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*US Army Information Systems Engineering Command
Fort Huachuca, AZ 85613-5300*

AD-A267 975



U.S. ARMY INSTITUTE FOR RESEARCH
IN MANAGEMENT INFORMATION,
COMMUNICATIONS, AND COMPUTER SCIENCES

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October 1990 - March 1991

ASQB-GB-91-021

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**U. S. ARMY INSTITUTE FOR RESEARCH
IN MANAGEMENT INFORMATION,
COMMUNICATIONS, AND COMPUTER SCIENCES
(AIRMICS)**

PROGRAM OVERVIEW

OCTOBER 1990 - MARCH 1991

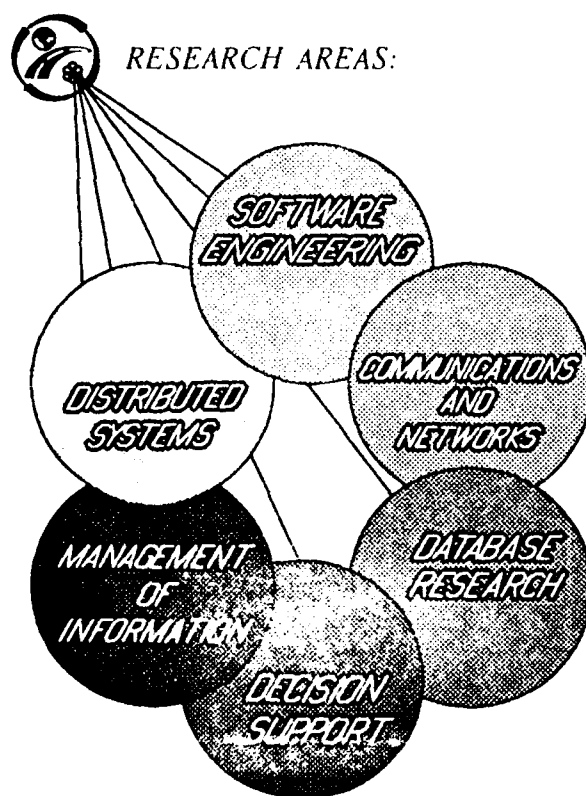
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The AIRMICS Program Overview is an information paper intended primarily for internal distribution. Unless otherwise stated, the views, opinions, and/or findings contained herein should not be construed as official Department of the Army position, policy, or decision.

A. INTRODUCTION

This Research Overview summarizes ongoing research tasks, technology transfer efforts, and technical support activities performed by the US Army Institute for Research in Management Information, Communications, and Computer Sciences (AIRMICS) during the period 1 October 1990 through 31 March 1991.

AIRMICS is part of the US Army Information Systems Engineering Command (ISEC) and serves as the research arm of the US Army Information Systems Command (ISC). In consonance with these relationships, AIRMICS provides direct support to the ISEC technical staff, ISC headquarters and subordinate commands, and to Program Executive Officers (PEOs) and Project Managers (PMs) in the Information Mission Area (IMA).



IMA advanced technology efforts that AIRMICS both sponsors and conducts are important since in an era of increasingly tight budgets, meticulous attention must be paid to obtaining the largest return on the Army's

investments. The rapidly changing, sophisticated high-technology areas are sources of particular scrutiny since funding must be concentrated on those developing technologies which have the greatest impact on enhancing the military's capabilities. In addition, duplication of previous work must be avoided, and great care must be taken to avoid simultaneously funding multiple efforts which are similar in scope and goal.

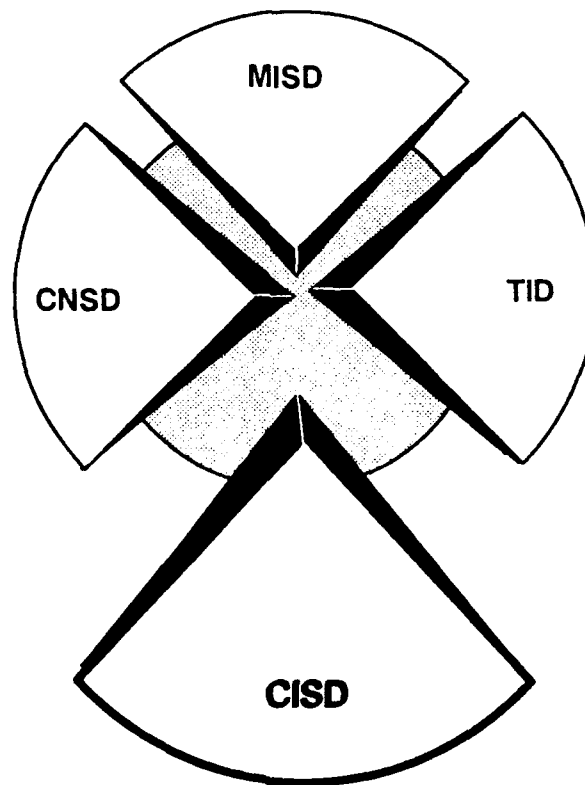
Some of the research activities performed by AIRMICS include: literature searches; state-of-the-art studies; technology feasibility studies; technology assessments; and planning, conducting, and evaluating pilot projects. The first four of these activities are necessary prerequisites to the development of any system and are applicable to non-developmental item (NDI) acquisitions.

Four functional divisions comprise AIRMICS — Management Information Systems Division (MISD); Computer and Information Systems Division (CISD); Communications and Network Systems Division (CNSD); and Technology Insertion Division (TID). Sections B, C, D and E are organized to provide information about the ongoing research tasks in each division. Section F presents the qualifications of AIRMICS personnel and the Facilities available to support the AIRMICS mission. The final section lists the FY91 reports published by AIRMICS.

B. COMPUTER AND INFORMATION SYSTEMS DIVISION (CISD)

CISD performs projects in the areas of Software Engineering and Very Large Database Systems.

