

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

DISSEMINATION AND STORAGE OF TACTICAL UNMANNED AERIAL VEHICLE DIGITAL VIDEO IMAGERY AT THE ARMY BRIGADE LEVEL

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The Department of Defense Joint Technical Architecture has mandated a migration from analog to digital technology in the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) community. The Tactical Unmanned Aerial Vehicle (TUAV) and Tactical Control System (TCS) are two brigade imagery intelligence systems that the Army will field within the next three years to achieve information superiority on the modern digital battlefield. These two systems provide the brigade commander with an imagery collection and processing capability never before deployed under brigade control. The deployment of the Warfighter Information Network (WIN), within three to five years, will ensure that a digital dissemination network is in place to handle the transmission bandwidth requirements of large digital video files.

This thesis examines the storage and dissemination capabilities of this future brigade imagery system. It calculates a minimum digital storage capacity requirement for the TCS Imagery Product Library, analyzes available storage media based on performance, and recommends a high-capacity storage architecture based on modern high technology fault tolerance and performance. A video streaming technique is also recommended that utilizes the digital interconnectivity of the WIN for dissemination of video imagery throughout the brigade.

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

KEYWORDS: Tactical Unmanned Aerial Vehicle, Tactical Control System, Redundant Array of Independent Disks, Warfighter Information Network, Tactical Internet, Global Broadcast System

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FIRE SUPPORT PLANNING SYSTEM (FSPS): A COMMERCIAL OFF THE SHELF (COTS), WINDOWS-BASED, WIRELESS APPROACH

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Given the rapid rate of today's technological changes and in an environment of austere budgets, DoD faces a significant challenge relating to hardware and software. This joint thesis explores two major issues. First, whether commercial off the shelf (COTS) software development tools in conjunction with the Rapid Application Development (RAD) software development methodology can be used to deliver meaningful applications for the warfighter. Second, this thesis describes an overview of the commercial wireless technologies available today and whether these technologies could enhance the capabilities of the Marine Corps tactical communications architecture to transmit RAD/Win32 compliant software applications. As a specific demonstration case, the authors developed the Fire Support Planning System (FSPS) software which would "ride on top" of the Marine Corps' Command and Control Personal Computer (C2PC) application.

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

KEYWORDS: Fire Support Planning System (FSPS), Wireless Technology, C2PC, Rapid Application Development (RAD)

COMPARING THE MOSAIC AND GTSIMS PROGRAMS IN THE INFRARED SIGNATURE REDUCTION AND COUNTERMEASURE ENVIRONMENT (U)

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It is well known through both simulation and field tests that IR flare countermeasures can be effective in reducing the vulnerability of aircraft to incoming IR missile seekers. This thesis summarizes the results from two of the premier IR modeling and simulation packages for one-on-one missile to aircraft engagements; Modeling System for Advanced Investigation of Countermeasures (MOSAIC) and the Georgia Tech Simulations Integrated Modeling System (GTSIMS). The aircraft and missiles chosen for this analysis were the F-15E and MH-60G, and the Stinger (Basic) and SA-16, respectively. For each set of conditions, e.g. specified aircraft, aircraft altitude and speed, missile, missile launch conditions, and with and without flares, the simulation was run with scaled IR signature ranging from (nominal) 100% down to 10%. For each 1:1 engagement the miss distance between missile and aircraft was recorded and observations of any trends in this miss distance are presented. Missile miss distances produced some unexpected, i.e. anomalous, results as the signature of the aircraft was reduced and the aircraft is engaged by the Stinger missile in an IRCM environment. Also, there is a comparative look at MOSAIC and GTSIMS with an accompanying discussion of the similarities and differences between the two packages.

