

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

DESIGNING A RELATIONAL DATABASE FOR THE BASIC SCHOOL: SCHOOL COMMAND WEB ENABLED OFFICER AND ENLISTED DATABASE (SWORD)

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The Basic School (TBS) is the first school assignment for every new Marine officer as they begin their careers. As the first example of life in the Marine Corps, the school should be a model of efficiency and display all of the traits that will be taught in the course of the Period of Instruction. The information management system at TBS is a mixed bag of stand alone applications, memorandum books, and self generated spreadsheets. The current system is not efficient in regards to time management or visibility of the data. The primary data storage systems used by the Marine Corps do not accommodate the type of text documents that are recorded at TBS nor do they allow for adequate visibility of an officers performance during the POI. The result is a duplication of effort at each level of the command.

This joint thesis team has produced a Two-Tier Client/Server Information Management System for use at The Basic School, known as SWORD. The system was developed using current industry standards that are compliant with the policies of the Department of Defense. The management tools are also compliant with the anticipated policies of the Navy and Marine Corps Intranet (NMCI).

KEYWORDS: Database, Internet, Web Enabled, Information Systems, Information Technology

COMPLIANCE WITH ESTABLISHED DEPARTMENT OF THE NAVY WEB SITE ADMINISTRATION POLICIES AND PROCEDURES REGARDING PUBLICLY ACCESSIBLE, OFFICIAL UNITED STATES NAVY WORLD WIDE WEB SITES

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The World Wide Web has grown in popularity as a communication mechanism, and the resultant availability has rapidly changed how the public accesses government-related information. The content, appearance, and relevance of information presented on publicly accessible Web sites directly reflect upon the professional standards and credibility of the United States Navy. The Department of Defense (DoD) has established Web site administration policy to provide guidelines for establishing, operating, and maintaining publicly accessible Web sites. The objective of this thesis is to determine compliance with established Department of the Navy (DoN) policies and procedures regarding the administration of official United States Navy publicly accessible Web sites. Failure to comply with established Web site administration policies and procedures introduces a potential danger to DoD personnel, assets, and operations if inappropriate information is posted to official public Web sites. This thesis also determines if a database or accurate inventory of official Navy Web sites exists, if there is a mechanism or process to verify DoN Web site compliance, whether DoD policy guidance ensures compliance, and if DefenseLINK is an effective Web site management tool. An extensive summary of findings is provided with recommendations for improving DoN Web site administration policies and procedures.

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KEYWORDS: Navy Web Site, Policy, Compliance, Descriptive Statistics, Sample Size, Publicly Accessible

COMMUNICATION DURING COMPLEX HUMANITARIAN EMERGENCIES: USING TECHNOLOGY TO BRIDGE THE GAP

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Multinational humanitarian and military efforts such as those seen in Somalia, Kosovo and Afghanistan are known as Complex Humanitarian Emergencies. These types of emergencies are complex and difficult to operate in because they contain political, military and humanitarian considerations. The various actors responding to a CHE can be divided into two distinct groups – military and civilian. Each of these groups needs the other to effectively respond to the crisis. Thus communication, collaboration and coordination are critical. Technology can play a significant role to enable information sharing between the various participants during CHEs. This thesis documents the development of a proof of concept that supports this. Current reports and user feedback were analyzed to determine requirements for a field-based system that could enhance the flow of information. The developmental process is presented including, requirements generation, group structure and information sharing, collaborative environments and the advantages of the virtual space. Based on a fictional relief operation, a web application was constructed and designated the Relief Operations Coordination Center (ROCC). Built on COTS technology and combined with commercially available collaboration tools, this application showcases the various uses of today's technology and how it can be used to facilitate information sharing during CHEs.

