INTRANET PROTOTYPE FOR THE UNITED STATES COAST GUARD ELECTRONIC SYSTEMS SUPPORT UNIT ALAMEDA

Ralph L. Benhart-Lieutenant, United States Coast Guard
B.S., Wayne State University, 1992
Master of Science in Information Technology Management-September 1998
and
Dean J. Dardis-Lieutenant, United States Coast Guard
B.S., Weber State University, 1991
Master of Science in Information Technology Management-September 1998
Advisors: Suresh Sridhar, Information Systems Academic Group
Carl Jones, Information Systems Academic Group

The objective of this thesis is to explore uses of Internet technologies and business model enhancements for Electronic Systems Support Unit (ESU) Alameda, a small Coast Guard command. To accomplish this task, this thesis will introduce the concept of Intranet technology, portray the efforts required to create an Intranet, and then discuss the benefits associated with Intranet use.

The thesis introduces two popular design methodologies, analyzes the advantages and disadvantages of each, and determines the best Intranet design methodology for this project by analyzing the needs and abilities of the organization. In addition, it describes the gathering of system and user requirements, data types, processes performed, business model evaluations, and conceptual Intranet development.

The work comprised within this thesis will enable coding and implementation of the Intranet by another thesis team working jointly on this project. While this thesis covers details of analysis and specification development, the thesis of the other team will continue discussion by addressing software coding, security, and maintenance.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Intranet, ESU, Rapid Prototyping, Coast Guard, Computer, Web-Based Application, Specification, Business Model, Data Flow Diagrams, Processes, Electronic Systems Support Unit Alameda

RE-ENGINEERING THE UNITED STATES MARINE CORPS SPECIAL EDUCATION PROGRAM (SEP)

Arthur W. Bornschein-Captain, United States Marine Corps
B.S., Cornell University, 1989
Masters of Science in Information Technology Management-March 1998
and
Michael Jernigan-Captain, United States Marine Corps
B.S., Auburn University, 1992
Masters of Science in Information Technology Management-March 1998
Advisors: Hemant K. Bhargava, Information Sciences Academic Group
Suresh Sridhar, Information Sciences Academic Group
LtCol Timothy Phillips, U.S. Marine Corps Representative

Within the United States Marine Corps, there exist billets (jobs) that require specialized graduate education. Department of Defense agencies submit requests to add billets to their organizational structure. Marine Corps Orders require for every billet added another must be removed elsewhere to balance manpower requirements. Additionally, continuing validation of the billets is required to ensure compliance with Secretary of Defense criteria. Problems in the key function, billet validation, include inflexible, inefficient, and ineffective processes, and nebulous validation criteria.

We address these problems by developing a centralized decision support system to be used in a distributed collaborative setting. The objectives of the Special Education Program (SEP) Billet Validation System are to allow SEP billet holders and commands to evaluate and justify existing SEP billets, to assist Military Occupational Specialty Sponsors in identifying manpower reductions, and to validate the graduate education requirement for existing SEP billets. Methods from Multi-

Criteria Decision-Making (MCDM) specifically Multi-Attribute Utility Theory (MAUT) and the Analytical Hierarchy Process (AHP) are used to formalize Secretary of Defense requirements and quantify relative ratings of billets. The system employs a Web Browser front-end application to allow the administrative review process to be performed in a parallel manner.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Manpower, Personnel and Training, Modeling and Simulation

KEYWORDS: Graduate Education, U.S. Marine Corps, Decision Support, Manpower, Web Browser, Utility Theory

FRAMEWORK FOR A LINK LAYER PACKET FILTERING SECURITY PROTOCOL

Gregorio G. Darroca-Civilian
B.S., United States Naval Academy, 1979
Master of Science in Information Technology Management-September 1998
Advisors: Geoffrey Xie, Department of Computer Science
Cynthia Irvine, Department of Computer Science
Rex Buddenberg, Information Systems Academic Group

Transport Layer (OSI Layer 3) switching and routing provides routing flexibility but not high throughput. Link layer (OSI Layer 2) switching provides high throughput but not the routing flexibility needed to manage topology change and load fluctuations in the network. Neither Layer 3 routing nor Layer 2 switching protocols were originally designed to support confidentiality and integrity of data, and authentication of participants. Proposals to integrate security may have positive results for data confidentiality, integrity and authentication, but often result in additional overhead, increased transmission latency, and decreased throughput. An added difficulty is reconciling standards and protocols when integrating heterogeneous routing networks with homogenous switching networks while minimizing impact on throughput.

