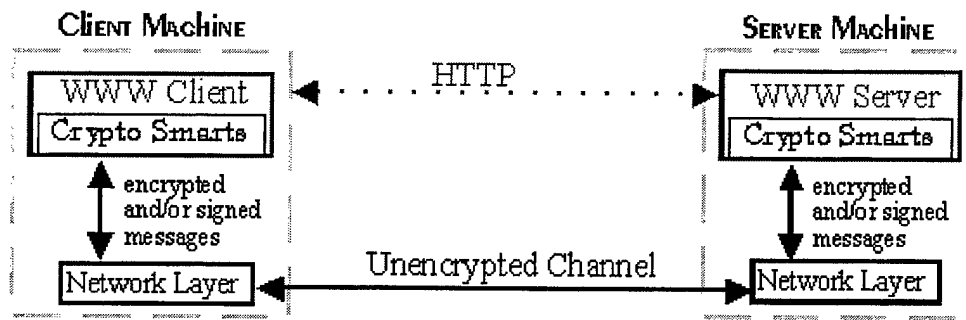


Figure 9. S-HTTP.

S-HTTP can digitally sign and encrypt specific documents. This ability to authenticate the contents of specific documents provides a level of security that SSL alone cannot provide. The greatest security can be implemented by using both SSL and S-HTTP in combination. (O'Reilly Software, 1996)

A URL (Uniform Resource Locator) is a string of characters that identifies the Internet resource (user). URL selectivity is simply the capability of a web server to allow the administrator to select which URLs will have access to the HTML pages served by the web server (access to the web site). The administrator can set up the web server so that any URL can gain access except selected URLs, or the administrator can specify a set of URLs with access, excluding all others. The latter would be the case for the Waterfront Intranet (i.e. The ships, CNSL, etc. might have access but no others).

In addition to specifying which URLs may have access to the Web site, the administrator may also choose to selectively password protect certain forums or "pages". For instance, all HTML pages in the Commodore's directory may be password protected. This doesn't provide any significant level of secrecy, per se, but does allow some degree of privacy.

IV. PROTOTYPE INTRANET

A. OVERVIEW

A prototype of the Waterfront Intranet was developed by the author for three reasons: 1) To demonstrate the possibilities of using Worldwide Web technology to enhance communications within the destroyer squadron, 2) to involve potential end-users in the development process and determine if there really is a perceived need for the Waterfront Intranet, and 3) to discover some "lessons learned" that can be applied by the end user to aid in establishing the actual program.

The prototype is not intended to provide the HTML coding (web pages) that will be used for the actual system. The prototype is not a complete system and is not intended to be anything more than a flexible vehicle to illustrate the Waterfront Intranet concept and to be used as an educational tool along with this thesis for a destroyer squadron or another organization who wishes to adopt this concept. The reader should be warned that adoption of the incomplete prototype should not be substituted for a complete review of the organization's information requirements and a structured plan for meeting some of those requirements with this technology. This plan should include all those areas discussed in Chapter III.

Appendix B contains numerous "screen shots" from the prototype, which is currently available for viewing at [<http://venus.as.nps.navy.mil>].

B. DEVELOPMENT OF THE PROTOTYPE

The author was provided access to a Pentium 166 MHz computer with 64 MB of RAM and a 4 GB hard drive. This computer was located at the Naval Postgraduate School and was more than sufficient for the task. The system was equipped with an external 100 MB IoMega ZIP drive that made frequent back-ups of the data a simple task.

A working group of six students (all working on various intranet related projects) evaluated a number of popular web servers, and determined that O'Reilly's WebSite Professional web server software would be an excellent choice for those reasons already discussed in Chapter III. This software was very easy to learn to operate, and in just a few days the author was comfortable with all the various functions offered.

Because it was necessary to edit the prototype both at the Naval Postgraduate School and from the author's home, an FTP (File Transfer Protocol) server was installed on the computer residing at the school. The software chosen can be downloaded from the Internet at no cost. The software is called WARFTP and can be located at <http://www.jgaa.com./warftpd2.htm>. The software has easily manageable security features that allow the administrator to choose who can gain access to the computer's file system and what privileges (read, write, execute) are assigned to those users. Using this software, the author was able to quickly transfer files to and from the school computer for editing. In addition to the FTP server, the client must be equipped with client-side FTP software.

Several versions of this type of software can be located on the Internet and downloaded at no cost.

Creation of the Web pages was initially attempted with a free product called AOL Press. This software is a graphics driven web design application that allows the user to create web pages without any actual HTML coding. Although this software was helpful in getting a very basic product published quickly, the author quickly determined that the software lacked the sophistication required for professional quality web pages. This led to the purchase of Microsoft FrontPage web design software. This too is an entirely graphics driven web design tool that avoids actual HTML coding. This is an extremely capable product that is easy and quick to learn.

The initial pages created were intentionally very simple. They were text-only and they all looked the same. The reason for this approach was to avoid having the project look "gimmicky" and to focus attention on the concept and content. This approach did not work. The first "draft" of the prototype did not get a great deal of attention from COMDESRON SIX. Although the reason is unclear, the author speculates that the pages were just too dull. It was then time to resort to gimmicks. Interesting pictures such as movie stars and images such as colored balls and bullets were downloaded from the Internet to be used on the web pages. The pages were recreated with varying colors of backgrounds, movie star pictures, interesting names, such as "LT U. B. Safe" for the safety officer and "Captain I. M. Tuff" for the Commodore. Although the pages were somewhat gaudy and

seemingly would detract from the concept, COMDESRON SIX staff members then began to look at the prototype and the feedback started flowing in.

Once adequate information and feedback were in hand, the author was able to remove the “gimmicks” and replace them with better quality material. It would seem that gimmicks are not always a bad thing.

C. PROTOTYPE CONTENT

The initial content of the prototype was conceived by the author based on past experience serving as the Readiness and Training Officer on the staff of COMDESRON SIX. A list of likely processes to be considered was compiled and given to the COMDESRON SIX staff for consideration. Some processes were removed by staff members or the author, while some were created. Although most of the areas addressed are presented in the form of static information, two processes require the use of a database and accessing that database via the Intranet/Internet.