KEYWORDS: Peer-to-Peer Network, Client-Server Network, Wireless Network, Collaborative Environment, Collaborative Tools, Complex Humanitarian Emergency, Knowledge Portal, Information Sharing, Coordination, Non-Governmental Organizations, International Organizations, Relief Operations, Peace Operations, Peace Keeping

A REQUIREMENT ANALYSIS FOR THE NAVAL POSTGRADUATE SCHOOL'S ALUMNI DATABASE SYSTEM

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Currently the Naval Postgraduate School's Alumni Database houses the records of nearly twenty-six thousand alumni, however there are over fifty thousand more records that need to be added. Although a database currently exists that attempts to fulfill many of the requirements of an alumni system, it has been determined that overall the current database is inadequate. A need exists to either modify or replace the current system to ensure that all of the Naval Postgraduate School's alumni relation needs are met. A decision is being pondered about whether the creation and management of such a system should be done within the confines of the school or outsourced to another organization. This thesis will aid in that decision making process. Throughout this study, evaluations are made on the feasibility of having an alumni system, and the most cost effective way to obtain it. Assessments and recommendations are also made on

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issues involving security, accessibility, and the responsibilities of the system's users, as well as the system. In its entirety, this thesis will serve as a foundation for those who will determine how the Naval Postgraduate School will proceed in finding a solution to its alumni needs.

KEYWORDS: Database Requirement Analysis

WINDOWS XP OPERATING SYSTEM SECURITY ANALYSIS

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Windows XP, released in October 2001, brought new features to improve the work environment throughout organizations. The purpose of this research is to determine if Windows XP, when used as a workstation operating system in domain-based networks, provides adequate security policy enforcement for organizations. In this research we performed a security analysis of the Windows XP operating system, assessed its vulnerabilities and made recommendations for XP configurations and use as an extension of enterprise network. In order to analyze Windows XP, a Windows 2000 Server based-domain was set up. Windows XP was installed on one of the workstations in the domain. In this lab environment, the security architecture and all new security features of Windows XP have been analyzed. Then vulnerability scans were made to assess the security of Windows XP in three configurations: after clean installation, after applying current patches and updates, and after applying security templates. Windows XP comes with selectable built-in templates. A new security template was created by combining the best of these templates. The new template also contains additional security settings not found in the built-in templates. This study provides recommendations for secure Windows XP configuration in Windows 2000 domains.

KEYWORDS: Windows XP, Computer Security, Operating System Security, Windows XP Architecture, Windows XP Security

INTEGRATED THEATER ASSESSMENT PROFILING SYSTEM

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The Integrated Theater Assessment Profiling System (iTAPS) takes the original stove-piped Theater Assessment Profiling System (TAPS) software solution and turns it into a robust, data-centric, web-based decision support system for Commander, Second Fleet. ITAPS uses the .Net Framework and ASP.NET/ADO.NET, along with SQL Server to provide a web-enabled application that gives an overarching, abstracted view of the battle space for the Operational Commander while still providing drill-down capability and trend analysis tools if more detail is desired. The software was developed using the extreme programming technique and black box testing methods. A demonstration was performed at Second Fleet to test its acceptability and usability.

KEYWORDS: Decision Support System, .NET Framework, Radar Diagrams, Theater Assessment

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ROLE OF ELECTRONIC-COMMERCE IN THE GROWTH OF TUNISIAN ECONOMY

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Tunisia has encouraged and enhanced the effective use of information technologies, including the Internet by making them widely accessible. The government started an action plan in 1997 to spread Internet connections to all classes of the community. In the meantime the government understood the benefits provided by e-commerce and established an electronic commerce taskforce (from the government and the private sectors) to study the implementation of e-commerce in Tunisia. Following that, six pilot projects about various Tunisian-made products and services were launched online. Today e-commerce services covering a wide range of Tunisian products including crafts, foodstuffs (dates, olive oil, and desserts), textiles, tourist services, stamps, and hotel reservations. A direct result of this general atmosphere of e-commerce is the emergence of trade exponentially as an important sector in the Tunisian economy. The incorporation of information technology as an important ingredient of its economy resulted in a steady growth of the country's Gross Domestic Product (GDP). Its exponential adoption of the Internet and its applications, principally e-commerce, seemingly contributed to the Tunisian economic growth.

KEYWORDS: Information Technology, Internet, E-commerce, Economy

ANALYSIS AND DESIGN OF AN IMPROVED SENSOR FORMULA FOR THE TACTICAL REMOTE SENSOR SYSTEM (TRSS)

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This thesis examines the current Sensor Formula and target classification capabilities of the Tactical Remote Sensor System (TRSS). It serves as the basis for a new and improved algorithm using object oriented programming techniques. It incorporates the software engineering principals of modularity and class inheritance in order to create a more robust and adaptable target classification capability. This thesis is focused on improving the sensor processing and target classification of both the remote sensors currently in use in the United States Marine Corps and those in development. Finally the thesis gives recommendations on how the formula structure can be further improved through the implementation of weather and terrain data stores which are updated on a near-real-time basis.