This thesis examined current Internet extensions and architectures as well as IP security services and Layer 2 switching in IP-based networks. Requirements for a framework for a proposed security protocol include: Link Layer switching and routing; independence of particular communication protocols and standards; IP packet filtering and routing according to predetermined security policies and with no significant impact on throughput; and continued routing flexibility of IP. This security protocol, called Link Layer (Link Layer Packet Filtering (LLPF)), filters packets at the Link Layer, and boasts two innovations: use of an authentication trailer and multiple cryptographic keys with short cryptoperiods.

DoD KEY TECHNOLOGY AREA: Other **(**Computer Network Security)

KEYWORDS: Network Security, Asynchronous Transmission Mode (ATM), Internetworking, Protocol

DECISION SUPPORT FOR RECONNAISSANCE USING INTELLIGENT SOFTWARE AGENTS

Marcia R. Edmiston-Lieutenant, United States Navy
B.A., University of Kansas, 1989
Master of Science in Information Technology Management-March 1998
and
Darrell R. Gregg, Jr-Captain, United States Army
B.S., Northeast Missouri State University, 1989
Master of Science in Information Technology Management-March 1998
and
David G. Wirth-Lieutenant, United States Navy
B.S., Pennsylvania State University, 1990
Master of Science in Information Technology Management-March 1998
Advisors: Tung X. Bui, Department of Systems Management
Carl R. Jones, Information Sciences Academic Group
Suresh Sridhar, Information Sciences Academic Group

Research in reconnaissance traditionally focuses on data detection and discrimination methods. Less emphasis is placed on transforming the collected data into useful information and presenting it to key command and control nodes in time for operational use. Information not presented in a timely manner is excluded from the decision process. This thesis proposes a conceptual model of intelligent software agents to support the human decision process and reconnaissance related tasks. The Mobile Agent Reconnaissance Kit (MARK) suggests a hierarchy of software agents to facilitate data integration and coordination in a network-centric multisensor environment. The model uses static and mobile agents to collect data from dispersed, heterogeneous data sources, process and fuse the data, and present the resultant information to the user in an HTML file. The authors explore applications of MARK in terms of the Military Intelligence Cycle, the Joint Director of Laboratories (JDL) Technical Panel for C3I Data Fusion Model, and the Joint Operations Planning and Evaluation System (JOPES) Crisis Action Procedures.

DoD KEY TECHNOLOGY AREAS: Command, Control and Communications, Computing and Software, Human Systems Interface

KEYWORDS: Software Agent, Intelligent Software Agent, Mobile Software Agent, Reconnaissance, Decision Suppor

OPERATIONALIZATION OF INFORMATION TECHNOLOGY FOR THE 21ST CENTURY (IT-21): THE FLIGHT SCHEDULING FUNCTION IN PATROL SQUADRON 40 AS A CASE STUDY

Richard P. Flatau, Jr.-Major, United States Marine Corps
B.S., George Mason University, 1983
Master of Science in Information Technology Management-September 1998
Advisors: Norman F. Schneidewind, Information Systems Academic Group
Douglas E. Brinkley, Department of Systems Management

In the past several years, greater exploitation of information technology to increase leverage of information has become a central focus in the military. This focus is reflected in a number of strategic vision documents. Two significant examples are "Joint Vision 2010" signed in 1996 by the Chairman of the Joint Chiefs of Staff and the 1997 Quadrennial Defense Review Report. Achieving and using information superiority is seen as essential to future military success. This has led to the emergence of a new warfare paradigm: network-centric warfare.

Towards this end, the Navy's service-wide IT improvement initiative is Information Technology for the 21st Century (IT-21). IT-21 establishes a standard for IT capability to be achieved throughout the Navy within which Navy units can shape their IT improvements.