The first of these two was the Inspections and Assist Visit Database. The ships and staff must track, schedule and participate in over 100 different Inspections and Assist Visits. This is a difficult feat even without the problem of nine ships and the staff having varying dates and information regarding these events. Therefore, to establish a centralized database maintained by the staff and to make it accessible to the ships via the Intranet/Internet could certainly improve the current process. The ships would be able to query the database by ship name to determine their specific historical and scheduling data, or query the database by inspection name to

gain comprehensive information such as where the inspectors come from, how many come, how long the event lasts, what the periodicity is and where information/check-sheets can be obtained. Although the staff had created a Microsoft Excel spreadsheet that recorded some of this information, the author determined that for full functionality, a high quality database should be created with Microsoft Access for this purpose. For the prototype, a very simple (and not very functional) database was created simply to demonstrate the concept of accessing a database via a web page.

The second process that required a database was that of providing the ships timely information regarding the status of CASREP Parts Requisition. Currently the staff creates a single page document to send this information to each of the ships via SALTS or FAX daily. A better idea would be to maintain active CASREPs that require parts in a simple database that could be queried by the ships via the Intranet/Internet. This concept is demonstrated in the prototype.

All database connectivity demonstrated in the prototype was accomplished using Cold Fusion Professional. Cold Fusion is a CGI software product that comes bundled with WebSite Professional. Cold Fusion Professional is a more capable version that was acquired separately and used to upgrade the existing version. CGI is discussed in Chapter III.

D. LESSONS LEARNED

1. Browser

Ensure the client is using a web browser which supports current HTML features, such as tables and frames. In other words, if the client is using Microsoft Internet Explorer, ensure that they have the most current version. Additionally, it is helpful to have copies of the various web browsers that the client might use. This gives the creator the ability to test the appearance and operation of the web pages using the various web browsers.

2. Monitors

Know, in general, the size of the computer monitors that the clients will most likely be using. This will allow the creator to adjust his screen resolution and font sizes appropriately. During the initial phase of creating the prototype, the author used a 17 inch monitor. The resulting web pages contained font which was much too large for small monitors (which the majority of the customers use).

3. Tools

Attempt to identify popular and capable software tools in the beginning of the project. A little more research and expense on the front-end of the project is easier to bear than learning new software tools and recreating the product in the middle of the project.

4. Appearance

Attempt to create attractive and user-friendly web pages that will appeal to the users. Dull pages do not get much attention.

5. Feedback

Implement new information provided by the customers as quickly as possible after receiving it. This helps to maintain their interest in the product and encourages more feedback. Make submission of feedback easy. An example might be to include a link to an email utility so that a viewer can send feedback by clicking on an icon while viewing the page of interest.

6. Directory Structure

Maintain a logical directory structure to contain all of the HTML files, image files, CGI Templates, etc. Because the author was initially unfamiliar with this type of project, all files were initially maintained in a single default directory. This led to an enormous directory with very little accountability for where files were being actually used. The directory contained many old files that were no longer used at all. For the actual implementation of the Waterfront Intranet, a proper directory structure will be imperative for managing content which will be provided by many sources.

E. COMPLETION OF THE PROTOTYPE

While the prototype will never be "complete", a stopping point must be established. Therefore, no modifications will be made to the prototype by the author after 30 June 1997. Further creation or fine tuning of the prototype will provide very little added value with regard to its main purpose of demonstrating the Waterfront Intranet concept. Any future efforts should be directed to the actual implementation of a pilot program at a destroyer squadron or like organization.

V. COST

A. ASSUMPTIONS

When determining the cost of implementing the Waterfront Intranet at COMDESRON SIX, the author assumes that, prior to implementation, the existing LAN will be replaced with a 100 Mbps (Fast Ethernet) LAN in accordance with CINPACFLT/CINCLANTFLT guidance (Appendix A). This installation will include Microsoft Windows NT 4.0 Server and Microsoft Office 97 Professional. The author also assumes that the ships will have acquired Microsoft Office 97 in accordance with Appendix A.

B. MARGINAL COSTS

The following software requirements are provided in the Microsoft Windows NT 4.0 and Office 97 suite. Therefore, they do not represent any marginal cost.

1. The Web Server

The Microsoft IIS web server is bundled with Microsoft Windows NT 4.0.

2. The Browser

The Microsoft Internet Explorer web browser is also bundled with Microsoft Windows NT 4.0.

3. Web Publishing Tools

The capability to save documents as HTML is a function included in the existing Microsoft Word 97. The capability to design web pages is

provided by Microsoft FrontPage web design software, which is also bundled with Microsoft Windows NT 4.0.

4. The Router

Because it is uncertain whether or not the COMDESRON SIX LAN installation will include Internet connectivity, the router may or may not be a marginal cost with regard to the implementation decision. In either case, a high quality router suitable for this purpose can be purchased for approximately \$3,500. In addition to the router, a CSU/DSU must be purchased. The specific hardware depends on the particular service level of the line service purchased, but the cost is approximately \$1,000. The service provider can normally provide the proper equipment (router and CSU/DSU). (Softaware, Inc., 1997)

5. Internet Connection for the Staff

A fractional T-1 line capable of 128Kbps should be acceptable for the COMDESRON SIX headquarters connection. The capacity of this line can be easily upgraded as demand increases. A survey of the Internet indicates that the monthly recurring service fee for a 128 Kbps Frame Relay line costs approximately \$450. A more capable line of 384 Kbps costs about \$600 per month. (Softaware, Inc., 1997)

6. Internet Connection for the Ships

The ships need to establish 33.6 Kbps dial-up service connection with an Internet Service provider. This service should include a static IP address. When most private parties have a dial-up Internet connection, they will be

given a different IP address each time they dial-up the local point-of-presence. With a static IP address, the user's IP address will always be the same. A static IP address is important so that the web server can identify who is gaining access to the web and set security parameters that allow access only to selected users (who are identified by their IP address). The cost of dial-up internet access with a static IP address is approximately \$30 per month for unlimited access. A dedicated line (the Internet connection is always present) costs about \$100 per month. (Global Connect, Inc., 1997)

7. Totals

The total approximate marginal cost at the destroyer squadron headquarters is about \$4500 plus a \$450 per month service fee (total annual service fee of about \$5400). The total cost for each ship is about \$30 to \$100 per month, depending on service selection. This amounts to a per ship annual fee of about \$360 to \$1200. If the destroyer squadron selected a 128 Kbps line and each of the nine ships selected a dedicated line, the total annual cost to the U. S. Navy would be about \$16,200.