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DoD KEY TECHNOLOGY AREAS: Air Vehicles, Modeling and Simulation

KEYWORDS: MOSAIC, GTSIMS, Infrared Countermeasures (IRCM), Modeling, Simulation, Stinger, SA-16, F-15E, MH-60G, Infrared (IR) Signature Reduction

JPALS FEASIBILITY FOR THE USN/USMC
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The Department of Defense (DoD) and the Federal Aviation Administration (FAA) are committed to a satellite-based, differential Global Positioning System (DGPS) for precision approach and landing. DGPS has proven successful in experimental and operational tests by civilian operators and the United States Air Force alike, and will serve as the foundation for the FAA's Wide Area Augmentation System (WAAS) and Local Area Augmentation System (LAAS). The DoD's DGPS Joint Precision Approach and Landing System (JPALS) essentially mirrors the FAA's efforts, and JPALS promises greater operability and capability between and among the services who currently use dissimilar, "stovepiped" systems. However, the Air Force-led DPGS program did not thoroughly review DGPS anti-jamming ability, and does not offer a feasible solution. Furthermore, the JPALS Analysis of Alternatives (AOA) and Operational Requirements Document (ORD) favored fixed-wing operations and did not thoroughly consider the operations of the Marine Corps and Navy. Even though JPALS represents a significant improvement over the present precision approach and landing systems in use by the DoD, the Acquisition Category 1D program must review anti-jamming capabilities, shipboard operations, and Marine Corps expeditionary missions.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Other (Computers, Intelligence, Surveillance and Reconnaissance)

KEYWORDS: GPS, LAAS, WAAS, JPALS, AOA, ORD

WORLD WIDE WEB ADMINISTRATION AND DISTRIBUTION OF THE
MAINTENANCE CLIMATE ASSESSMENT SURVEY (MCAS)
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Naval Aviation has been tasked to reduce its 1996 human factors related Class A flight mishap rate in half by the year 2000. The Human Factors Quality Management Board (HFQMB) was established in 1996 to help Naval Aviation achieve its mishap reduction goals. Previous HFQMB mishap reduction initiatives focused on flight mishaps and aircrew related issues, however a recent shift to broaden the scope now puts attention on aircraft maintenance and consequently maintainers. Baker (1998) developed, from a Maintainer's perspective, a Climate Assessment Survey (MCAS). The purpose of the MCAS was to provide a diagnostic tool to identify potential intervention areas from the perspective of maintenance-related mishaps. This thesis seeks to provide a vehicle fostering the proliferation of the MCAS throughout the fleet by adapting it for the World Wide Web (WWW), and developing a prototype Web site. A usability analysis was conducted to form a basis for future modification to the online version of the MCAS,

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with the ultimate goal being an effective tool to promote the reduction of human factors related mishaps in Naval Aviation maintenance.

DoD KEY TECHNOLOGY AREA: Other (Aviation Safety)

KEYWORDS: MCAS, Aviation Maintenance Safety

GLOBAL BROADCAST SERVICE REACH BACK VIA SATELLITE TACTICAL DIGITAL LINK J (S-TADIL J)

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To meet the increasing need for additional wideband satellite capability within the Department of Defense, the Global Broadcast Service (GBS) is being developed. GBS is an asymmetric network providing up to 24 Mbps from the Satellite Broadcast Manager (SBM) to deployed forces via UHF Follow On (UFO) satellites during GBS Phase Two. The concept of Smart Push provides for most of the users' needs but cannot anticipate every need or emerging needs of the user. The user through User Pull requires the ability to request information products from the SBM through existing communication paths. This capability is termed reach back. Due to the nature of operations, not as much information is sent back from operating forces to headquarters commands; therefore, less bandwidth is required from deployed forces to headquarters commands. Reach back channels do not require as much bandwidth as GBS. This research explores the viability of using Satellite Tactical Digital Link J (S-TADIL J), also known as Satellite Link 16, as a reach back option for GBS.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Global Broadcast Service, GBS, Link 16, Reach Back, Smart Push, User Pull, Satellite Tactical Digital Link J, S-TADIL J