This study explores a requirements-approach for planning improvement of IT through IT-21. Specifically, it focuses on a single function of one squadron: flight scheduling in Patrol Squadron 40. This study addresses how to establish

information requirements, assess current IT performance, and formulate specifications by which to drive planning for IT improvement. It concludes by mapping IT-21 components to requirements to provide VP-40 with a plan for improving its flight scheduling process through IT-21.

DoD KEY TECHNOLOGY AREA: Other (Information Technology Systems Analysis and Design)

KEYWORDS: IT-21, Flight Scheduling, Information Technology, Systems Analyais and Design

A FUNCTIONAL INTRANET FOR THE UNITED STATES COAST GUARD UNIT

Robert T. Hannah-Lieutenant, United States Coast Guard
B.S., United States Coast Guard Academy, 1991
Master of Science in Information Technology Management-September 1998
Advisors: Suresh Sridhar, Information Systems Academic Group
Carl Jones, Information Systems Academic Group

This thesis describes the complete development process of a functional Intranet for an operational United States Coast Guard (USCG) Electronic Support Unit (ESU) in Alameda, California. The final product is suitable for immediate use. It may also be used as a prototype for future Intranet development efforts.

The methodology used to develop a finished, working product provides the core subject matter for this thesis. The discussion concentrates on why certain applications were developed and what business benefits they provide.

The Intranet was developed in seven unique stages of the Waterfall Model of information systems design. The Waterfall Model traces a systems development lifecycle from planning, to logical design, through physical design, and finally ends with the implementation process. Each stage of the development model is addressed in this thesis.

Intranet technology provides a radical new means of communicating throughout an organization, which has the potential to change the organization. Elaboration on both the social and technical aspects of introducing an information systems change to the ESU is included.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Intranet, Information Systems Design, HTML, Active Server Pages, Web Enabled Database, Internet, World Wide Web, Web Authoring, Waterfall Model, Rapid Prototyping, Coast Guard, ESU Alameda

DESIGN CONSIDERATIONS TO BE ADDRESSED WHEN DEVELOPING WEB BASED APPLICATIONS FOR SENIOR MANAGERS

David W. Hardy-Lieutenant, United States Navy
B.S., University of Georgia, 1991
Master of Science in Information Technology Management-September 1998
Advisor: Barry Frew, Information Systems Academic Group
Second Reader: Rudy Darken, Department of Computer Science

This thesis develops guidelines for building Web sites that are useful to senior managers in two ways. First, these managers can obtain information from or pass information to a site in order to accomplish tasks more effectively and efficiently. Secondly, the senior manager must be able to go to a site and use that site without being required to undergo instruction or read manuals before using the site. Web technology is in place to assist these managers in performing at a higher level. Methodologies used in this thesis combine a study using sample web sites, based on the Center for Executive Education Web Site, two surveys, database connectivity, and usability design practices to aid in Internet or intranet based applications. This document contains results from surveys of senior managers which are evaluated to select a suitable methodology for designing Web sites specifically for this subset of users.

DoD KEY TECHNOLOGY AREA: Other (Interface Design)

KEYWORDS: Usability, ODBC, Interface Design, Senior Management, Senior Managers, Internet, Intranet, Web Based Application Interface

AN AGENT-BASED APPROACH TO ANALYZING INFORMATION AND COORDINATION IN COMBAT

Richard B. Hencke-Lieutenant, United States Navy
B.S., California State Polytechnic University, Pomona, 1990
Master of Science in Systems Engineering-September 1998
Advisors: Donald P. Gaver, Department of Operations Research
Carl R. Jones, Information Systems Academic Group

The quality and quantity of information flows is a critical factor in the command and control of forces in battle. Many current simulations do not adequately show the interactive effects of information on the battlefield. Agent-based simulation is a promising technique that can provide insight into these effects.

The purpose of this thesis is to develop an agent-based simulation to analyze the relationship between information and command structure. (SinBaD) Simulation of Information in Battlefield Decisions is the agent-based simulation developed specifically for this thesis. Although SInBad is only an abstract model of combat, it is believed that this approach can provide much insight into the mechanisms that affect the effectiveness of information in battle.