C. POSSIBLE COST REDUCTIONS

When the Waterfront Intranet is fully implemented, some of the possible cost reductions include long distance telephone costs and mail costs. These reductions are not the primary benefit of the Waterfront Intranet but should be noted. Obviously, reduced time spent on the telephone reduces long distance fees, although this is offset by the monthly fees associated with Internet access. With regards to mail costs, by evaluating the outgoing mail

and determining what could be more cost effectively published via the Internet, costs could be reduced. An example is the publishing of a COMDESRON SIX instruction that has been revised. Instead of mailing a copy to all concerned, the instruction could be distributed in electronic form. Not only would this decrease mail costs, but the user would then have an electronic copy of the document that could be distributed via the user's LAN, instead of photocopied, thereby further reducing costs. These types of examples need to be considered when evaluating current processes and exploiting the Internet/Intranet.

VI. IMPLEMENTATION CONSIDERATIONS

A. INTRODUCTION

This chapter briefly discusses several areas that should receive attention when planning for the implementation of the Waterfront Intranet. Because the topic of planned change covers such a broad spectrum, specific implementation instructions are avoided here. Another graduate student at the Naval Postgraduate School is addressing the implementation of this system in a full thesis which is being written somewhat concurrently.

At a minimum, the author assumes that the implementation will be based on an implementation plan which shall be acceptable to the COMDESRON SIX staff and ships. The following areas of concern should be addressed in the implementation plan.

B. AREAS OF CONCERN

1. Adoption of the Prototype

As mentioned in Chapter IV, the existing prototype was developed solely to demonstrate the Waterfront Intranet concept. One disadvantage of a prototype is that users may wish to adopt it as a completed system when it is inadequate (Kendall and Kendall, 1995). Users are in a hurry to get a system that works, even if it doesn't always work well. In the case of the Waterfront Intranet, patience and planning will yield a more functional system, and it will stand a far better chance of being adopted as standard practice in the workplace. This doesn't necessarily mean that the prototype

should be discarded, but that the users requirements and desires should be documented so that the system is not adopted until it is obvious that the system meets this documentation.

2. Policy

The implementation plan should include a complete review of all relevant policies. These policies include those of both the destroyer squadron and the higher level commands. Some examples of relevant policies include Internet access and usage, Security, ADP acquisition, Funding for Internet services, etc. This review is not simply to ensure conformance, but to determine which policies must be changed to keep up with current technology. No doubt, some policies will be found that are simply unproductive.

3. Education

The users and maintainers at the staff and on the ships must be educated as to how the system works, what things are possible, and most importantly, the intended function of the system. Above all else, one of the most critical aspects to ensure the success of this system is that of ensuring that the system is used for its intended purpose. This is an important learning threshold that must be met in the initial implementation phase. Not only is it important at the beginning of the system, but also must be considered during the life of the system as commands find new ways to use it to their benefit. Finding new uses for the system is important, but these must be constantly reconciled with the overall system purpose. If not

monitored with a sharp eye, the system could slowly evolve into something completely unintended, or ignored entirely, as many electronic BBS's have.

4. Dissatisfaction

A successful implementation plan will balance the desire of the user to get the system as quickly as possible with the need to adequately plan its development. Fortunately, this provides an opportunity to create a large amount of dissatisfaction with the current system so that when the system is implemented, the users are more likely to fully support it. Educating the users about the capabilities that the system provides while amplifying the current system's shortcomings will help to create this dissatisfaction.

This dissatisfaction can be enhanced with good salesmanship by supporters of the system. This opportunity presents itself every time a staff officer goes aboard a ship or is visited by a member of a ship. The staff should attempt to identify personnel in leadership positions on the ships who can be champions of the system.

5. Expansion

The implementation plan should ensure that the system is developed with future expansion in mind. For example, if the staff should become responsible for supporting more ships, either permanently or temporarily, the system should allow for this growth. For instance, when databases are developed, they should allow the user to easily add a new ship, or change its location, etc. Also, because this system is the first of its kind, migration to other commands should be kept in mind. The probability of future expansion

of the system to other major commands can be increased if other commanders are invited to "have a look" when the system is implemented. Again, spreading the word becomes important to creating system awareness and dissatisfaction.

6. Feedback

When the system is implemented, over 1,000 sailors will have the opportunity to witness it. Therefore, the implementation plan must include a feedback method. One method is to establish a web page that contains a form that the users can complete while online. A policy for responding to this feedback is encouraged. A thousand heads are better than one.

While this list is not all inclusive, it is a start to ensure that the all important implementation plan contains some important aspects that will aid in a successful implementation and a long lasting and effective system.

C. AREAS FOR FURTHER CONSIDERATION

1. Future Growth

The system stands the best chance of adoption when the ships are provided with Local Area Networks and routers of their own. This will allow moving from dial-up Internet access to establishing a PVC (Permanent Virtual Connection) between the ships and the squadron staff. In addition to improved capacity , the LAN will deliver email and Internet service closer to the end users.

2. Caching

Until ship's have the capability to access the Internet at sea, the ships could install there own web servers with the capability to cache large amounts of data. Conceptually, the ships would cache (save) a large number of web pages prior to departure, then the web server would serve these pages to the ship's LAN while underway. Unfortunately, these pages would not be updated by the staff's web server until the ship regained access to the Internet/Intranet. Additionally, access to squadron databases would not be possible while at sea.

3. Added Features

In addition to the basic World Wide Web functions discussed throughout the thesis, additional capabilities which should be considered include adding email service, white board functionality, and an FTP server for download of files from the squadron staff.

VII. CONCLUSION

Regardless of the method chosen, few would argue that a tool which increases the communications capability within an organization deserves serious consideration. This is especially true when the proposed tool has already been tested and proven in thousands of organizations around the world.

A destroyer squadron such as Destroyer Squadron SIX may represent over 1,000 personnel, all with a large stake in the success of the organization. From the most junior sailor to the Commodore, each individual is directly affected by the level of success that their command achieves while accomplishing their mission. Increased availability of information and communications provides a means of enhancing the performance capabilities of all involved. By creating new communication channels and increasing the efficiency and effectiveness of our personnel, we are giving every sailor the opportunity to enjoy more success in the performance of their duties.

This thesis has proposed a system which provides the destroyer squadron the opportunity to make the communication and information availability improvements mentioned above, and to do so at a very moderate cost. Additionally, it provides the opportunity to introduce the squadron personnel to the concept of using the Intranet and Internet as a productive tool. Because the Waterfront Intranet truly is an "On-ramp to the Internet", when Internet capability is finally provided to all of our ships at sea, our people will be prepared to utilize it effectively.