In the Software Engineering area, CISD works to reduce software life cycle costs, increase the productivity of software development and support organizations, and increase the quality of the components, systems, and products delivered. CISD conducts projects on topics associated with software quality and productivity measurements, software requirements, software reusability, software maintenance, management of software development, Ada transition, and modernization of the Army's installed base of application programs. In the Very Large Database area, CISD works to develop the capability to effectively design, implement, operate, and manage large geographically dispersed heterogeneous databases. CISD also investigates methods, practices, and tools to aid these endeavors.



CISD represents AIRMICS at two research centers: The Software Engineering Institute (SEI) as an affiliate member representing ISEC, and the

National Science Foundation's Software Engineering Research Center (SERC) located at Purdue University and the University of Florida.

During the last six months, tasks were conducted on several projects in the software engineering area and one in the database area. For software engineering, a joint AIRMICS SDC-Atlanta effort was undertaken to investigate the process of moving/transitioning an existing STAMIS (Standard Army Management Information System) written in COBOL to Ada. We specifically address the topics of reverse engineering, object-oriented design versus functional decomposition design, the use of CASE tools, the degree of training required, and the use of Ada. The results showed that the object-oriented design methodology was easier to implement and more closely adhered to sound software engineering principles. SDC-Atlanta is now implementing the object-oriented design in Ada.

A study sponsored by DISC4 to evaluate the Distributed Computing Design System (DCDS) and determine its appropriateness in meeting the requirements of a software support environment for the MIS community has concluded. TRW had developed DCDS for the Strategic Defense Command specifically for supporting large, complex, real-time distributed systems. Part of the scope for this project was to determine the suitability of DCDS as a software engineering environment for the IMA community. Other pertinent objectives of this task addressed software development information supported by the SEI Contractors Assessment Questionnaire and software development information supported by typical CASE tools. It was determined that with modifications DCDS could be used with MIS systems. A complete discussion of the results are presented in the final report.

DISC4 also sponsored a project whose objective was to develop a methodology for determining/measuring the quality of software products as well as the effectiveness of software development and support organizations. Such a system will indicate where improvements can be made, which in theory, once made, should reduce the need for frequent modifications and corrections in fielded software systems. They should also lead to improved management of activities conducting both software development and maintenance support. A step-by-step guide on how to establish quality

measures for information systems support and a support measures framework will be included in the nearly complete final report.

In September 1990, AIRMICS initiated development of a method to predict software reliability in the operational phase of a system and to determine operational readiness at major reviews. A prototype tool which implements this new method will be developed. The Operational Test and Evaluation Command (OPTEC) sponsored this work, which is still on-going.

Through a Small Business Innovation Research (SBIR) project, AIRMICS is studying Ada Programming Support Environments (APSE). The initial objective is to understand the characteristics of available tools and support environments as they apply and relate to Management Information Systems (MIS) development. Results should be available in early summer.

In the database area, the current development phase of our ANSWER (Army's Non-Programmer System for Working Encyclopedia Requests) project is nearing completion. The IPR for Phase 3-B was held on 25 March 1991 at Honeywell Research Labs. Though there are plans to continue its development, only one phase remains on the original contract and that phase will be completed in October of 1991. The current prototype system is capable of registering, integrating and browsing schemas from multiple heterogeneous databases. Gateways to Oracle and Informix DBMS systems are available. The query processing module assists users in preparing correct SQL statements and then processes them. Processing involves the decomposition of a single generic SQL query into multiple queries which are then routed to the appropriate database manager over a local area network. Approximate SQL relational algebras are used to combine the results from multiple sources and present them to the user. Future plans call for additional gateways to other database systems, incorporating the draft standard for Remote Data Access (RDA), and the development of an application interface.

In addition to the tasks in the software engineering and database areas, CISD continues to provide consultant work both within the Army and the DOD. For the Army, CISD continues to support the PEO/PM structure. Specifically, CISD assisted COL Byrd, PM Installation Support Modules

(ISM), by participating in several of PM-ISM's workshops that focused on the development of the Installation Level Integrated Database and the Installation Level Acquisition and Procurement System. CISC also provides recommendations to the Data Management Directorate of ISSC on the Army Data Dictionary and the Army Dictionary Support System.

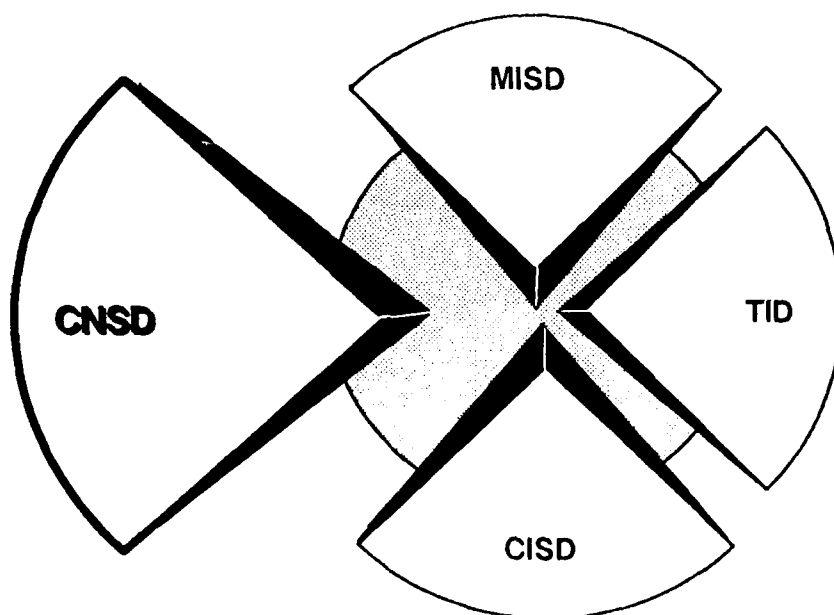
For DOD, CISC is participating in working group meetings and providing input to the DOD Software Technology Plan. This plan will provide a coordinated strategy to strengthen the DOD software base to more effectively address defense requirements. In this effort CISC represents the IMA Research, Development, Test, and Evaluation (RDTE) interests. In another DOD effort, CISC participated in Project Reliance. It is a Tri-service initiative by the Under Secretary of Defense (Acquisition) to reduce costs and increase productivity of Science and Technology (S&T) programs through greater inter-service cooperation and consolidation. A Tri-service strategy was completed in January 1991 and the responsibility for implementing the recommendations has been given to the Joint Directors of Laboratories (JDL). Several technical panels are being established to support this effort and CISC has been invited to participate on the Computer Science Technology Panel.