Several combat scenarios are simulated using different control rules. These simulations suggest that there exists scenarios where information is essential to mission success and some cases where its role is less instrumental or even detrimental. Other insights generated from this research suggest that agent-based simulation may help define metrics useful in aiding decision-makers during the planning and execution of a large and complex campaign.

DoD KEY TECHNOLOGY AREA: Modeling and Simulation

KEYWORDS: Agent-Based Simulation, Complexity Theory, Complex Adaptive Systems

SOFTWARE AGENTS AND THE DEFENSE INFORMATION INFRASTRUCTURE: RE-ENGINEERING THE ACQUISITION PROCESS

Jerome Hudson-Major, United States Army
B.S., Prairie View A&M University, 1984
Master of Science in Management-September 1998
Advisors: Mark E. Nissen, Department of Systems Management
Tung X. Bui, Information Systems Academic Group

Process innovation within the Department of Defense (DoD) procurement system ultimately translates into flexibility, combat effectiveness, and technological advantage on the modern battlefield. A critical enabler of process innovation is the effective use of advanced information technology (IT) products, such as software agents. Software agent-based systems are used as an IT enabler for redesigning processes within the Defense Information Infrastructure (DII) Acquisition system. The Simplified Acquisition Procedures (SAP), a key element of acquisition reform, are used as the focus of our redesign efforts. To accomplish this task, the process is represented using a traditional process-flow model, Use Case analysis to integrate the DII macro-process view and the agent technology micro-view, and using a heuristic measure of process complexity to identify processes suitable for machine verses human performance. By exploiting the inherent strengths of both software and human agents, productivity is enhanced by freeing human agents from routine tasks and enables the refocusing of human resources to high value acquisitions. The result is an agent-based redesign of SAP processes where human agents and software agents share in the responsibilities for process execution.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Software Agents, Acquisition Reform, Process Innovation, Defense Information Infrastructure

RE-ENGINEERING THE UNITED STATES MARINE CORPS' ENLISTED ASSIGNMENT MODEL (EAM)
Gary D. Koch Jr.-Major, United States Marine Corps
B.S., The Citadel, 1986
Master of Science in Information Technology Management-June 1998
Advisors: Hemant K. Bhargava, Information Sciences Academic Group
Suresh Sridhar, Information Sciences Academic Group

In a time of downsizing and budgetary constraints the Manpower division of Headquarters, the United States Marine Corps, accomplishes its mission "to put the right Marine in the right place at the right time with the right skills and quality of life" in a variety of ways. Currently, one of the processes that assist the Marine Enlisted Assignments branch is the Enlisted Assignment Model. The current system is not producing the results that are needed and the current managers do not trust the output. This thesis proposes changes to the EAM user interface, data access, and data storage capabilities to enable the Marine Corps to use the latest information technology to more closely mirror the vision as stated above. With the use of Business Process Re-engineering, Process Modeling, and Database Design a prototype is developed to address areas of the current system that can be changed. By using these methods to ensure an appropriate interface with optimization techniques, a complete Decision Support System for manpower assignments can be realized. These changes will empower managers to effectively and efficiently manage, not just monitor manpower readiness in order to meet the challenges of the 21st century.

DoD KEY TECHNOLOGY AREAS: Manpower, Personnel Management and Assignment, Database Management Systems

KEYWORDS: U.S.M.C., Databases, Manpower Assignment, Models, Decision Support Systems, Graphical User Interface

VRML TERRAIN MODELING FOR THE MONTEREY BAY NATIONAL MARINE SANCTUARY (MBNMS)
R. Greg Leaver-Lieutenant, United States Navy
B.S., Oklahoma State University, 1987
Master of Science in Information Technology Management-September 1998
Advisor: Don Brutzman, Undersea Warfare Academic Group
Rex Buddenberg, Information Systems Academic Group

This thesis develops an online model of the topographic terrain of Monterey Bay National Marine Sanctuary (MBNMS) seafloor. Written in the Virtual Reality Modeling Language (VRML), the model is an interactive 3D application composed of hundreds of topographic tiles linked together to form a mosaic of the bay. Low-resolution tiles are traded for higher resolution tiles as the viewer gets closer to the terrain.