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APPENDIX A

>ADMINISTRATIVE MESSAGE

>ROUTINE

>

>R 300944Z MAR 97 ZYB PSN 038075M23

>

>FM CINCPACFLT PEARL HARBOR HI//N00//

>

>TO ALPACFLT

>ALLANTFLT

>

>INFO ASSTSECNAV RDA WASHINGTON DC//C4I//

>CNO WASHINGTON DC//N00/N09/N095/N2/N4/N41/N43/N46/N6/N6B/

> N8/N80/N85/N86/N87/N88//

>CINCLANTFLT NORFOLK VA//N00/N6//

>CINCUSACOM NORFOLK VA//J00/J6//

>USCINCPAC HONOLULU HI//J00/J6//

>CINCUSNAVEUR LONDON UK//00/N6//

>COMNAVSEASYS COM WASHINGTON DC//N00/N08/PMS335/PMS3

>BUMED WASHINGTON DC//N00//

>RUCJNAV/COMUSNAVCENT//N00/N6//

>CNET PENSACOLA FL//N00//

>BUPERS WASHINGTON DC//N00//

>COMMARFORPAC//CG/G6//

>COMMARFORLANT//CG/G6//

>COMSPAWARSSYS COM WASHINGTON DC//N00/N05/PMW171/PMW176//

>NAVSTKAIRWARCEN FALLON NV//N00//

>COMNAVSECGRU FT GEORGE G MEADE MD//N00//

>COMNAVSUPSYS COM MECHANICSBURG PA//N00//

>COMNAVSPECWARCOM CORONADO CA//N00//

>NRL WASHINGTON DC//N00//

>COMNAVCOMTELCOM WASHINGTON DC//N00/N3//

>NAVMASSO CHESAPEAKE VA//N00/N6//

>NCCOSC RDTE DIV SAN DIEGO CA//N433//

>CINCPACFLT PEARL HARBOR HI//N00//

>

>UNCLAS //N05230//

>

>ALPACFLT 008/97

>

>MSGID/GENADMIN/CINCPACFLT/008//

>

>SUBJ/INFORMATION TECHNOLOGY FOR THE 21ST CENTURY//

>POC/M.R. SCOTT/CDR N6/CINCPACFLT/-/TEL: 808 471-8637//

>POC/D.A. STRAUB/CDR N6/CINCLANTFLT/-/TEL: 757 322-5863//

>

>RMKS/1. THIS IS THE FIRST IN A SERIES OF JOINT CINCPACFLT AND

>CINCLANTFLT MESSAGES CONCERNING THE DEVELOPMENT AND

IMPLEMENTATION OF IT-21. THIS MESSAGE PROVIDES IT-21

HARDWARE/SOFTWARE IMPLEMENTATION STANDARDS FOR PROGRAMS

INSTALLING INFORMATION SYSTEMS ON FLEET UNITS/BASES AND PROVIDES THE FLEET WITH GUIDANCE ON MAINTAINING EXISTING INFORMATION SYSTEMS UNTIL INSTALLATION OF IT-21 PRODUCTS. THE IT-21 IMPLEMENTATION STANDARDS OUTLINED BELOW ARE PROMULGATED IN ADVANCE OF DON-WIDE GUIDANCE FROM THE DON CHIEF INFORMATION OFFICER (CIO). THE DON CIO WILL PROMULGATE DON-WIDE STANDARDS FOLLOWING NEGOTIATION OF ENTERPRISE-WIDE NETWORK OPERATING SYSTEMS AND APPLICATIONS.

>

>2. BACKGROUND: INFORMATION SUPERIORITY IS THE FOUNDATION OF
>JOINT VISION 2010 BATTLEFIELD DOMINANCE, AS WELL AS THE
>WARFIGHTING VISION FOR EACH SERVICE. NETWORK WARFARE, ROBUST
>INFRASTRUCTURE AND INFORMATION DISSEMINATION TO DISPERSED FORCES
>ARE KEY ELEMENTS IN ACHIEVING INFORMATION SUPERIORITY. IT-21 IS
>A FLEET DRIVEN REPRIORITIZATION OF C4I PROGRAMS OF RECORD TO
>ACCELERATE THE TRANSITION TO A PC BASED TACTICAL/TACTICAL SUPPORT
>WARFIGHTING NETWORK. THE INACTIVATION OF THE CURRENT DOD
MESSAGING SYSTEM (AUTODIN) BY DEC 99, WITH NO PLANNED NAVY
INFRASTRUCTURE REPLACEMENT, MANDATES THE RAPID IMPLEMENTATION OF
THIS WARFIGHTING NETWORK.

>

>3. COMMERCIAL NETWORK OPERATING SYSTEMS (NOS) AND E-MAIL
PRODUCTS HAVE ACHIEVED FUNCTIONAL PARITY. THE FLEETS CANNOT
CONTINUE TO SUPPORT A MULTITUDE OF DIVERSE OPERATING SYSTEMS AND
E-MAIL PRODUCTS WITH THEIR OWN TRAINING, OPERATIONAL PROCEDURES
AND TROUBLESHOOTING REQUIREMENTS. THE DOD JOINT TECHNICAL
ARCHITECTURE (JTA) AND DEFENSE INFORMATION INFRASTRUCTURE COMMON
OPERATING ENVIRONMENT (DII COE) PROVIDE DOD WITH THE AIS SYSTEM
GUIDANCE REQUIRED TO TAKE THE NAVY INTO THE 21ST CENTURY. THIS
CONVERGENCE OF SOLUTIONS, PROBLEMS AND GUIDANCE PROVIDES THE
IMPETUS TO ESTABLISH MINIMUM NAVY AIS STANDARDS AT THIS TIME.
IMPLEMENTATION OF THIS POLICY REQUIRES ALL NON-STANDARD NOS AND
E-MAIL PRODUCTS BE REPLACED NLT DEC 99.

> A. WINDOWS NT SERVER 4.0 IS THE STANDARD FLEET NOS. IT WILL
>SOON BE FOLLOWED BY WINDOWS NT 5.0. WINDOWS NT SERVER 4.0 IS DII
>COE COMPLIANT.

> B. MS EXCHANGE IS DESIGNATED AS THE STANDARD E-MAIL SOLUTION
>FOR BOTH FLEETS TO ENSURE AN INTEROPERABLE SECURE MESSAGING
SYSTEM IS OPERATIONAL PRIOR TO AUTODIN INACTIVATION NLT DEC 99.

> C. MS OFFICE 97 IS DESIGNATED AS THE STANDARD FLEET OFFICE
>SOFTWARE.