If you are interested in any of the above areas discussed in this report, or have questions relating to CISC, please contact Mr. Glenn Racine, e-mail address racine%airmics@gatech.edu, phone (404) 894-3110.

C. COMMUNICATIONS AND NETWORK SYSTEMS DIVISION (CNSD)

CNSD performs projects in Distributed Systems, and Communications and Network Technology.

The CNSD efforts in communications and distributed systems supports the Information Mission Area (IMA). AIRMICS transfers the results of this work to the Army through programs in ISEC and ISC. CNSD projects directly support the ISA 97 Architecture developed by ISEC. In addition, the results of this work can be directly applied to ISEC matrix support for the PEO/PM acquisition structure.



The projects conducted by CNSD develop tools, techniques, and prototypes for the design, implementation, transition and maintenance activities of various technologies of importance to the Army. In communications, CNSD conducts projects in ISDN, FDDI, and LAN/WAN. In distributed systems, CNSD actively pursues projects in distributed architectures that support ISA 97, various PMs, and the Army architecture in an open systems environment. Projects include distributed control of databases, communications, and interoperability among heterogeneous systems.

The first major group of projects is on ISDN. CNSD strongly pursues projects in the Integrated Services Digital Network (ISDN), a key technology in the ISA 97 Architecture. The Army has committed to introducing this technology in the next ten years, so it is vitally important for the Army to understand the implications of this commitment.

CNSD is a major experimenter on the Advanced Communications Technology Satellite (ACTS) under development by NASA for launch in the 1992 time frame. As ISDN is deployed throughout the Army, the lack of ISDN signaling infrastructure interconnecting Army installations will prevent the use of ISDN services inter-installation. AIRMICS is designing a series of experiments using a terrestrial-satellite ISDN interface that will be capable of interconnecting three ISDN Army installations by satellite. The experiments have several scenarios representing Army applications including fixed locations and mobile end users. This work is under the sponsorship of NASA. CNSD was selected to perform this work on the basis of a competitive proposal process which solicited experiment proposals from all services. In support of this work, CNSD also participated in several ACTS ISDN Working Group meetings and discussed the AIRMICS-CNSD experiment projected to be on-board when the satellite is launched from a space shuttle in 1992.

CNSD actively participates in the Army's ISDN experiment at Redstone Arsenal. CNSD visited Redstone Arsenal several times during the reporting period to keep pace with the progress of the Army's only full-scale ISDN implementation. Numerous discussions were held relative to the assistance AIRMICS can provide to Redstone in this important work and led to the planned implementation of an ISDN help desk in the Redstone Arsenal Information Center for FY91.

CNSD is assisting PERSINSCOM (USAISC-Hoffman) in using ISDN technology to provide more effective and efficient personnel services to soldiers in the field. Soon, soldiers will call their personnel managers and be automatically routed to the appropriate personnel manager, while the personnel manager will simultaneously be presented with the soldier's telephone call and a picture of the soldier's file on the manager's PC screen. AIRMICS presented this application at the North American ISDN Users Forum (NIUF) meeting as one of the Army's planned applications.

CNSD is working with ISEC-SED and MITRE on a comparison of ISDN and a LAN, where the ISDN is used as a replacement for a LAN. These efforts gather information on end user information transfer requirements and existing networking environments at the local level (i.e. installation level and below). MITRE will visit CNSD during the next quarter to gather first hand information on ISDN technology produced from experiments in the AIRMICS ISDN applications laboratory.

CNSD provided support to the ISEC-SED Tiger Team studying an ISDN investment strategy. AIRMICS recommended an approach for analyzing this strategy. This analysis assesses the network level communication system (i.e., off-post, installation level and above) with which the Army must interface. MITRE will use the results from this study combined with results from the companion assessment of the local-level communications described above to develop an overall Army ISDN investment strategy.

The Director of Combat Development, Materiel Systems Division (MSD), Signal Center, Fort Gordon, asked CNSD to provide the general characteristics of ISDN and the feasibility of tactical ISDN. Information was provided to MSD on the potential interoperability problems between ISDN and current tactical Mobile Subscriber Equipment (MSE) for data transfer. Implementation of a tactical ISDN to replace MSE potentially provides a solution to this problem. Coordination with and assistance to MSD is continuing on an as requested basis.

In the second major group of projects, CNSD is conducting work in local area networks (LAN), metropolitan area networks (MAN), wide area networks (WAN) and distributed systems.

In January 1991, CNSD initiated Phase II of a project to develop an Environment for Simulation of Distributed Systems. The kick-off meeting for Phase II was conducted at AIRMICS with participation of ISEC-SED and ISEC-SAO using the videoteleconferencing network. There continues to be considerable enthusiasm for the project in ISEC. The \$500,000 Phase II effort is funded in two, one-year increments of \$250,000 beginning in January 1991. The final software product will be used as a development and

support environment in designing and modeling Distributed Systems. ISEC-SED and ISEC-SAO will be the users when the product is completed.