A DATA WAREHOUSE ARCHITECTURE FOR DoD HEALTHCARE PERFORMANCE MEASUREMENTS

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In order to improve business practices and access to healthcare related information within the Department of Defense's Healthcare System, a Performance Metrics Driven Decision Support System (PMDSS) framework has been designed using Data Warehouse technology. As part of this performance metrics-driven framework, this thesis defines a methodology to design, develop, implement, and apply statistical analysis and data mining tools to a Data Warehouse of healthcare metrics. With the DoD healthcare system undergoing significant changes, the ability for senior healthcare officials to have access to a wide range of management information in one central data repository can greatly enhance their decision making capabilities. This framework can be used as the foundation for moving DoD healthcare into the 21st century.

The major challenges involved in designing a data warehouse using this methodology are to identify the critical data needed to generate the data warehouse schema. The relevant data suggested in this thesis are healthcare performance metrics. Therefore, a team should be assembled that represents each functional

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business area to identify the critical performance metrics. Once the data has been identified and collected, it is straightforward to build a DSS for tracking performance metrics. The DSS consists of decision metrics, Geographical Information System (GIS), World-Wide Web and Online Analytical Process (OLAP) tools, Data Mining and statistics and forecasting components. Finally, it is very important to select the right people and proper tools, technology, and equipment to construct a corporate data warehouse architecture using a PMDSS.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Other (Data Warehousing)

KEYWORDS: Data Warehouse, Data Marts, Healthcare Data Warehouse, Healthcare Metrics, and Performance Measures

**A PERFORMANCE MEASUREMENT-BASED COMPANY OFFICER
MANAGEMENT INFORMATION SYSTEM PROTOTYPE
FOR THE UNITED STATES NAVAL ACADEMY**

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A company officer at the United States Naval Academy (USNA) is tasked with developing midshipmen morally, mentally, physically, and to imbue them with the highest ideals of duty, honor, and loyalty. This task requires increased knowledge on performance measurement and the right tool that will enhance their ability to develop midshipmen into the 21st century. A performance-measurement-based management information system will greatly enhance the company officer's ability to develop, maintain, and use information technology for purposes of performance measurement.

Based on user requirements, this research identifies the key result areas and key indicators, designs, and develops a prototype. The Company Officer Management Information System (COMIS) prototype is developed using Microsoft Access 97, an approved Department of the Navy IT-21 compliant software application.

The findings in this research strongly support the use of the COMIS prototype at the USNA and indicate that future research and future application development will significantly enhance the development of midshipmen well into the 21st century.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Human Systems Interface, Manpower, Personnel, and Training, Other (Information Technology)

KEYWORDS: COMIS, Database, Management Information System, Microsoft Access 97, Performance Measurement, and Prototype

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**RSLES: AN ARCHITECTURAL IMPLEMENTATION OF A DECISION
SUPPORT SYSTEM FOR OPTIMAL RECRUIT STATION LOCATION**

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This thesis describes a component-based methodology for developing a decision support system (DSS) for optimal location of military recruiting stations in regional recruiting markets. The DSS is designed to ensure that stations are selected that minimize cost for a given level of production. The interface allows users to perform “what if” analysis to determine if there are better locations to meet desired objectives. The Recruit Station Location Evaluation System (RSLES) integrates a user interface, a database, a GAMS optimizer model and a geographic information system (GIS) mapping engine to provide a flexible environment that leverages operational recruiting, market analysis, and demographic information for decision-making.

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

KEYWORDS: Decision Support Systems, Geographic Information Systems, Application Development, Recruiting, Site Location

**REDESIGN OF ADVANCED EDUCATION PROCESSES IN THE
UNITED STATES COAST GUARD**

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The processes used in the operation of the Coast Guard Advanced Education Program have evolved as most business processes that were developed prior to the introduction of information technology. These processes include the selection, management, assignment and tracking of advanced education student. These processes are still fully dependent on physical files and the mail system. The Coast Guard has an information technology infrastructure that supports better processes, however it is not being utilized in an integrated fashion. The objective of this thesis is to document the present processes and apply Business Process Re-engineering techniques to identify avenues of change to improve critical measures of performance. Key findings include the lack of critical performance measures, present system billet and officer codes do not identify job billets that require advanced education or personnel with advanced education, and electronic submission of information could reduce cycle time and facilitate decision-making in these processes.