Important contributions include a naming convention for autogeneration of interlinked files, test usage of proposed metadata conventions linking VRML and the eXtensible Markup Language (XML), demonstrated use of the GeoVRML Working Groups proposed QuadLOD node, and a preliminary 3D navigation icon for terrain interrogation and wayfinding. Terrain data was produced from registered, smoothed and subsampled bathymetric sonarscan results. Because the model is geo-referenced with the Universal Transverse Mercator (UTM) coordinate system, a user can easily add scientific content or data to a selected location of the MBNMS in a manner analogous to adding 2D content to an HTML page. Thus, the user can place 3D content anywhere in the MBNMS in geographic context merely by specifying the geographic coordinates and depth of the content in standard VRML syntax.

Future work includes improvement of metadata interoperability, navigation icon user testing, and autogeneration of image-based texture tiles for scientific visualization.

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Computing and Software, Environmental Quality, Human Systems Interface, Sensors, Modeling and Simulation

KEYWORDS: World Wide Web, Virtual Reality Modeling Language (VRML), Large-Scale Virtual Environments (LSVEs), Monterey Bay, 3D Graphics Modeling

INTRANET-BASED DECISION SUPPORT FOR THE MARINE AIR GROUND TASK FORCE AVIATION COMBAT ELEMENT

Malcolm LeMay-Major, United States Marine Corps
B.S., United States Naval Academy, 1983
M.A.I.S., Old Dominion University, 1992
Master of Science in Information Technology Management-September 1998
Advisors: Suresh Sridhar, Information Systems Academic Group
Barry Frew, Information Systems Academic Group

Information technology can be an effective force multiplier for the Air Combat Element (ACE) of the Marine Air Ground Task Force (MAGTF). Through the use of Intranet-based decision support, internet technology can be leveraged to improve the decision support and information processes of the ACE. This thesis reviews the objectives of Intranet-based decision support and provides a methodology to follow for implementing Intranet-based decision support for the ACE. The methodology combines systems development life cycle (SDLC) practices, command and control theory, an organizational analysis of the ACE and prototyping to achieve Intranet-based decision support. The results from a process analysis are evaluated to select suitable processes for migration to Intranet-based decision support. Prototype development involves coding approximately 100 software files in Cold Fusion. As part of the prototyping process, comments from fleet-based Marines are collected and incorporated in the prototype when possible. The methodology developed for this project could be used for other MAGTF related Intranet-based decision support systems.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Intranet, Marine Air Ground Task Force (MAGTF), Air Combat Element (ACE), Intranet-Based Decision Support

INTRANET FOR THE SYSTEMS MANAGEMENT DEPARTMENT

Robert H. Lunn-Major, United States Army
B.S., Texas Tech University, 1983
Master of Science in Information Technology Management-March 1998
and
Edward D. Loewen-Captain, United States Army
B.B.A., Oklahoma University, 1987
Master of Science in Information Technology Management-September 1997
Advisor: Suresh Sridhar, Information Sciences Academic Group
Second Reader: Hemant Bhargava, Information Sciences Academic Group

The objective of this thesis is to describe in detail the reasoning and development of an Intranet-based decision support system. This thesis is intended to show how World Wide Web technologies can be used to develop a prototype Intranet that can provide access to information for faculty, students, and staff members via a World Wide Web browser. It provides more open communication in the Department of Systems Management, quicker and more consistent information flows (service) to the faculty and staff, and reduced time spent on the handling of repetitive and often simple information exchanges. The

decision support function is supported by a database which is an information clearinghouse, providing all personnel with 24-hour access. Personnel are empowered by information availability and are likely to be more proactive. A prototype has been developed to demonstrate the concept and to demonstrate the validity of rapid prototyping as a means of validating the effectiveness of the modified Intranet development methodology. The prototype is located at (http://131.120.41.236).

DoDKEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Intranet, Decision Support System, World Wide Web

PROCESS INNOVATION: ANALYSIS AND REDESIGN OF THE CALIFORNIA ARMY NATIONAL GUARD STATE EMERGENCY MOBILIZATION PROCESS

Patrick F. McGuire-Captain, United States Marine Corps
B.S., Pennsylvania State University, 1992
Master of Science in Information Technology Management-September 1998
and
David A. White-Lieutenant, United States Navy
B.S., Jacksonville University, 1990
Master of Science in Information Technology Management-September 1998
and
Andrew J. Palan-Captain, United States Marine Corps
B.A., University of Missouri-Columbia, 1991
Master of Science in Information Technology Management-December 1998
Advisors: Suresh Sridhar, Information Systems Academic Group
Mark E. Nissen, Department of Systems Management

Process innovation can empower an organization to realize orders of magnitude improvement in its key business processes. Through process redesign, information technology can be used as an enabler to support effective, efficient, and cross-functional business processes. The area of research for this thesis is the analysis and redesign of the State Emergency Mobilization Process (SEMP) of the California Army National Guard. This is accomplished through a detailed study of the State Emergency Mobilization Process with an emphasis of the key business processes of the California Army National Guard. The baseline process will be measured and diagnosed for inhibiting pathologies, and redesigned processes will be proposed based on benchmarking best practices of other organizations and by utilizing Process Innovation best practices. Critical process enablers such as people, culture and technology will be examined and applied to redesign alternatives. Once completed, the best redesigned business process will be recommended and an implementation plan drafted to integrate with the CA-ARNG Strategic Information Systems Plan.

DoD KEY TECHNOLOGY AREA: Other (Process Innovation)

KEYWORDS: California Army National Guard, Benchmarking, Reengineering, CA-ARNG, Change Management

REMOTE NETWORK ADMINISTRATION OF THE SEANET COMMUNICATION NODE SYSTEM

Don C. Murray-Lieutenant, United States Navy
B.S., University of Oklahoma, 1991
Master of Science in Information Technology Management-September 1998
and
Christopher L. Pratt-Lieutenant, United States Navy
B.S., Virginia Military Institute, 1990
Master of Science in Information Technology Management-September 1998
Advisor: Rex Buddenberg, Information Systems Academic Group
Second Reader: Don Brutzman, Undersea Warfare Academic Group

Maritime data communications are expensive and of limited capacity. Currently there is no established infrastructure to support Internet connectivity for sea-going vessels. The SeaNet program is investigating maritime networking solutions. One aspect of the SeaNet program is promoting remote network management. Remote network management will provide the maritime research community with a flexible and cost-effective tool for monitoring sea based assets. The objective of this thesis is to investigate remote network management over a satellite connection in support of the SeaNet programs goals.

To research the potential for remote network management, the Naval Postgraduate School has developed its own SeaNet laboratory. This laboratory simulates both the shipboard and shore-based infrastructure of the SeaNet program and conducts remote network management on these components. This thesis discusses the SeaNet program, network management concepts, the NPS SeaNet laboratory, research findings, and recommendations for future research. Remote Network Management of the SeaNet Control Node system is possible, however, continued research in this area is needed.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Network Management, Internet-to-Sea, SeaNet

DETERMINING AND APPLYING TELEMEDICINE MEASURES OF EFFECTIVENESS WITHIN THE U.S. NAVY

Doris J. Nedved-Lieutenant, United States Navy
B.S., South Dakota State University, 1991
Master of Science in Information Technology Management-September 1998
Advisors: Barry Frew, Information Systems Academic Group
Tung Bui, Information Systems Academic Group

Telemedicine is a system of healthcare delivery tools which uses telecommunications consultations as an alternative to transportation of the patient. There are no conclusive studies to prove or disprove the use of telemedicine and it is often implemented with little basis for measuring its effectiveness. Recent initiatives have been driven by advances in technology and pressure by upper management to reduce the cost of health care, but not from local needs assessments. This thesis provides a methodology to collect data used in supporting measures of effectiveness. The methodology is developed through a review of strategic goals, an assesment of potential measures of effectiveness, and the use of a model for data collection. It is applied at a Navy medical treatment facility recently installing telemedicine equipment.