> D. EXPENDITURE OF OPERATING FUNDS TO MAINTAIN EXISTING IT-21
>NONCOMPLIANT NOS AND APPLICATIONS SHALL BE THE ABSOLUTE MINIMUM
>NECESSARY TO MEET OPERATING REQUIREMENTS UNTIL IT-21 NOS/SOFTWARE
>IS INSTALLED EVEN IF TEMPORARY LAN DEGRADATION OCCURS. SOFTWARE
>REQUIREMENTS DRIVE HARDWARE STANDARDS. HARDWARE AND SOFTWARE
>PURCHASED TODAY MUST BE CAPABLE OF MEETING MISSION REQUIREMENTS
>THROUGH THE YEAR 2000.

>

>4. CINCPACFLT AND CINCLANTFLT ARE ACTIVELY WORKING WITH OPNAV ON
>IT-21 FUNDING AND IMPLEMENTATION PLANS. IN GENERAL, AFLOAT IT-21
>IMPLEMENTATION WILL BE LINKED TO DEPLOYING BATTLEGROUPS AND
>ASHORE IT-21 WILL BE IMPLEMENTED IN A PHASED APPROACH. SPECIFIC
>IMPLEMENTATION SCHEDULES WILL BE PROMULGATED AT A LATER DATE.

>CINCPACFLT AND CINCLANTFLT ARE TRANSITIONING TO WINDOWS NT 4.0,
>MS EXCHANGE AND MICROSOFT OFFICE 97. THIS ENVIRONMENT CANNOT BE
>OPTIMIZED WITHOUT 32 BIT OPERATING SYSTEMS, HIGH RESOLUTION
>DISPLAYS AND MASS STORAGE. ATM BACKBONE LANS WITH AT LEAST 100
>MBS (TCP/IP) TO THE DESKTOP PC WILL BE INSTALLED ON ALL SHIPBOARD LANS,
>FLEET HEADQUARTERS (CPF, CLF, TYCOMS, GROUP AND SQUADRON
>COMMANDS) AND SHOULD BE INSTALLED IN THOSE SHORE ACTIVITIES THAT
>SUPPORT TACTICAL OPERATIONS. THIS WILL THEN ALLOW TRANSITION TO
>ATM-TO-THE-DESKTOP PC WHEN THE ATM TECHNOLOGY MATURES.

>

>5. SYSTEM COMMANDS AND PROGRAM MANAGERS:

> A. NTCSS WILL BECOME THE IT-21 PROGRAM OF RECORD FOR
>INSTALLATION OF BOTH SECRET AND UNCLASSIFIED LANS ONBOARD
>COMMISSIONED SHIPS. NTCSS (ATIS/SNAP III) LANS INSTALLED FROM THIS
>POINT ON WILL HAVE AN ATM BACKBONE, 100 MBS (FAST ETHERNET) TO THE
>DESKTOP PC AND THE HARDWARE/SOFTWARE OUTLINED AT THE END OF THIS
>MESSAGE. THE MIGRATION OF NTCSS LANS TO HIGHER CAPACITY LANS WILL
>REDUCE THE NUMBER OF PC'S DELIVERED DURING INITIAL INSTALLATION.
>THE TRADE-OFF OF QUANTITY FOR FRONT END PC'S IS REQUIRED TO
>SUPPORT JV-2010 AND AUTODIN INACTIVATION.

> B. SPAWAR IS WORKING WITH NAVSEA TO ENSURE THAT LANS
>INSTALLED DURING NEW CONSTRUCTION MEET THE IT-21 REQUIREMENTS.

> C. APPLICATION PROGRAM MANAGERS SUCH AS JMCIS, NSIPS, TAMPs,
>AND GCSS SHOULD MIGRATE CURRENT APPLICATIONS TO THE DII COE WITH
>AN IMMEDIATE OBJECTIVE OF OBTAINING PC WORKSTATION ACCESS TO ALL
>APPLICATION DATA ON AN ENTERPRISE LAN.

> D. PROGRAMS INSTALLING INFORMATION SYSTEMS (NEWNET, SMARTLINK,
>SMARTBASE, TELEMEDICINE, ETC.) MUST INSTALL COMPONENTS IN FLEET
>ACTIVITIES THAT MEET IT-21 STANDARDS AND PROVIDE INTEROPERABILITY
>THROUGHOUT THE WARFIGHTING NETWORK.

>

>6. TYCOMS AND THIRD ECHELON COMMANDS SHALL ENSURE THAT:

> A. SHIPS AND ACTIVITIES INSTALLING NEW LANS, UNDERGOING
>SIGNIFICANT LAN UPGRADES OR THOSE ACTIVITIES WITH STAND ALONE PC'S
>SHALL INSTALL IT-21 HARDWARE AND SOFTWARE. NEW OR REPLACEMENT
>SHIPBOARD AND SHORE BASED TACTICAL LANS SHOULD HAVE AN ATM
>BACKBONE WITH AT LEAST 100 MBS (FAST ETHERNET) TO THE PC.

> B. SHIPS AND ACTIVITIES WITH EXISTING LANS, WHICH REQUIRE
>REPLACEMENT OF UNSERVICEABLE HARDWARE, SORT OF A FULL NETWORK
>UPGRADE, SHALL INSTALL HARDWARE WHICH MEETS IT-21 STANDARDS. THE
>NEW EQUIPMENT MAY NOT BE COMPATIBLE WITH THE EXISTING LAN
>HARDWARE. CINCPACFLT AND CINCLANTFLT BELIEVE THAT ALL AUTOMATED
>INFORMATION SYSTEMS (AIS) PROCURED MUST BE COMPATIBLE WITH THE IT-21
>LAN STANDARDS EVEN IF TEMPORARY LAN DEGRADATION OCCURS. THERE IS
>ONLY SUFFICIENT FUNDING TO DO IT RIGHT THE FIRST TIME.

>

>7. THE IT-21 STANDARDS BELOW REPRESENT FRONT END MARKET
>TECHNOLOGY, ARE DYNAMIC IN NATURE, AND WILL CONTINUE TO BE CLOSELY
>LINKED TO COMMERCIAL TRENDS. THE STANDARDS LISTED BELOW ARE
>INTENDED TO BE MINIMUM STANDARDS AND WILL BE UPDATED PERIODICALLY.