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

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KEYWORDS: Information Infrastructure, Decision Support System, Business Process Re-engineering, Simulation

WILL THE LOGISTICS MANAGEMENT DECISION SUPPORT SYSTEM MEET THE INFORMATION AND DECISION PROCESS REQUIREMENTS OF ITS USERS?

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The development of the Logistics Management Decision Support System (LMDSS) by the Naval Air Systems Command (NAVAIR) has been on going since 1991. Originally conceived as a strategic Decision Support System (DSS), LMDSS has instead evolved into a Web portal for data analysts to access NAVAIR's Aviation Maintenance and Material Management (AV-3M) data. LMDSS is more accurately described as a Web-based, Management Information System (MIS) than as a DSS.

This research examines the information needs and decision process requirements of LMDSS users. Focus groups, interviews, and a Web-based survey were conducted to collect decision support and data requirements from Fleet customers. User perceptions, feedback, and recommendations to improve LMDSS are described and analyzed. Historical insights into the development history of LMDSS are introduced as a lessons learned for future NAVAIR software teams.

Problems identified by users are presented followed by specific recommendations for solutions. A prototype model developed for this thesis is found in the appendices as an example of how a modeling capability could enhance the ability of LMDSS to better support strategic, unstructured decisions. Recommendations are provided for future research.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Modeling and Simulation

KEYWORDS: Logistics Management Decision Support System, LMDSS, NALDA, Decision Support Systems, Software Development

UNITED STATES NAVY IMPLEMENTATION OF DEPARTMENT OF DEFENSE (DOD) PUBLIC KEY INFRASTRUCTURE (PKI)

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Information assurance (IA) within DoD is becoming an increasingly difficult task as information resources are moving toward a web-based environment. To counter this problem, DoD is mandating that all services implement DoD Public Key Infrastructure (PKI). DoD PKI is part of DoD's defense in depth strategy. It leverages the power of public key cryptography and digital certificates to improve IA. The thesis begins with a presentation of background information on public/private key cryptography and the elements of a PKI. The thesis then discusses those PKI management issues, i.e., CRLs and directories, that an IT manager should consider when implementing a PKI. The thesis then outlines the three areas the Navy should focus on as it implements DoD PKI; specifically PKI implementation strategies, key distribution

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alternatives, and how to manage change. In response to the first two areas, the author recommends regionalization, based upon the NMCI architecture, smart cards, and biometrics as answers. In response to the third area, the reader is provided with a discussion on managing change as it relates to the implementation of DoD PKI. The thesis is concluded with a discussion of what the Navy and DoD needs to do in order to implement the ideas presented in this thesis.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Public Key Infrastructure, Public Key Cryptography, Computer Security, and Biometrics

DIGITAL VIDEO IMAGERY AND WIRELESS COMMUNICATIONS FOR LAND-BASED RECONNAISSANCE MISSIONS

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Information superiority is a critical element of warfare. The commander who makes good decisions and executes these decisions at a superior tempo in the face of uncertainty and constrained time, most often leads his forces to victory. The research presented in this thesis seeks to provide superior information to the Commander in a visual form. This thesis explores, analyzes, and performs a proof-of-concept implementation for a real-time digital video reconnaissance system from forward locations to the rear using wireless communication.