CNSD's project on Distributed Systems is making a significant contribution to the understanding of adaptable and reliable distributed systems. This effort supports the Army objective to share heterogeneous data, software, and hardware. It will help ISEC in engineering a unified distributed system implementation. ISEC-SED, ISEC-SID, and ISEC-SAO have all indicated the results will make a major contribution to both standards development and IMA architecture decision processes. The project is also developing the principles necessary to build high performance, reliable, and reconfigurable distributed systems to give users access to computing resources from distributed geographic locations. The current software version of a prototype system, RAID, is being evaluated and there are plans to integrate it into the ISA 97 Architecture Test Bed Project. A recent report, "Implementation and Performance of a Communication Facility for the RAID Distributed Transaction Processing System" was published in the *Proceedings of the Symposium on Experiences with Distributed and Multiprocessor Systems*, 21-22 March 1991.

CNSD represents AIRMICS as a member of the Center for Telecommunications Research (CTR) located at Columbia University. The Center supports faculty research in all areas of telecommunications and networking. The Center is considered one of the pioneers in telecommunications research. The small fee paid by AIRMICS to join the Center is, therefore, multiplied into several million dollars of high quality research. Numerous projects are in progress at all times. Two projects important to ISC/ISEC are the MAGNET II network testbed and the NEST simulation software. The goal of MAGNET II is to build a network with an aggregate capacity of terabits/sec (trillion bits per second) serving thousands of users at gigabits/sec (billion bits per second). At this time, the Center has achieved a network capacity of 2.5 gigabits/sec. The network can be used as a testbed for studies of advanced, distributed, knowledge-based network control, performance, and management. We obtain information from the Center in the form of research reports for further distribution throughout the Army.

CNSD uses the Network Simulation Testbed (NEST), a software package that simulates complex networks from the CTR. CNSD runs the software on its network and will evaluate the package by simulating various aspects of the ISA 97 Architecture. Results of this work apply to work being done by ISEC-SID and PM-SBIS.

CNSD initiated several projects to support PM-ISM and PEO-STAMIS. The objectives of the projects are to add the capability of performing rapid prototype development by becoming proficient in the use of ACE Technology software, then transferring this knowledge to other areas of the Army. The Publications Stock Inventory and Requisitioning System (PUBSIARS) project will support ordering forms and publications for all installations in the Army. The system supports the installation level publications accounting and management functions as well as the unit level publications ordering functions. The system will include connectivity to the Publications Center in Baltimore to provide an on-line index to forms and publications to the installation and unit. It is estimated this system will save the Army \$100 million in the next ten years. PM-ISM funds this work which will continue throughout FY91.

CNSD supported the Office of Technology Assessment, United States Congress, with discussions on communications and distributed database concepts that might be used to support a database on the Industrial Base. The Industrial Base capabilities are of particular interest during budget cuts because of the high risk of losing manufacturing expertise for Commander-in-Chief critical items. The database will track sub-tier sub-contractors to identify where expertise can potentially be lost (e.g., only one manufacturer of an item that goes out of business).

CNSD works with the Navy to investigate the compatibility and conformance to GOSIP of a fiber network to be implemented at the Naval Facilities Engineering Command, Washington Naval Yard. The study will provide a report to assist DOIMs in evaluating transition to GOSIP and fiber-based networks.

CNSD is assisting ISC-DCSPLNS in preparing the Technology and Standards Volume of the Information Systems Architecture. AIRMICS is preparing

numerous Technology Assessments for the volume. These will also be published as an AIRMICS report.

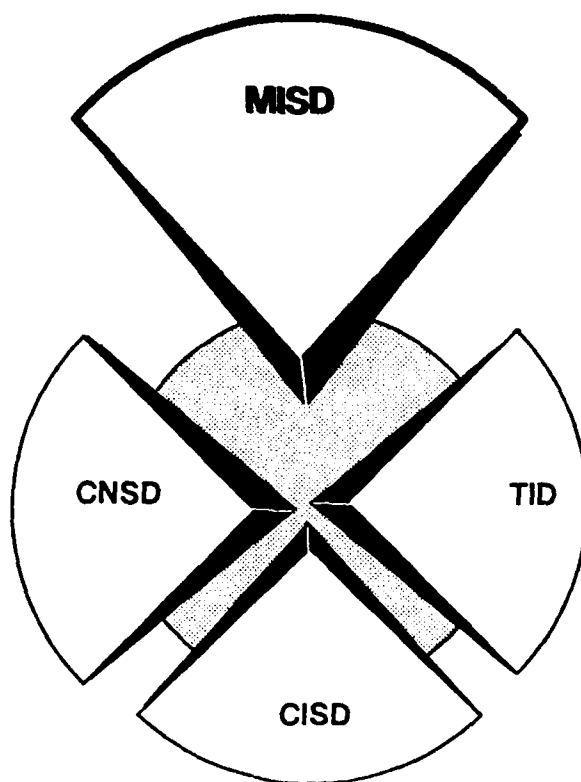
CNSD participated in DCA Working Group meetings on various topics of interest to ISC/ISEC. These meetings included briefings by the attendees, including CNSD, on issues important to the Army. Attendance at these meetings enables CNSD to maintain liaison with attendees representing ISC, ISEC, ISMA, DOD (including other services), DCA, DCEC, JITC, JTC3A, AT&T, Computer Science Corporation (CSC), NSA, and other commercial companies.

If you are interested in any of the above areas discussed in this report, or have questions relating to CNSD, please contact Dr. Jay Gowens, e-mail address gowens%airmics@gatech.edu, phone (404) 894-3106 or 894-3110.

D. MANAGEMENT INFORMATION SYSTEMS DIVISION (MISD)

MISD performs projects in Decision Support and Management of Information.

In the Decision Support area, MISD develops techniques and methods to improve the quantity and quality of information to support decision making. MISD's current efforts are grouped into four general categories: Individual Support, Group Support, Executive Support, and Expert Support. This work closely relates to the target architectures developed by ISC where ISC lists Decision and Executive support as basic services to be supported by command-developed information systems. This effort supports work performed by PMs, engineers and architects of Army information systems.