KEYWORDS: Sensors, Target Classification, Sensor Formula, Sensor Algorithm, TRSS, Tactical Remote Sensor System, RSMS, Remote Sensor Management System

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EVALUATION OF ENTERPRISE APPLICATION INTEGRATION (EAI) AND WEB SERVICES AT FITTING OUT AND SUPPLY SUPPORT ASSISTANCE CENTER (FOSSAC) UNDER NMCI

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Information technology has woven itself into the fabric of every organization. As organizations grow and develop specialized needs, specialized software applications emerge to address the needs. Often the business processes take shape around the capabilities of the software applications and the technology infrastructure, until the two are inseparable from one another. When an organization decides to incorporate new processes or upgrade its information architecture, the new system may lack compatibility with the old system. The old, incompatible software is typically referred to as a "legacy application." In an effort to integrate the old applications with the new, organizations are typically faced with expensive, proprietary Enterprise Application Integration solutions. Fitting Out and Supply Support Assistance Center (FOSSAC) is an organization facing a legacy application integration challenge with the implementation of the Navy-Marine Corps Intranet.

This thesis examines the applicability of traditional Enterprise Application Integration (EAI) methodologies for FOSSAC as way to preserve access to its legacy applications. As an alternative integration solution, this thesis explores the potential of the emerging Web Services architecture. The Web Services architecture employs standard Internet protocols to facilitate application integration and information sharing across a variety of computing-platforms.

KEYWORDS: Enterprise Application Integration (EAI), Web Services, Middleware, Legacy Applications, Navy-Marine Corps Intranet (NMCI)

A SURVEILLANCE SOCIETY AND THE CONFLICT STATE: LEVERAGING UBIQUITOUS SURVEILLANCE AND BIOMETRICS TECHNOLOGY TO IMPROVE HOMELAND SECURITY

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The thesis research examines the emergence of surveillance and biometrics technologies as a pragmatic baseline supporting the goals of homeland security. Assessment of existing catalysts of the world condition, conflict states, terrorist and criminal networks have facilitated increased U.S. and international attention to the field of surveillance and biometric technology. This study scrutinizes surveillance, biometric techniques, strategies, and prevailing present day applications. It contrasts the evolving requirements for improved security with a balanced consideration of civil liberties and privacy. The authors address developmental issues surrounding the hypothesis for a ubiquitous surveillance grid to monitor and combat terrorism, crime, and other contributing illicit behaviors. The authors recommend that federal, state, local, and corporate agencies unite in improving homeland security by implementing the deterrence, detection, monitoring, and response actions that these technologies have to offer.

KEYWORDS: Ubiquitous Computing, Surveillance, Biometrics, Homeland Security, Terrorism, Civil Liberties, Information Privacy

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INFLUENCE NET MODELING: HAMAS (U)

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(U) Following the tragic events of September 11, our nation has emphasized operations to end terrorism around the globe. A crucial first step in combating terrorists is understanding the factors which lead terrorists to commit acts of violence. Traditional military conflicts have been motivated by economic or political factors. The factors that lead Muslim extremists to commit acts of terror appear to stem from deep-seated religious and ethnic hatred. Modeling and analyzing factors may lead planners to a course of action that could stem the acts of terrorism around the world.

(U) Utilizing SIAM as a tool to model HAMAS behavior may realize the knowledge needed to influence their behavior away from committing terrorism. By analyzing the factors that enable HAMAS to commit acts of terror, planners should be able to identify critical nodes that ultimately lead to HAMAS committing such acts.