This thesis defines the requirements behind the implementation of the system and identifies a prototype suite of equipment. It investigates emergent Commercial-Off-the-Shelf components to identify the equipment that satisfies the system requirements and takes full advantage of current technological advances. Design selection is based on an evaluation of each component against criteria of minimum requirements and selects the most compatible device. It performs an analysis of the prototype by evaluating system throughput used to transmit audio and real-time video imagery. Results of this analysis suggest implementation of the prototype is feasible and that it satisfies the information gathering process.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Reconnaissance, Wearable Computers, Digital Video Imagery, Real-Time Video, Wireless Communications Proof-of-Concept

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PRELIMINARY ROADMAP FOR THE UNITED STATES MARINE CORPS PUBLIC KEY INFRASTRUCTURE

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Over the last decade, the Marine Corps has capitalized on the advantages of the Internet by increasingly using the NIPRNET for electronic operations and communications. The Marine Corps wants to further leverage the capabilities of the Internet by moving more applications to the NIPRNET, however, security threats have restricted the type of information that can be exchanged across public networks. The Internet's open design enables message interception, monitoring and forgery; therefore, the Marine Corps is reluctant to use the Internet for transmitting sensitive information. Public key cryptography is becoming the foundation for electronic operations that require security and authentication in open networks. The use of public key cryptography requires a Public Key Infrastructure (PKI) to publish and manage public key values. The objective of a PKI is to provide authentication, confidentiality, integrity and non-repudiation of data. In conjunction with DoD PKI development efforts, the Marine Corps will develop and implement PKI services to protected information currently exchanged across the Internet and to enable the use of automated applications. This thesis begins by describing public key cryptography, the requirements for a PKI, and the components necessary to operate a PKI. Next, a preliminary USMC PKI roadmap is developed, including objectives and strategies for Marine Corps implementation efforts. Supporting material describes design issues, such as scalability and interoperability, and technical challenges, such as directories, key escrow, and smart cards. Finally, change management approaches are discussed, emphasizing unique cultural and organizational requirements for mitigating resistance to a Marine Corps PKI implementation.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: PKI, Public Key Infrastructures, Computer Security, MCEN, Marine Corps Enterprise Network

CAN THE MILITARY BENEFIT FROM CORPORATE USE OF STRATEGIC INFORMATION SYSTEM PLANNING?

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The Naval Construction Force, much like the Department of Defense, is adrift without a formal strategic plan for building an integrated information system. The purpose of this study is to explore and discuss how Strategic Information System Planning (SISP) is used by corporate business to plan integrated information systems. The paper examines how SISP is used as a means of gaining competitive advantages by corporate business in the marketplace with a view of how it can benefit the military. In addition, this paper will examine business process improvement as a means of making processes more efficient prior to the development of an information system. This research targets the development of information systems by the Naval Construction Force. An ancillary objective of this thesis is to provide the Naval Construction

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Force with a framework for developing integrated information systems. Throughout this research, the SISP methodology of Information Engineering will be used to make comparisons to corporate business that use this strategy and applications within the Naval Construction Force. This methodology will also be used to determine if this strategy can be tailored to suite the needs of the Naval Construction Force in information system planning.

DoD KEY TECHNOLOGY AREA: Other (Information System Planning)

KEYWORDS: Strategic Information System Planning, Information Engineering, Business Process Improvement, and Management Information Systems

RESPONDING TO THE THREAT OF CYBERTERRORISM THROUGH INFORMATION ASSURANCE

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The number of people connecting to the Internet is growing at an astounding rate: estimates range from 100% to 400% annually over the next five years. This unprecedented level of interconnectedness has brought with it the specter of a new threat: cyberterrorism. This thesis examines the impact of this threat on the critical infrastructure of the United States, specifically focusing on Department of Defense issues and the National Information Infrastructure (NII). A working of possible measures for countering the threat of cyberterrorism are discussed, infrastructure is provided. A number of possible measures for countering the threat of cyberterrorism are discussed, with particular attention given to the concept of information assurance.