In the Management of Information area, MISD develops concepts to support the use of technology in the management and operations of information intensive segments of the Army. This area brings together several diverse projects. These projects include work on the evolution of Information Centers (IC) to support the entire Information Mission Area (IMA), membership in

the Center for Information Management Research at the Georgia Institute of Technology and the University of Arizona, and a video teleconferencing network to support communication between Historically Black Colleges and Universities (HBCUs) and the Army. This effort supports actions in ISC-DCSPLANS, ISEC-PID, ISEC-SID, and the 7th Signal Command.

The Army Acquisition Management System (AAMS) project supports PM-AIM for ASA(RDA) by expansion of earlier work on the AAMS prototype. This effort has extended the prototype to over 30 PM shops and 10 PEOs. This project was completed in December 1990. The AAMS is being considered as a DOD standard system; in addition, the Air Force is considering modifying the AAMS for its acquisition process. This project supports AIRMICS efforts in Executive Information Systems and is coordinated with ISEC-SED.

The AIRMICS pilot video teleconferencing (VTC) network, installed as part of the CARTS project with Clark Atlanta University, was used by a wide variety of people during the year. The ASA(RDA) funded this project. It is supported by the DA SADB, DISC4, ISC-DCSPLANS, and ISEC-PID. The effort examines the uses and the economics of low cost VTC. Additionally, the project establishes closer links between the Army and Historically Black Colleges and Universities (HBCUs). Network sites operate at Fort Huachuca, Fort Belvoir, PERSINCOM, AIRMICS, the US Naval Surface Weapons Center, Clark Atlanta University, and Prairie View A&M.

The expansion of the AIRMICS mission to include the entire Information Mission Area, created the need to cover many new technology areas. The Center for Information Management Research (CIMR) links the Information Management program at the University of Arizona with the Information Engineering program at the Georgia Institute of Technology. The center focuses on: (1) ways to enhance information systems support of organizational goals, objectives, and strategies, (2) promoting the development of information systems designs which focus on the resources and needs of diverse organizational environments, (3) promoting the integration of advanced information technologies with traditional information systems, (4) developing a framework for management of information systems resources which is consistent with the organization's management system, and (5)

encouraging the identification and development of a portfolio of information products and services. The CIMR is a joint University-Industry-Government research center, sponsored by the National Science Foundation (NSF) and the Army. Members of the center pool limited amounts of money to execute a significant research program. CIMR research results have been used by PM-ISM, the Director of Management at HQDA, and ISEC-SID.

Four projects were continued from the previous year to support PM-ISM: (1) Electronic Meeting results were applied to the development of functional descriptions for ISM modules. Last fiscal year, seven sessions were conducted and during the first half of FY91, two additional sessions were conducted with impressive results. Actual meeting durations of the electronic meetings as compared to similar conventional methods of non-automated meetings showed a 75% reduction in time consumed and significant cost reductions/avoidances ranging from 20-70%. (2) The Economic Justification of Information Systems project will develop a baseline work profile study of two or more offices prior to the implementation of information systems, do a follow-up study once the systems are functioning smoothly, determine the economic value of the systems, and finally generalize the results so that cost justifications can be done without detailed "before and after" economic studies in each and every case. Test sites have been selected but no data has been collected. (3) Computer-based instruction/training techniques have been applied to one ISM module (Central Issue Facility (CIF)) and are intended for two others this year. Initial testing, with CIF, indicates significant improvement in training when the dynamic help approach is used. A guidebook for future developments will be produced. (4) The Computer Aided Design (CAD) for Information Management project is identifying ways to improve decision making at multiple levels, dealing with data about automation and communications resources. This project is demonstrating the ability to combine graphical and non-graphical data at a local level, using commercial PC-based software, and up-load the data to update a mainframe database which can then be accessed by higher headquarters as needed. It is also allowing the test site activity to combine seven separate databases into one with multiple-point access provided for updates and data extractions. The initial implementation at Fort McPherson is nearing completion. Up to three

more posts will be selected for additional studies. In addition to the PM-ISM, this project is supported by 7th Signal Command DCSOPS and the DOIM at Fort McPherson.

A new project was started to develop a rapid prototyping and development capability at Historically Black Colleges and Universities (HBCUs). In the long run, we hope to have several schools trained to use AT&T's Application Connectivity Engineering (ACE) for rapid development of Army data processing systems, but at first we will concentrate on two schools which will then train several others. This project has two specific goals: to prototype a useful application for TRADOC, and to establish at Morris Brown College and Clark Atlanta University the capability to respond to the Army's need for rapid prototyping using ACE. The Army needs the ability to quickly create systems which integrate information from otherwise incompatible systems. ISC headquarters has received many requests from the user community for this type system. However, the traditional method for developing systems is too slow and too costly to meet this need. Moreover, much of the burden of traditional methods is justified by the need to insure accurate data collection. This need does not exist in the systems being discussed. They seek to use data that has already been collected, edited, and stored by larger systems. The first application chosen for prototyping is a TRADOC application called TRADOC Resource Manager's Information and Decision System - Test (TRMIDS-T). TRMIDS-T is designed to collect resource data from several different databases and to allow decision makers and their analysts to view, analyze and manage the data. The TRMIDS-T prototype has been completed and installed at Fort Monroe. This project is being done in cooperation with ISC-DCSOPS and TRADOC.