KEYWORDS: HAMAS, SIAM, Terrorism, Israel, Modeling

XML BASED ADAPTIVE IPSEC POLICY MANAGEMENT IN A TRUST MANAGEMENT CONTEXT

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TCP/IP provided the impetus for the growth of the Internet and the IPsec protocol now promises to add to it the desired security strength. IPsec provides users with a mechanism to enforce a range of security services for both confidentiality and integrity, enabling them to securely pass information across networks. Dynamic parameterization of IPsec further enables security mechanisms to adjust the level of security service “on-the-fly” to respond to changing network and operational conditions. The IPsec implementation in OpenBSD works in conjunction with the Trust Management System, KeyNote, to achieve this. However the KeyNote engine requires that an IPsec policy be defined in the KeyNote specification syntax. Defining a security policy in the KeyNote Specification language is, however, extremely difficult and the complexity of the language could lead to incorrect specification of the desired policy, thus degrading the security of the network. This thesis looks into an alternative XML representation of this language and a graphical user interface to evolve a consistent and correct security policy. The interface has the simplicity of a simple menu-driven editor that not only provides KeyNote with a policy in the specified syntax but also integrates techniques for correctness verification and validation.

KEYWORDS: KeyNote, ISAKMP, IKE, IPsec, Graphical User Interface, Security Association (SA), Security Policy Database (SPD), XML, XSLT, DTD, Schema, JDOM, SAX, Security Policy

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ESTABLISHING A BEOWULF CLUSTER FOR PASSWORD RECOVERY (U)

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(U) As the amount of information stored on computer systems continues to expand, the importance of safeguarding that information continues to rise. The ability to prevent access to these systems by unauthorized users is critical to insuring information remains intact and available to legitimate users. Requiring user account and password authentication has traditionally been the primary method used to accomplish this.

(U) This work examines the characteristics of strong passwords and the ability of system administrators to verify that passwords are secure enough to protect the system. Methods used to store passwords are examined and tools used to conduct password audits are reviewed. Because audits of strong passwords can be very resource intensive, changes enabling use of openly available password recovery software on a LINUX-based Beowulf computer are recommended.

KEYWORDS: Beowulf Cluster, Parallel Computing, Distributed Computing, Password Auditing, Password Cracking, Linux

WEB BASED DATABASE PROCESSING FOR TURKISH NAVY OFFICERS IN USA

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This thesis reports the client server architecture choices (2-tier versus 3-tier) and details the supporting web server and database server choices. It then presents a prototype of a web-based database system to speed and simplify tracking of academic and personal information on naval officers attending graduate school in another country. The result will be better manpower data for naval headquarter with fewer errors at a lower cost. The difficulties implementing client server systems are discussed along with suggestions for better management of information technology.

KEYWORDS: Information Technology, Database, Web-database Connectivity, Three Tier Architecture, Two Tier Architecture, Unified Modeling Language

AN INTEGRATED INTRANET AND DYNAMIC DATABASE APPLICATION FOR THE SECURITY MANAGER AT NAVAL POSTGRADUATE SCHOOL

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This thesis presents an analysis, design and implementation of the Naval Postgraduate School's Sensitive Compartmented Information Facility (SCIF) consolidated Access database and website. The database was designed using a Microsoft Access 2000 relational database. This new database consolidates two previously separate personnel and classified inventories databases. The SCIF website was created utilizing Macromedia's Dreamweaver MX. Active Server Pages are used to provide connectivity between the

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website and database. The website accessible via any standard browser will provide the capability for designated users to manipulate data in the database. Protection of sensitive data is implemented utilizing Macromedia's embedded user authentication features.

KEYWORDS: Databases, Intranet, Access 2000, Macromedia, Dreamweaver, Web Design

ENTERPRISE IMPLEMENTATIONS OF WIRELESS NETWORK TECHNOLOGIES AT THE NAVAL POSTGRADUATE SCHOOL AND OTHER MILITARY EDUCATIONAL INSTITUTIONS

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The purpose of all information systems is to assist people in transitioning data into information, and then information into knowledge. In order to reach IT modernity, three things need to occur: a convergence of single open platform data exchange (e.g., Extensible Markup Language (XML)), the development of new doctrine to manage this information (e.g., Net Centric Warfare), and the creation of a robust mobile secure network (e.g., 802.11). The heart of this research will focus on the last element.

Future wars will be fought using wireless mobile networks. Wireless research is being realized at the Naval Postgraduate School (NPS) Wireless Warrior Group. The Wireless Warrior Group is designing and implementing the new unclassified wireless network at the NPS using the IEEE 802.11 standard. The Wireless Group was founded by the author of this thesis and is currently made of 150 members consisting of staff, faculty, and students from a variety of different curriculums.