DoD KEY TECHNOLOGY AREAS: Other (Information Systems and Technology, Medical and Biomedical)

KEYWORDS: Measures of Effectiveness, Telemedicine

GARRISON BASED INTRANET PROTOTYPE FOR THE 40TH INFANTRY DIVISION (MECHANIZED)

Thomas M. Olson-Major, United States Army
B.S., South Dakota State University, 1983
Master of Science in Information Technology Management-March 1998
and
Nelson T. Heckroth-Major, United States Marine Corps
B.A., Oregon State University, 1985
Master of Science in Information Technology Management-September 1997
Advisor: Suresh Sridhar, Information Sciences Academic Group
Second Reader: Tung Bui, Information Sciences Academic Group

This thesis introduces the concept of an Intranet, chronicles the efforts required to create and deliver an Intranet, and provides a discussion of advantages and disadvantages of using an Intranet. It demonstrates that an Intranet can be a useful mechanism to solve problems related to information control and distribution for the reserve component of the 40th Infantry Division (Mechanized).

The thesis contains a detailed description of the rapid prototyping process model, as well as the modifications required to adapt the process for Intranet development. Further, it describes the gathering of system requirements using the results of several structured walk-throughs. It also describes, in detail, the development efforts to address each of the requirements identified.

The prototype developed as part of this thesis demonstrates several key aspects of Intranet development and deployment. For example, it incorporates webpage development using commercial-off-the-shelf products common to the division, and the development of interactive functions with spreadsheet and database programs. This thesis also addresses issues such as security and content control which are crucial for Intranet deployment.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Human Systems Interface, Other (Intranet/Network Design

KEYWORDS: Intranet Design, Garrison, Ground Unit

A NAVAL RESERVE DATABASE APPLICATION AND FUTURE NETWORK SOLUTIONS

Bruce M. Patrou-Commander, United States Naval Reserve
B.S., University of West Florida, 1981
Master of Science in Information Technology Management-June 1998
Advisors: Suresh Sridhar, Information Sciences Academic Group
William R. Gates, Department of Systems Management

This thesis develops a Naval Reserve squadron database management system prototype and provides recommendations on future network solutions. The development centers on a Strike Fighter Squadron 203 (VFA-203), located in Atlanta, Georgia.

This project focuses on an application, which will support those current critical administrative systems that are not electronically automated or do not reside in a distributed computing environment. Emphasis is on utilizing current hardware and software while minimizing costs, training and organizational change associated with new information systems. Database scalability using Access 97 and IT 21 compliance are important features of this system.

A small local area network (LAN) option in a Peer-to-Peer configuration is discussed as a means to increase system efficiency by providing distributed access to this application. Future client/server network architecture capable of far greater scalability, network sharing and security will be recommended for further increases in system effectiveness.

DoD KEY TECHNOLOY AREA: Computing and Software

KEYWORDS: Database Management System, DBMS, Access 97 Software, Local Area Network, LAN

THE DEVELOPMENT OF A LITTORAL REGION AREA COMMUNICATIONS NETWORK IN SUPPORT OF OPERATIONAL MANUEVER FROM THE SEA
Bryan J. Smith-Major, United States Marine Corps
B.S., University of Arizona, 1982
Master of Science in Information Technology Management-September 1998
Advisors: Rex A. Buddenberg, Information Systems Academic Group
John Osmundson, Command, Control, and Communications Academic Group

Despite the apparent abundance of modern communication technology such as satellites, computers, and fiber-optic transmission systems, communication capacity is a limited resource for littoral operations. The Navy and Marine Corps lack the dedicated networks to support such doctrinal concepts as Operational Maneuver From the Sea (OMFTS). One solution is to develop a Littoral Region Area Network (LRAN). The primary goal of this thesis is to underscore the littoral operating environment and bandwidth requirements. It also investigates reliable seaborne network communication systems complementary to satellite and wireless networks, and proposes an open, standards-based modular architecture, utilizing a network centric design model as the basis for LRAN. It employs modeling and simulation techniques to demonstrate coupling of the system integration processes with the doctrinal concepts of OMFTS.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Other (Information Technology)

KEYWORDS: Networks, Aerostats, Littorals, Operational Maneuver from the Sea (OMFTS), Communications, Modeling and Simulation, IEEE 802.11, ADNS, Marine Corps Tactical Data Network

ANALYSIS OF NATIONAL OVERHEAD INTELLIGENCE COLLECTION (U)
Randall L. Smith-Lieutenant, United States Navy
B.S., United States Naval Academy, 1989
Master of Science in Space Systems Operations-March 1998
Advisors: Dan Boger, Command, Control, and Communications Academic Group
Carl Jones, Information Sciences Academic Group

Space systems provide wide-ranging support to the military and the National Command Authority (NCA) during any developing crisis. This thesis explores how the national systems responded to such an event against the geopolitical backdrop of world events. Each system architecture's capability and role is examined in detail. The entire satellite process is covered from the tasking process and distribution of assets through the dissemination of information to NCA decision makers and on scene military commanders.