> A. IT-21 LAN:

> (1) AFLOAT LAN STANDARDS - ATM FIBER BACKBONE, 100 MBPS

>//

>ALPACFLT 008/97

>
>MSGID/GENADMIN/CINCPACFLT/008//
>
>SUBJ/INFORMATION TECHNOLOGY FOR THE 21ST CENTURY//
>
>RMKS/
>(FAST ETHERNET) TO THE PC.
>> (2) ASHORE TACTICAL AND HEADQUARTERS COMMAND CENTER
STANDARD (CPF, CLF, TYCOMS, GROUP AND SQUADRON COMMANDS) - ATM
BACKBONE, 100 MBPS (FAST ETHERNET) TO THE PC.
> (3) ASHORE TACTICAL SUPPORT COMMAND STANDARDS (BASES) - ATM
>BACKBONE, 100 MBPS (FAST ETHERNET) TO THE PC.
> (4) METROPOLITAN AREA NETWORKS (MAN) SHOULD BE CAPABLE OF
>SUPPORTING AT LEAST OC-3 (155MBS).
> B. IT-21 SOFTWARE:
>- WINDOWS NT 4.0/5.0 WORKSTATION
>- MS OFFICE 97 PROFESSIONAL (WORD 97, POWERPOINT 97, EXCEL 97, S
>ACCESS 97)
>- IBM ANTI VIRUS (NAVY LICENSE, AVAIL FROM NAVCIRT)
>- MS BACK OFFICE CLIENT
>- MS OUTLOOK 97
>- MS EXCHANGE 5.0
>- MS IMAGE COMPOSER
> C. IT-21 ATABASES. RELATIONAL DATABASES THAT CAN SUPPORT WEB
>TECHNOLOGY IAW THE COE (ORACLE, SYBASE, SQL SERVER, ACCESS, ETC.)
>ILL BE USED TO SUPPORT DATA REQUIREMENTS AND APPLICATION
>DEVELOPMENT. ALL PROCESS ENGINEERING INITIATIVES THAT RESULT IN
>DESIGN/REDESIGN OF A DATA COLLECTION/CAPTURE SYSTEM MUST USE COE
>COMPLIANT RELATIONAL DATABASE MANAMENT SYSTEMS (RDBMS)
SOFTWARE. THIS REQUIREMENT IS PROVIDED TO ENSURE RDBMS INITIATIVES
USE COTS APPLICATION SOFTWARE. FOR ADDITIONAL INFORMATION ON
RELATIONAL DATABASES CONTACT CDR SANDY BUCKLES, CPF N67, COMM/DSN
(808)
>474-6384, NIPRNET U67@CPF-EMH.CPF.NAVY.MIL.
> D. MINIMUM IT-21 PC CAPABLITIES: CPF CAN CURRENTLY PURCHASE
>THE IT-21 STANDARD PC WITH SOFTWARE FOR \$3250.00 - \$3579.00 -
>SEE PARA 7(H) D 7(I).
>- 200 MHZ PENTIUM PRO CPU
>- 64 MB EDO RAM
>- 3.0 GB HARD DRIVE
>- 3.5 INCH FLOPPY DISK DRIVE
>- 8X IDE CD-ROM
>- DUAL PCMCIA/PC CARD READER
>- PCI VIDEO W/2MB RAM
>- 17 INCH MONITOR (1280X 1024)
>- POINTING DEVICE (TRACKBALL OR MOUSE)
>- SOUNDBLASTER (COMPATIBLE) AUDIO CARD WITH SPEAKERS KEYBOARD
>- CPU COMPATIBLE 100 MBPS FAST ETHERNET NIC
> E. STANARD IT-21 LAPTOP WORKSTATION: APPROXIMATELY \$5300 -
>SEE PARA 7(H).
>- 150 MHZ PENTIUM
>- 32 MB EDO RAM
>- 12.1 IN SVGA ACTIVE MATRIX COLOR DISPLAY
>- 2.1 GB EIDE HDD

- >- 6X INTERNAL CD-ROM
- >- MODEM, PCMCIA SLOTS, NIC CARD
- >- SMART LITHIUM BATTERY
- > F. IT-21 NT FILE SERVER FOR DIRECTORY NETWORK SERVICE:
- >APPROXIMATELY \$26K - SEE PARA 7(H). THESE ARE MINIMUM
- >SPECIFICATIONS. NEEDS OF THE SPECIFIC NETWORK WILL DICTATE
- >REQUIREMENTS.
- >- DUAL 166 MHZ PENTIUM CPU
- >- 512K SECONDARY CACHE MEMORY- 256 MB RAM
- >- TWO 4 GB SCSI HDD
- >- ONE 6 GB DAT DRIVE
- >- ONE 3.5 INCH FLOPPY DISK DRIVE
- >- 6X SCSI CD-ROM
- >- DUAL PCMCIA/PC CARD READER
- >- 2 DPT SCSI III CACHING CONTROLLERS (SMARTCACHE 4)
- >- PCI VIDEO W/2MB RAM
- >- 17 INCH MOITOR (1280 X 1024)
- >- POINTING DEVICE (TRACKBALL OR MOUSE)
- >- KEYBOARD
- >- TWO CABLETRON CPU COMPATIBLE ATM NIC CARDS
- >- ANTEC DUAL POWER SUPPLY CASE (HOT SWAPPABLE)
- > G. IT-21 FILE SERVER/APPLICATION SERVER: APPROXIMATELY \$26K -
- >SEE PARA 7(H). SAME AS IT-21 NT FILE SERVER FOR DIRECTORY NETWORK
- >SERVICE WITH THE FOLLOWING CHANGES:
- >- CHANGE HDD RQRM TO FIVE 4 GB DRIVES
- >- CHANGE DAT TO 18 GB.
- > H. PRICES FOR PC TECHNOLOGY ARE CONSTANTLY CHANGING AND CAN
- >VARY GREATLY DEPENDING ON METHOD OF PROCUREMENT. FOR EXAMPLE,
- ON 28 MAR 97 AN IT-21 PC PURCHASED DIRECTLY FROM A VENDOR COSTS \$3643.
- >GOVERNMENT RATE FOR SMALL PURCHASES (LESS THAN TEN) IS \$3579.
- >A BULK PROCUREMENT (MORE THAN SEVENTY-FIVE) COSTS \$3250. THE ABOVE
- >PRICES INCLUDE SHIPPING. BULK PROCUREMENTS SHOULD BE MADE
- THROUGH THE TYPE COMMANDERS WHEN APPROPRIATE. MR. RICK KOOKER,
- CPF N65, COMM/DSN:(808) 474-5882, NIPRNET: U65@CPF-EMH.CPF.NAVY.MIL IS
- >AVAILABLE TO ASSIST TYCOMS WITH AIS PROCUREMENT ISSUES.
- > I. AS NETWORK COMPUTER TECHNOLOGY EVOLVES SOME COMMANDS MAY
- BE ABLE TO TRANSITION TO NETWORK COMPUTERS. WHEN CONSIDERING
- >INSTALLATION OF NETWORK COMPUTERS, TOTAL NETWORK COST MUST BE
- >EVALUATED. NETWORK COMPUTERS HAVE NOT MATURED SUFFICIENTLY TO
- >IMPLEMENT THEM IN FLEET PLATFORMS AT THIS TIME.
- >
- >8. WAIVER REQUESTS FROM THE ABOVE STANDARDS SHOULD BE SUBMITTED
- >DIRECTLY TO THE RESPECTIVE CPF/CLF N6. POINTS OF CONTACT ARE AS
- >FOLLOWS:
- > A. CINCLANTFLT: CDR DEBRA STRAUB AT COMM (757) 322-5863,
- >NIPRNET: U6@CLF.NAVY.MIL
- > B. CINCPACFLT: CDR MIKE SCOTT AT COMM (808) 474-7860,
- >NIPRNET:U6@CPF-EMH.CPF.NAVY.MIL.//
- >
- >BT