The purpose of Wireless Warrior is to develop the doctrine of wireless networking by making it a part of every student, staff, and faculty daily communication and production. Only through constant scrutiny and use can real solutions emerge. The entire campus becomes a computer lab. Wireless Warrior provides a fertile ground for students to write new applications, to communicate and collaborate in ways unthinkable just a few years ago. Wireless computing does to computers what the cell phone did to the wired telephone. It is an educational and operational force multiplier. Wireless mobility is the future of warfare, and usable, supportable, secure mobile communication is what wins wars. This thesis documents the NPS journey into the wireless domain.

KEYWORDS: IEEE 802.11, Wireless, Local Area Networks, Educational Network Design, Campus Networks

INFORMATION TECHNOLOGY (IT) ETHICS: TRAINING AND AWARENESS MATERIALS FOR THE DEPARTMENT OF THE NAVY

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Information ethics is a relatively new field of study that aims to identify and to analyze the impact technology has on society, personal values, and the application of ethics in cyberspace. The Department of

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the Navy (DoN) continues to experience incidents of unethical behavior by personnel using government computers and accessing the Internet from within government networks. These incidents will continue and grow in number as the Navy and Marine Corps' dependence upon information technology (IT) increases. There are circumstances requiring ethical decision making encountered by naval personnel that are not sufficiently addressed by policy. Many of these situations do not neatly translate from ordinary experience to the IT world. These topics include the right to privacy, the protection of intellectual property, the collection and stewardship of information, and cyber crime. To address this problem, training materials on a CD-ROM have been created with the objective of giving DoN personnel a better understanding of the ethical responsibilities that are required when using IT. The training materials provide decision making tools to better prepare naval personnel when facing ethical dilemmas in the IT context.

KEYWORDS: Ethics, Information Technology, Networks, Training, Awareness

DIGITAL VIDEO (DV): A PRIMER FOR DEVELOPING AN ENTERPRISE VIDEO STRATEGY

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The purpose of this thesis is to provide an overview of digital video production and delivery. The thesis presents independent research demonstrating the educational value of incorporating video and multimedia content in training and education programs. The thesis explains the fundamental concepts associated with the process of planning, preparing, and publishing video content and assists in the development of follow-on strategies for incorporation of video content into distance training and education programs.

KEYWORDS: DV, Digital Video, Distance Learning, Training and Education

REQUIREMENTS FOR DIGITIZED AIRCRAFT SPOTTING (OUIJA) BOARD FOR USE ON U.S. NAVY AIRCRAFT CARRIERS

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This thesis will evaluate system and process elements to initiate requirements modeling necessary for the next generation Digitized Aircraft Spotting (Ouija) Board for use on U.S. Navy aircraft carriers to track and plan aircraft movement.

The research will examine and evaluate the feasibility and suitability of transforming the existing two-dimensional static board to an electronic, dynamic display that will enhance situational awareness by using sensors and system information from various sources to display a comprehensive operational picture of the current flight and hangar decks aboard aircraft carriers.

The authors will evaluate the current processes and make recommendations on elements the new system would display. These elements include what information is displayed, which external systems feed information to the display, and how intelligent agents could be used to transform the static display to a powerful decision support tool. Optimally, the Aircraft Handler will use this system to effectively manage the Flight and Hangar decks to support the projection of air power from U.S. aircraft carriers.

KEYWORDS: Intelligent Agents, Decision Support, Aircraft Handling, Sensor Fusion, Machine Vision, Network Management

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U.S. MARINE SPECIFIC SOFTWARE INTEROPERABILITY REQUIREMENTS OF THE AFATDS AND IOS SOFTWARE SUITES

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The Marine Corps has several Tactical Combat Systems at the Infantry Division level and below. The Information-Operations Server Version 1 (IOS v. 1) is a command and control (C2) system with a client-server architecture that when networked offers the Common Operational Picture (COP). The client is called Command and Control Personal Computer (C2PC). IOS was designed primarily to support maneuver, and has its roots in the Navy's Joint Maritime Command Information System (JMCIS). C2PC has been fielded to all Battalion and Squadron level and higher units in the Marine Corps, while IOS resides in Regimental and higher units.