DoD KEY TECHNOLOGY AREAS: Space Vehicles, Other (Intelligence)

KEYWORDS: Signals Intelligence, Imagery Intelligence, Requirements Process

RE-ENGINEERING THE UNITED STATES MARINE CORPS'

RECRUIT DISTRIBUTION MODEL (RDM)
Kevin J. Snoap-Lieutenant, United States Navy
B.S., University of Texas at Austin, 1991
Master of Science in Information Technology Management-September 1998
Advisors: Hemant K. Bhargava, Information Systems Academic Group
Suresh Sridhar, Information Systems Academic Group

The United States Marine Corps accomplishes its mission "to put the right Marine in the right place at the right time with the right skills and quality of life" in a variety of ways. One of the information systems assisting the Marine Enlisted Assignments branch is the Recruit Distribution Model (RDM). This thesis proposes changes to the RDM user interface, data management, assignment model, and analysis capability. With the use of business process re-engineering, process modeling, mathematical modeling, and database design a fully functional prototype has been developed to address each identified change proposal. This re-engineered system includes numerous innovations such as an intuitive navigational scheme using switchboards, and the elimination of manual data entry for data already available in the system. It also provides a number of significant contributions beneficial to the USMC. For instance, the re-engineered system allows the user to objectively analyze different results by comparing four different objective measures, and its mathematical model uses commercial-off-the-shelf products eliminating a proprietary solver. All these changes will empower managers to effectively and efficiently manage the assignment of recruits in order to meet the challenges of the 21st century.

DoD KEY TECHNOLOGY AREAS: Manpower, Personnel, and Training, Modeling and Simulation, Other (Database Management Systems)

KEYWORDS: USMC, Databases, Manpower Assignment, Models, Decision Support Systems, Graphical User Interface

OPTIMIZING UNITED STATES MARINE CORPS ENLISTED ASSIGNMENTS
Brian F. Tivnan-Captain, United States Marine Corps
B.S.M.E., University of Vermont, 1992
Master of Science in Operations Research-September 1998
Advisor: Robert F. Dell, Department of Operations Research
Second Reader: Hemant K. Bhargava, Information Systems Academic Group

The United States Marine Corps (USMC) has 156,000 active duty enlisted Marines and annually orders over 90,000 of them to permanently change station. The Commandant of the Marine Corps requires assignments of the "Right Marine, to the right place with the right skills and quality of life." USMC manpower planning uses staffing goals (billet requirements) to capture the Commandant's requirements, but, surprisingly, does not monitor how many Marines fill appropriate staffing goal billets. This thesis finds that although the staffing goals are completely achievable, only 45% of active duty Marines fill a staffing goal billet and 47% of staffing goal billets are under-staffed. The USMC has used the Enlisted Assignment Model (EAM) since the 1970s to help enlisted monitors determine assignments. EAM has several shortcomings. Among these, enlisted monitors reject most of EAM suggested assignments and EAM offers no measure of effectiveness to gauge the quality of its assignments. This thesis presents a network model, EAM-GLOBAL to optimize the by-name assignment of Marines to staffing goal billets. EAM-GLOBAL attempts to assign the "right Marines to the right places" while simultaneously balancing staffing shortages, allowing grade and military occupational specialty substitutions, and minimizing the costs of permanent change of station transfers within the continental United States.

DoD KEY TECHNOLOGY AREAS: Manpower, Personnel, and Training, Modeling and Simulation

KEYWORDS: Assignment Model, Staffing Goals, Manpower Models, Transportation Model, Network, Elastic Network Model