APPENDIX B

This appendix contains some screen shots from the proof-of-concept prototype. Only enough pages are shown to indicate the likely content of the Waterfront Intranet.

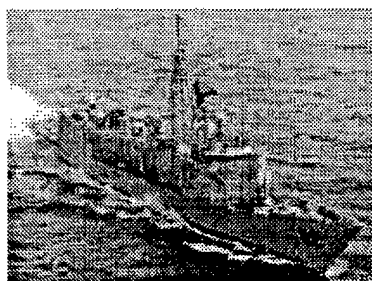
COMDESRON SIX
WATERFRONT WEB
DESTINATIONS

- [Commodore](#)
- [Chief Staff Officer](#)
- [Administration](#)
- [Chaplain](#)
- [Career Counselor](#)
- [Combat Systems](#)
- [Command Master Chief](#)
- [Inspection Database](#)
- [Material](#)
- [Medical Officer](#)
- [Operations](#)
- [Readiness and Training](#)
- [Safety](#)
- [Supply](#)
- [COMNAVSURFLANT](#)

Thesis Home Page

WELCOME TO THE CDS-6

Waterfront Web



"TENACITY"

This prototype is a part of a thesis titled "Developing a Waterfront Intranet" being written by LT Curtis Lenderman at the Naval Postgraduate School.

If you would like to comment on this prototype, you can send me email at [lucky33@ibm.net](mailto: lucky33@ibm.net).

☛ This is only part of the puzzle. Please take time to view my Thesis Home Page.

Welcome to the Commodore's Home Page. This will be the Commodore's private forum for those with access (Commanding Officers, etc). This page will be password protected. The content and format will be based on the Commodore's desires.



Captain John W. Young, Jr.

United States Naval Reserve

Commercial: (601) 761-3350 -- DSN Prefix 358



- [Bi-Weekly Update](#)
- [Documents of Interest](#)
- [Send Email to the Commodore](#)
- [Biographic Summary](#)
- [Return to WELCOME Page](#)



Commander, Destroyer Squadron Six

Captain John W. Young, Jr.

United States Naval Reserve

Captain Young was born in Scranton, Pennsylvania on 11 April 1947. He attended the University of South Carolina, graduating in 1970 with a Bachelor of Science degree in Banking and Finance. After commissioning, he was assigned to the Defense Language Institute, Monterey, California for an intensive course in the Vietnamese language. Thereafter, he was assigned to Sub Unit ONE First Air Naval Gunfire Liaison Company (1st ANGLICO), Team 4-4, Vi Thanh, Republic of Vietnam. Subsequent tours included: CINCPACFLT Public Affairs Detachment, Western Pacific, Subic Bay, R.P. as Assistant Public Affairs Officer; USS SHASTA (AE 33) as Assistant First Lieutenant; and Commanding Officer NRC Tuscaloosa, Alabama. During his tour as Commanding Officer NRC Tuscaloosa, Captain Young earned a Master of Arts degree in Comparative Government from the University of Alabama.

Upon graduation from Surface Warfare Officer Department Head School in May 1980, Captain Young was assigned as Operations Officer aboard USS MULLINNIX (DD 944) followed by a tour as Operations/Plans Officer for Commander, Naval Surface Group FOUR, Newport, Rhode Island. From 1983-1985, he served as Executive Officer aboard USS JOHN L. HALL (FFG 32). During his Executive Officer tour, he deployed to the Red Sea and Persian Gulf and participated in several operations. Thereafter, he was assigned to the Pentagon on the Staff of the Chief of Naval Operations (N-095) as Head for Surface Training.

Captain Young was ordered to duty as Commanding Officer of USS JACK WILLIAMS (FFG 24) in May 1988, where he participated in two Persian Gulf deployments. Upon completion of his command tour in 1990, he was ordered to the Staff of Commander, Naval Surface Reserve Force as Deputy Chief of Staff for Plans and Requirements. In June 1992 he was ordered to Commander Naval Surface Group SIX, Mobile, Alabama, as Chief of Staff. Most recently, Captain Young served as Commander, Naval Reserve Readiness Command Region EIGHT, Jacksonville, Florida.

Captain Young is presently Commander, Destroyer Squadron SIX/Commander, Regional Support Group Pascagoula homeported at Naval Station, Pascagoula, Mississippi.

Captain Young, a designated Master Training Specialist, has been awarded various personal, unit and campaign decorations.

Captain Young is married to the former Ellen Schmaltz of West Pittston, Pennsylvania. They have three children: Eric Pierce, a junior in college, Lyle Christopher and Lauren Kendal.