The Advanced Field Artillery Tactical Data System (AFATDS), originally designed by the Army, is the Marine fire support C2 System of Record. Current AFATDS software is tightly coupled to a particular hardware platform. AFATDS is currently being fielded to all units in the Fleet Marine forces.

There are several problems with having two stand-alone C2 systems inside the same Combat Operations Center (COC). Among the most pressing problems is the inability for fires to support maneuver without tedious and dangerous manual conversion of data between systems. This thesis explores the software requirements for tactical systems integration of AFATDS and IOS.

KEYWORDS: Command and Control, Tactical C2 Systems, AFATDS, IOS, Intelligence-Operations Server, Interoperability

LEVERAGING WIRELESS NETWORK SELF ANALYSIS TO IMPROVE COMPUTER NETWORK DEFENSE (CND)

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Since the horrific attacks of September 11, 2001, the nation has taken on a renewed sense of operational security (OPSEC) that has not been seen since the devastating attack of the Pacific Fleet in Pearl Harbor on December 7, 1941. However, technological innovations of the last decade pose a new and daunting security risk. Specifically, IEEE 802.11b wireless networks are appearing as fast as enterprising young men and women can devise ways to leverage this commercially available product to improve their home/work environment. Its proliferation is a given as it is a flexible, economically priced technology requiring little expertise. It is the intent of this thesis to conduct an operational fleet assessment seeking to exploit the IEEE 802.11b wireless environment. This real world analysis will provide the Naval Postgraduate School (NPS) with initial data to further the development of a research platform to investigate the exploitation of the expanding wireless environment. This thesis shall provide a template for self analysis and monitoring that can be utilized on a routine basis to determine the security vulnerabilities of wireless computer networks. The analysis and research concludes with recommendations on how to successfully employ IEEE 802.11b in the current operational environment.

KEYWORDS: Computer Network Defense (CND), Wireless Computer Security, IEEE 802.11b Protocol

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EXPLOITATION OF EXISTING VOICE OVER INTERNET PROTOCOL TECHNOLOGY FOR DEPARTMENT OF THE NAVY APPLICATION

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This thesis documents an investigation into the technology of Voice over Internet Protocol (VoIP). VoIP promises to be a widely accepted technology in the future. The issues of efficient use of bandwidth over network choke points, cost savings gained from a common data and voice infrastructure, reduced cost associated with toll calls and the merger of the telephone with the desktop will keep adoption of this technology on the path to ubiquitous use.

Topics explored in the thesis include convergence over IP infrastructure, the status of VoIP technology available and providers in the VoIP industry. A prototypical cost benefit analysis of implementing VoIP is presented using NPS as an example.

Convergence on bandwidth restricted satellite links offers the most promising application of VoIP in the DoN today. A test network is constructed demonstrating the feasibility of implementing VoIP on the Automated Digital Network System (ADNS). Quality of Service (QoS) features enable further enhancements in throughput.

KEYWORDS: Voice Over Internet Protocol, VoIP, Convergence, ADNS, Cost Benefit Analysis, Quality of Service, QoS

DEVELOPMENT OF A PROTOTYPE DETAILING MANAGEMENT SYSTEM FOR THE CIVIL ENGINEER CORPS

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The Civil Engineer Corps (CEC) is a small group of naval officers totaling approximately 1250 officers. Being a small community, the CEC attempts to capture the location and other relevant information of every CEC Officer at a given time and publish that information in the Chief of Civil Engineers Directory (P-1). The CEC detailers also produce and work off a Staffing Plan to help them manage the movement of officers. The current process of developing the Staffing Plan and P-1 is complex and arduous.

This thesis examines existing systems at the CEC detail shop and explores the possibilities of developing a Detailing Management System. The intent is to develop a prototype application that links with existing systems to assist the detailers in the execution of their tasks including the streamlined production of the P-1 and Staffing Plan.

A prototyping methodology is used to accomplish these goals. The methodology includes the following phases: Problem Definition, Requirements Analysis, Design, Build/Revise prototype, and Finalize application. The build phase is iterated through several end-user reviews to obtain the best possible product to support their needs.

The application supports the immediate requirements of streamlining the development of the Staffing Plan and P-1 while providing additional detailing management capabilities.

KEYWORDS: Database, Legacy Systems, Personnel Management, Data Migration, Data Integration, Civil Engineer Corps