MISD continued its efforts in the Small Business Innovation Research (SBIR) program. A Phase I project, started at the end of the year, has developed the ability to characterize, extract, and exploit knowledge contained within a database using neural network techniques. Conventional technology requires significant knowledge of both SQL and the content of a database in order to extract or distill the knowledge contained in the database. A follow-on Phase II proposal has been received and is being evaluated which will combine demonstrated results of Phase I with Database Mining concepts developed as a

result of civilian contracts to produce an Army Data Analysis and Modeling (ADAM) workstation. Phase II will develop advanced capabilities for information analysis not available elsewhere. These capabilities will include automated data cleaning, data redundancy reduction, relationship discovery, and automatic model building. Limited funding is available and this Phase II proposal has to compete against other in-house projects for those funds. A final selection decision is expected in early May 91. Another SBIR project completed Phase I during the year. The objective of this project was to create Group Decision Support System (GDSS) software that permits groups of decision makers to make decisions quickly, even when the decision makers are located at distant points around the world. The specific objectives were to define the features that the GDSS model should include such as: (1) easy-to-use word processing, graphics, calendar, and databases; (2) state-of-the-art communications so that Army decision makers can be informed via fax, electronic mail, and paper mail; and (3) ability to collect comments, tabulate and rank votes and report the results to all of the decision makers. The second phase of this project will begin around 15 April 1991. This project was supported by PM-ISM, ISEC-SED, and FORSCOM who served as a testbed for the software.

MISD continued providing support to a variety of other Army organizations. Last year the Army Management Staff College requested that a class be developed and taught on Decision Support Systems and Expert Systems. This support was continued and the class has been taught twice this year. LABCOM was supported with two efforts. The first effort investigated methods of knowledge representation and elicitation to improve computer manipulation and presentation of visual knowledge. This project will produce a prototype interface that facilitates direct pictorial communication between user and machine. This project will be completed by 30 September 1991. The second LABCOM funded project supports the automated input, editing and maintenance of Work Unit Information Summaries into the Defense Technical Information Center database for the entire Army R&D community. The Army Artificial Intelligence Center supported a project to develop and demonstrate a design methodology for developing Expert Decision Support Systems for solving problems under conditions of uncertainty. FORSCOM

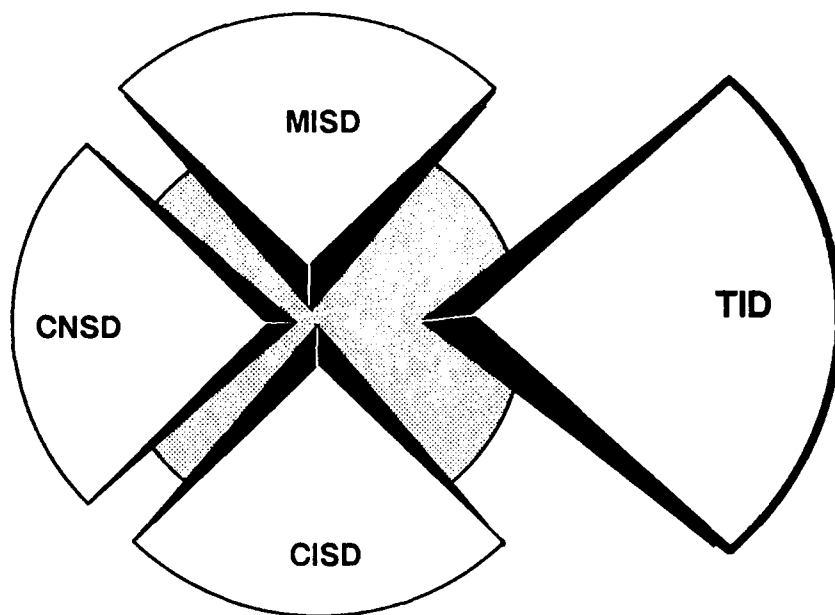
has been supported by MISD on the FORSCOM Automated Intelligence Support System (FAISS) which looks at support tools and connectivity with numerous data sources.

If you are interested in any of the above areas that are discussed in this report, or have questions relating to MISD, please contact Dr. Jim Gantt, e-mail address gantt%airmics@gatech.edu, phone (404) 894-3107.

E. TECHNOLOGY INSERTION DIVISION (TID)

The Technology Insertion Division is AIRMICS' newest element. It provides a conduit for improving the flow of technology between the Army and industry, academia, and other government agencies.

AIRMICS reviews industry independent research and development projects (IR&D) and participates in jointly funded research centers. During this six month period, AIRMICS reviewed almost 350 project plans from fifteen companies. In these reviews, 33 IMA-related projects were identified. These results will be summarized in the annual IR&D Summary Report.



TID initiated and funded the use of the SEI's Software Engineering Self-Assessment Process at the Software Development Centers (SDCs) (Washington, Lee, Benjamin Harrison, and Huachuca) of the Information Systems Software Center (ISSC) throughout the past year. This project was completed this fiscal year with the development of an ISSC corporate assessment based on the combination of the individual SDC assessments. As a result of the ISSC self-assessment, ISSC has established an ISSC-level Software Engineering Process Group with the charter to oversee the definition, documentation, and improvement of the ISSC software engineering process.

TID also represents ISC and ISEC on the Advisory Board for the Annual Conference on Ada Technology (ANCOAT). The 9th ANCOAT was held in Washington, DC in March 1991. Copies of the proceedings are available in limited numbers to organizations within ISC.

TID has been heavily involved in the Software Test and Evaluation Panel sponsored by OPTEC. This project is an outgrowth of a 1983-1987 DOD project of the same purpose in which AIRMICS was a significant contributor. The current project has resulted in initiatives to streamline the regulations involved in the production and test of software and the establishment of a preliminary set of measures to be taken in software projects throughout the Army. AIRMICS personnel participated in the development of the initiatives along with representatives from ISSC, AMC, OPTEC, DISC4 and others. A final report has been drafted and is being staffed now throughout the Army.

TID's main effort is bringing technology to the Army from industry and academia. A second focus is "Domestic Technology Transfer" involving the transfer of technology to private industry and the co-development of technology with industry through Cooperative Research and Development Agreements. The Stevenson-Wydler Act of 1986 mandated this task for all federal laboratories. AIRMICS was designated as a Federal Laboratory during FY90 and began this work by joining the Federal Laboratory Consortium. With this opportunity, TID will develop win-win situations between the Army and industry. The government will get unlimited use of new products and our industry partners will commercially exploit these developments.