Information assurance demands that trustworthy systems be developed from untrustworthy components within power-generation systems, banking, transportation, emergency services, and telecommunications. The importance of vulnerability testing (or red teaming) is emphasized as part of the concept of information assurance. To support this, a cyberterrorist "red team" was formed to participate in the Marine Corps' Urban Warrior Experiment. The objective of this thesis is to address the impact of these issues from a Systems Management perspective. This includes taking into account the changes that must occur in order to improve the U.S.' ability to detect, protect against, contain, neutralize, mitigate the effects of, and recover from attacks on the Nation's Critical Infrastructure.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Computing and Software, Electronics Warfare, Manpower, Personnel, and Training, Other (Terrorism)

KEYWORDS: Terrorism, Information Terrorism, Cyberterrorism, Information Infrastructure, Critical Infrastructure, Information Assurance, Information Warfare, Vulnerability Testing

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A FUNCTIONAL ANALYSIS OF DOD IMPLEMENTATION OF SEAT MANAGEMENT

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This study explores the use of seat management as a method of overcoming the difficulty of procuring, managing and maintaining information technology. Seat management, also known as desktop outsourcing, involves the acquisition and management of all hardware and software, desktop and network management, operations management, support services and technology refreshment into one concise contract managed by a vendor who specializes in IT.

The findings of this functional analysis, focusing on seat management, total cost of ownership and asset management, are reported. These findings show that seat management is not a panacea. But, when used in conjunction with sound management practices it can provide benefits to an organization.

DoD KEY TECHNOLOGY AREA: Other (Information Systems)

KEYWORDS: Seat Management, Desktop Outsourcing, Total Cost of Ownership

A SIMULATION BASED STUDY YIELDING A FULL CHARACTERIZATION OF THE MISS- DISTANCE TOPOLOGICAL MANIFOLD FOR THE F/A-18 C/D, VARYING RANGE, ANGLE, WET VERSUS DRY CONDITIONS AND IR SIGNATURE (U)

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In today's technologically sophisticated battlefield, smart infrared (IR) missiles successfully employ sophisticated counter-countermeasure tracking algorithms to reduce the effectiveness of countermeasure flares expelled by target aircraft. Another countermeasure option available to aircraft designers is the employment of designs, which reduce the IR signature to make the aircraft less vulnerable. This thesis is a study of results from simulated engagements conducted with a preeminent IR modeling and simulation package for one-on-one missile to aircraft engagements, the Modeling System for Advanced Investigation of Countermeasures (MOSAIC). The aircraft and missiles chosen for this analysis were the F/A-18 C/D and the Stinger (Basic), the SA-16, and the AA-7D, respectively. For each set of conditions, e.g. aircraft altitude and speed, missile, missile launch parameters, and with or without flares, the simulation was run with a scaled IR signature in 10% increments from 100% down to 10%. For each engagement the miss distance between missile and aircraft was recorded and observations of any trends in this miss distance are presented. Additionally, a comparison of engagement results obtained with a simplistic IR signature model, the circular source model, and a high definition model, the SPIRITS model, is conducted.

DoD KEY TECHNOLOGY AREAS: Air Vehicles, Modeling and Simulation

KEYWORDS: MOSAIC, SPIRITS, Infrared Countermeasures (IRCM), Modeling, Simulation, Stinger, SA-16, AA-7D, F/A-18 C/D, Infrared (IR) Signature Reduction, Engine Thrust Reduction

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DATABASE DESIGN AND IMPLEMENTATION FOR USMC MANPOWER RETENTION SURVEY

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MCERC is a database design and implementation to support the survey instruments for the USMC Exit and Retention Censuses, which are administered over the Internet. The Retention Census is a longitudinal survey administered annually to all Marines. A review of commercially available survey software revealed a lack of support for longitudinal surveys. A semantic object model for survey instruments is developed that relates them to the response data they collect. The resultant database schema facilitates version management of survey instruments over their lifecycle. The design supports the longitudinal aspect of the USMC Censuses by allowing the tracking of the instruments and response data over time. A relational model of the database design is prepared and implemented in Access™. A user interface is designed using Visual Basic, which integrates Cognos Powerplay™ into the system for analysis of the data. The interface includes the capability to convert raw data into a matrix for analysis. Issues of database administration are discussed as they relate to scaling the system from a stand-alone to a multiple-user environment.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Database, Manpower Survey, Data Model, Longitudinal