Chief Staff Officer

Commander Paul Noel Hixenbaugh

United States Navy

Commercial (601) 761-3351/2/3 – DSN Prefix 358

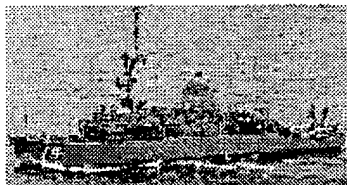


- [Biographic Summary](#)
- [Return to Welcome Page](#)

COMDESRON SIX
COMMAND MASTER CHIEF

ETCM(SW) D. BURNS

Commercial (601) 761-3382 —DSN Prefix 358



USS CHIEF (MCM-14)

- [Command Master Chief](#)
- [Ombudsmen Information](#)
- [Meeting Calendar](#)
- [Navy and Marine Corps Relief](#)
- [Command Advancement Program](#)
- [Helpful Telephone Numbers](#)
- [CMC Instructions of Interest](#)
- [Sailor of the Year/Quarter](#)
- [ESWS](#)
- [Retirement Ceremonies](#)
- [Final Thoughts](#)
- [Send Email to the CMC](#)
- [Return to Welcome Page](#)

Welcome to

The Chaplain's Office

Chaplain: LCDR T. Love, CHC (601) 761-2267 -- DSN 358

Religious Programs: RP1 J. Hurst, FMF (601) 761-3364

- [Worship Service Schedules](#) (By Region)
- [Special Events](#)
- [Phone List](#) (Our compilation of good-to-have numbers)
- [Return to the Welcome Page](#)

COMDESRON SIX

Inspection and Assist Visit Database

Soon you will also be able to query "by inspection" from a drop down menu. The result will be all the dates of interest (last completed, etc.) plus all the inspection info like inspection team, how many will come, how long it lasts, where you get the checksheets, etc. There are over 100 inspections and assist visits!

SHIP:

[RETURN](#) to Prototype Front Page

[RETURN](#) to Admin Home Page

[RETURN](#) to Combat Systems Home Page

Inspection and Assist Visit Database

Query Results

List of Events for USS CLARK

NAVCHECK

Last Completed On 08/21/96

Due Again By 08/21/97

Next Scheduled On

AVCERT/ARE

Last Completed On 10/03/96

Due Again By 10/03/97

Next Scheduled On 09/15/97

CART I

Last Completed On 05/10/97

Due Again By 05/10/99

Next Scheduled On

CART II

Last Completed On 07/18/95

Due Again By 07/18/97

Next Scheduled On 07/01/97

TSTA 1

Last Completed On 09/20/95

Due Again By 09/20/97

Next Scheduled On 09/01/97

COMDESRON SIX

Medical Department



Medical Officer: LT T. Blankenship, MC
(601) 761-2265/66 --DSN 358

- Monthly Guidance
- Quality Assurance Schedule
- Medical Inspections and Assist Visits
- Dental Readiness
- Clinic Information (by Region)
- Important References

Readiness and Training Department

READINESS AND TRAINING OFFICER: LTJG H. Bode USN

Commercial: (601) 761-3365/66 -- DSN Prefix 358



- **VTT-Schedule/Procedures**
- **Surface Rescue Swimmer Info**
- **Search and Rescue**
- **Navigation Check-Ride Info**
- **SURFTRAMAN Notes**
- **SORTS Notes**
- **Inspection and Assist Visit Database**
- **Return to Welcome Page**

COMDESRON SIX

SUPPLY DEPARTMENT

Supply Officer: LT P. Stevens, USN SC



Assistant Supply Officer: SK1(SW) R. Dutton, USN
(601) 761-3353/54 -- DSN 358

Here's whats available:

CASREP Parts Requisition Status (By Ship)

More coming soon!

CASREP PARTS

Requisition Status Request

Note: Some ships may not have data in the database at this time! (This is just representative data to demonstrate the capability!)

As a matter of fact, USS FAHRION has the only data until Friday, 25 April 1997

USS CLARK	▼	Submit
-----------	---	--------



COMDESRON SIX

Casrep Parts Requisition Status Search Results

List of Parts for 20975

Casrep Number: 97006 --- **Document Number:** W037-002

Status:BRZ - Shipped to Nassau---**EAD:** 7150

Casrep Number: 97009 --- **Document Number:** W099-040

Status:BKM - Backordered---**EAD:** 7300

Casrep Number: 97008 --- **Document Number:** W080-004

Status:BZZ---**EAD:** 7125

Casrep Number: 97006 --- **Document Number:** W038-004

Status:BZZ---**EAD:** 7180

Casrep Number: 97009 --- **Document Number:** W099-041

Status:No Status---**EAD:** 0

Combat Systems Department

Home Page



Combat Systems Officer: LCDR J. Noel, USN

Commercial (601) 761-3375/78 -- DSN Prefix 358

- [Inspection and Assist Visit Database](#)
- [Explosive Handling](#)
- [Ammunition](#)
- [CIWS](#)
- [Communications](#)
- [Sonar](#)
- [CART/TSTA/FEP Notes and Checksheets](#)
- [Return to Welcome Page](#)

Administrative Department

ADMINISTRATIVE OFFICER: YNC(SW) J. DODSON

COMMERCIAL (601) 761-3350 -- DSN Prefix 358



- [Recurring Reports Schedule/Status](#)
- [Inspection and Assist Visit Database](#)
- [List of Effective Instructions](#)
- [Electronic Viewing of Important Instructions](#)
- [Commodore's Itinerary](#)
- [Return to Welcome Page](#)

COMDESRON SIX
SAFETY DEPARTMENT

SAFETY OFFICER: LTJG M. Blake, USN

Commercial: (601) 761-3380 --DSN Prefix 358

● **HAZMAT**

● [Slip Safety Award](#)

● [Annual Winners](#)

● [Safety Statistics](#)

● [Safety returns us to the Welcome Page!](#)

COMDESRON SIX

MATERIAL DEPARTMENT

Material Officer: LT H. Pringle, USN



Assistant Material Officer: CWO3 Holmes, USN

INDEX

- CDS-6 Material Team (Points of Contact and Phone Numbers)
- COMDESRONSIXINST 3540.7E (Engineering Training and Assessment Process)
- Material Personnel Travel Schedule
- **Class Advisories**
- **Safety Bulletins**
- **NSTM Advance Change Notices**
- **ETG Checklists**
- **Gas Turbine Bulletins**

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center2
 8725 John J. Kingman Road., Ste 0944
 Ft. Belvoir, VA 22060-6218

2. Dudley Knox Library2
 Naval Postgraduate School
 411 Dyer Rd.
 Monterey, CA 93943-5101

3. Commander1
 Destroyer Squadron SIX
 Bldg. 10 Naval Station
 Pascagoula, MS 39595-3000

4. James S. Laughlin1
 9886 Brookgrass Pl.
 Salinas, CA 93907

5. Suresh Sridhar1
 Code SM/SR
 Department of Systems Management
 Naval Postgraduate School
 Monterey, CA 93943

6. Rex Buddenberg1
 Code SM/BU
 Department of Systems Management
 Naval Postgraduate School
 Monterey, CA 93943

7. Curtis Lenderman.....2
 385D Bergin Drive
 Monterey CA 93940