If you are interested in any of the above areas discussed in this report, or have questions relating to TID, please contact LTC Blake or Mr. Hocking, e-mail address blake%airmics@gatech.edu or hocking%airmics@gatech.edu, phone (404) 894-3104 or 894-3110, respectively.

F. PEOPLE, CAPABILITIES, AND FACILITIES

AIRMICS has an exceptional staff consisting of 18 full-time technical people and three administrative people. Of the 18 technical people, 6 hold doctorates and 8 have Masters Degrees. One more is working on a PhD and the remaining three are working on Masters Degrees. In addition, we have two DA interns (both working on Masters Degrees in EE) and 2 half-time ROTC Co-Op students. We frequently use Intergovernmental Personnel Act (IPA) employees to augment our staff. Our civilian employees are computer and electronics engineers, computer scientists, and operations research analysts. Our military officers are communications-electronics engineers or computer scientists. All officer positions require PhD-level education and are designated Army Acquisition Corps developmental positions.

The AIRMICS staff possesses a tremendous inventory of expertise with capabilities in Artificial Intelligence, Communications Technology, Data Modeling, Decision Support Systems, Distributed Processing, Entity-Relationship Modeling, Executive Information, Expert Systems, Modeling and Simulation, Network Technology, Programming Languages, Software Engineering, Software Development, Software Metrics, User Interfaces, and Very Large Databases.

AIRMICS possesses diverse and powerful automation facilities that support our projects. Figure 1 shows our current configuration. Included are various hardware platforms (SUN 3/280, 3/50, 386i, SPARC+, and SLC; 80286 and 80386 based PCs; IBM PS/2; Zenith 248; MacIntosh II; Apple Laser Writers; and a Xerox Telecopier), operating systems (UNIX—SUN/OS 4.2BSD, MS-DOS), graphics environments (Meta WINDOW/PLUS, Suntools, X, and MacDrawII), a distributed operating system (RAID), communications software, languages (including Ada, C, and FORTRAN), database management systems (INFORMIX, ORACLE, dBase, and XDB), development environments, and office automation tools (Interleaf, Word Perfect, Word, Wordstar, FrameMaker, TEX, LATEX, and ccplus).

AIRMICS is available to help answer questions about today's research and operational issues. If you are interested in obtaining information on any of the above capabilities or facilities, please call Mr. Hocking at (404) 894-3110, e-mail address hocking%airmics@gatech.edu.