A CRITICAL EXAMINATION OF IT-21: THINKING BEYOND VENDOR-BASED STANDARDS

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The Information Technology for the 21st Century (IT-21) policy endorses the use of a Microsoft Windows NT-based PC in a client-server environment for all Navy computing needs. The rationale given for taking this vendor-based approach towards standards is that it will lower costs and increase fleet-wide interoperability. This thesis takes a critical look at the IT-21 policy from an economic, security, availability, procurement, and practical level, and explores the role of vendor-based standards in the Navy computing architecture. It identifies the concerns or deficiencies of an architecture based on products or vendors, and offers an alternative architecture that attempts to mitigate these concerns. It finds that a vendor-based standard will not necessarily increase interoperability, and the selection of Microsoft as that standard could end up costing the Navy much more than anticipated. On first inspection, vendor-based standards make sense for the reduction of costs and the increase in interoperability. However, this ignores the power that diversity gives the end user and it ignores the pending disaster of single points of failure in Navy information systems. This thesis recommends a web-based, 3/n-tier client/server computing architecture such as one using Common Object Request Broker Architecture middleware and the Extensible Markup Language for data presentation. This architecture should make it easier and cheaper to maintain and deploy applications, allow for the dynamic nature of IT, and permit computer applications to communicate with one another no matter what operating system they are using.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: IT-21(Information Technology for the 21st Century), Information Systems, Information Technology, Availability

INFORMATION TECHNOLOGY MANAGEMENT

NETWORK POLICY MANAGEMENT

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Effective military and commercial use of the Internet to conduct mission critical and commerce-oriented transactions over shared networks is increasingly inhibited by the shortcomings of the very enabling technology of the Internet - the TCP/IP protocol. Without network performance, security and other management controls, TCP/IP networks can't meet the overall requirements of a network. To complicate the network policy management issues, new applications are exchanging increasingly larger amounts of digital data (image, audio, video, etc.), and some of them require stringent Quality-of-Service (QoS) measured by delay and loss from the network. This places very diverse but demanding requirements on the network in terms of bandwidth, security and data delivery. Research needs to be conducted that will assist network managers in identifying and defining network policy resources. Network prioritization and policy options, usage, advantages and disadvantages have not been researched to the point where they are useful to the manager. There is a growing need for knowledge of management tools capable of running a new generation of applications over existing infrastructure. Policy-based network management can be broken into three areas: Security (strategies and policies), QoS (differential and integrated services, mechanisms and implementation) and Cost (multi, hybrid and primary vendor strategies). Future networking initiatives will be developed based on these three policy areas.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Network, Policy, Management

IMPROVEMENT OF THE U.S. MARINE CORPS COMBAT DEVELOPMENT SYSTEM

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In this thesis, possible methods for improving the U.S. Marine Corps Combat Development System are introduced. The Combat Development System (CDS) is a system designed to produce integrated capabilities for the U.S. Marine Corps. A review of the CDS doctrinal implementation, such as orders as directives, and actual implementation, through organizational visits and personal interviews, highlight several possible methods for improving the CDS.

Recommendations for improving the CDS include commercial and government management techniques and performance measurement models. A knowledge management (KM) study of British Petroleum and a study of Microsoft are introduced as examples of how KM can improve CDS. Merging the two main information systems that support CDS is recommended to provide cost and effort savings within Marine Corps Systems Command and Marine Corps Combat Development Command.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Manpower, Personnel, and Training, Materials, Processes, and Structures

KEYWORDS: Information Management, Change Management