AIRMICS Facilities

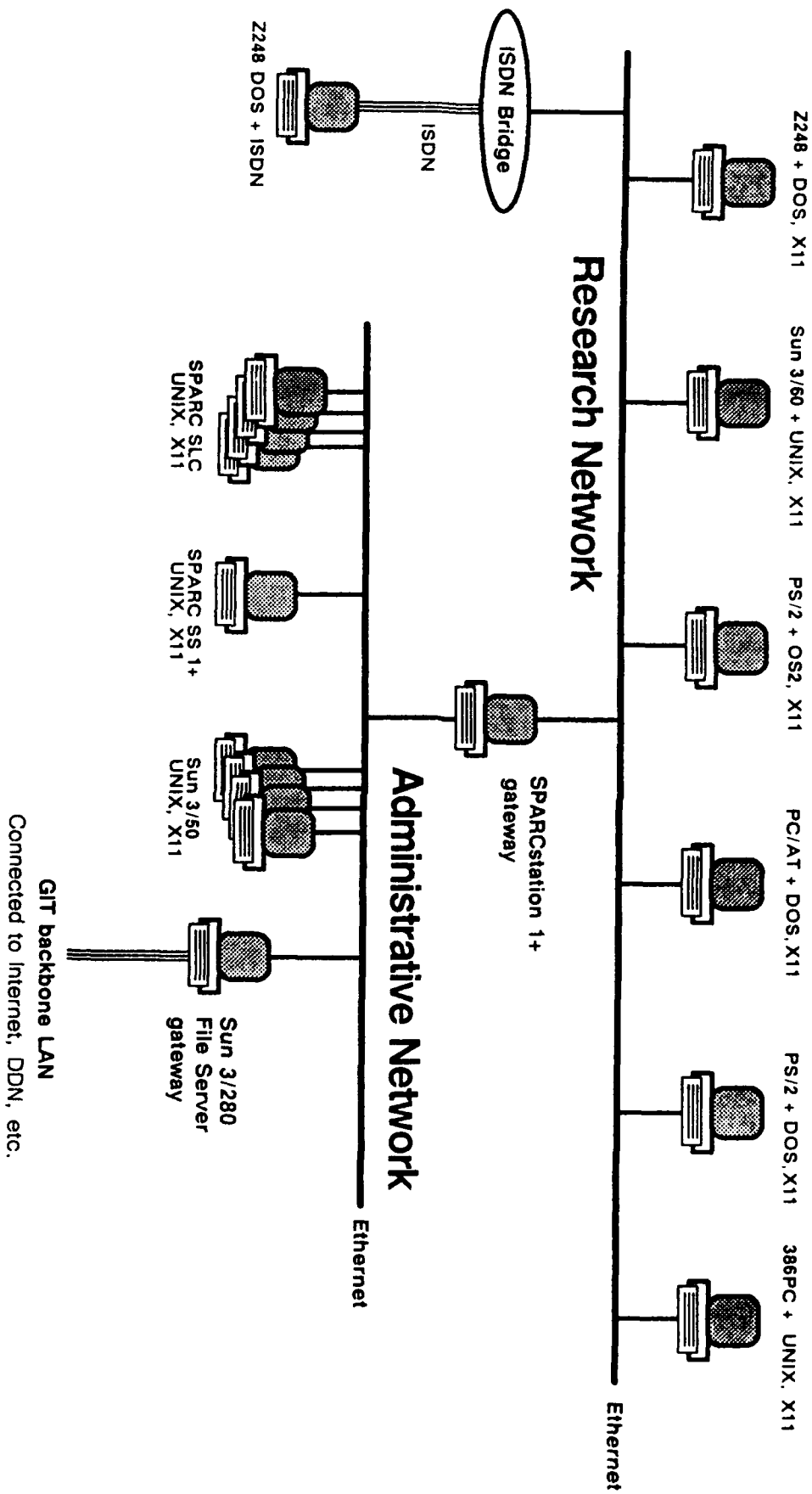


Figure 1

AIRMICS Publications - FY91

NUMBER	TITLE	DATE	AUTHORS
ASQB-GB-91-001	AIRMICS Research Status Report -- October 1989 - September 1990	11-90	AIRMICS staff
ASQB-GC-91-002	Technical Issues in Evolving to ISDN (Final Report)	11-90	Enslow
ASQB-GC-91-003	Multimedia Workstation Research (Final Report)	11-90	Iskac
ASQB-GB-91-004	AIRMICS Research Overview -- October 1989 - September 1990	12-90	AIRMICS staff
ASQB-GI-91-005	Ada Transition Research Project	12-90	Hobbs, et. al.
ASQB-GM-91-006	Information Technology Transition Strategies	10-90	Putnam
ASQB-GI-91-007	ANSWER IIIA Final Report	1-91	Honeywell
ASQB-GI-91-008	A Distributed TDMA Rescheduling Procedure for Mobile Packet Ra- dio Networks	1-91	Stevens
ASQB-GI-91-009	Evaluation of DCDS for Meeting the Data Collection Requirements for Software Specification, Develop- ment, and Support	2-91	Dunsmore, et. al.
ASQB-GM-91-010	Physical Configuration Audit of the Mitre LAD	1-91	Smith & Wandelt
ASQB-GM-91-011	MITRE LAD Evaluation	1-91	Smith & Wandelt
ASQB-GM-91-012	FAISS Access to DODIIS Alternatives	1-91	Wandelt
ASQB-GM-91-013	Application of Neural Networks for the Extraction and Characteriza- tion of Knowledge Contained in Data Bases	4-91*	Caid
ASQB-GI-91-014	Software Development Information Supported by Typical CASE Tools	3-91	Dunsmore, et.al.
ASQB-GI-91-015	Software Development Information Supported by the SEI Contractor Assessment Questionnaire	3-91	Dunsmore, et.al.
ASQB-GI-91-016	Volume I, Developing Quality Measures For Information Systems Support	3-91	McCracken, et.al.

* projected publication date

AIRMICS Publications - FY91

NUMBER	TITLE	DATE	AUTHORS
ASQB-GI-91-017	Volume II, The Review of Metrics for Developing an Information Systems Support Measurement Framework	3-91	McCracken, et.al.
ASQB-GI-91-018	Volume III, Implementing the Software Supportability Measure	3-91	McCracken, et.al.
ASQB-GI-91-019	Volume IV, Implementing the Support Organization Assessment Measure	3-91	McCracken, et.al.
ASQB-GI-91-020	Volume V, Implementing the Operational Readiness Measure	3-91	McCracken, et.al.
ASQB-GB-91-021	AIRMICS Program Overview	4-91	AIRMICS Staff
ASQB-GM-91-022	FORSCOM Automated Logistics Control System: Users Manual Vers. 1.0	12-90	GTRI
ASQB-GM-91-023	FORSCOM Automated Logistics Control System: Warehouse Inventory Control System Design Document - Version 1.0	12-90	GTRI
ASQB-GM-91-024	FORSCOM Automated Logistics Control System: Maintenance Integrated Logistics System Design Document - Version 1.0	12-90	GTRI
ASQB-GI-91-025	ANSWER Phase IIIB Final Report	4-91	Honeywell, Inc

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188
Exp Date: Jun 30 1986

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS NONE		
2a. SECURITY CLASSIFICATION AUTHORITY N/A			3. DISTRIBUTION/AVAILABILITY OF REPORT N/A		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) ASQB-GB-91-021			5. MONITORING ORGANIZATION REPORT NUMBER(S) N/A		
6a. NAME OF PERFORMING ORGANIZATION AIRMICS		6b. OFFICE SYMBOL (If applicable) ASQB-GT	7a. NAME OF MONITORING ORGANIZATION N/A		
6c. ADDRESS (City, State, and Zip Code) 115 O'Keele Bldg. Georgia Institute of Technology Atlanta, GA 30332-0800			7b. ADDRESS (City, State, and Zip Code) N/A		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION AIRMICS		8b. OFFICE SYMBOL (If applicable) ASQB-GT	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N/A		
8c. ADDRESS (City, State, and Zip Code) 115 O'Keele Bldg. Georgia Institute of Technology Atlanta, GA 30332-0800			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO. 62783A	PROJECT NO. DY10	TASK NO. 15
11. TITLE (Include Security Classification) AIRMICS Program Overview: October 1990 — March 1991 (UNCLASSIFIED)					
12. PERSONAL AUTHOR(S) Daniel E. Hocking. (Editor)					
13a. TYPE OF REPORT		13b. TIME COVERED FROM Oct 1990 TO Mar 1991		14. DATE OF REPORT (Year, Month, Day) 1991, March, 15	
15. PAGE COUNT 28					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUBGROUP	Software Engineering, Communications and Networks. Decision Support, Database, Distributed Systems, Management Information, Information Mission Area, Technology Transfer		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) This Program Overview summarizes ongoing research tasks, technology transfer efforts, and technical support activities performed by the US Army Institute for Research in Management Information, Communications, and Computer Sciences (AIRMICS) during the first half of Fiscal Year 1991.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a. NAME OF RESPONSIBLE INDIVIDUAL Daniel E. Hocking			22b. TELEPHONE (Include Area Code) (404) 894-3110		22c. OFFICE SYMBOL ASQB-GT