USAISEC

AD-A268 625

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

AIRMICS

PROGRAM

OVERVIEW

April – September 1991
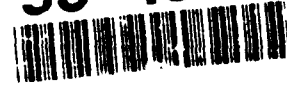
ASQB-GI-92-005

DTIC
ELECTE
AUG25 1993
S E D

93-19672

93 8 24 008

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

PROGRAM OVERVIEW

APRIL – SEPTEMBER 1991

ASQB–GI–92–005

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 CLASSIFICAION AUTHORITY N/A	3. DISTRIBUTION/AVAILIBILTY OF REPORT
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A	N/A

4. PERFORMING ORGANIZATION REPORT NUMBER(S) ASQB-GI-92-005	5. MONITORING ORGANIZATION REPORT NUMBER(S) N/A

6a. NAME OF PERFORMING ORGANIZATION AIRMICS	6b. OFFICE SYMBOL (If applicable) ASQB-GCI	7a. NAME OF MONITORING ORGANIZATION N/A

6c. ADDRESS (City, State, and Zip Code) 115 O'Keefe Bldg. Georgia Institute of Technology Atlanta, GA 30332-0800	7b. ADDRESS (City, State, and ZIP Code) N/A

8b. NAME OF FUNDING/SPONSORING ORGANIZATION AIRMICS	8b. OFFICE SYMBOL (If applicable) ASQB-GCI	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N/A

8c. ADDRESS (City, State, and ZIP Code) 115 O'Keefe Bldg. Georgia Institute of Technology Atlanta, GA 30332-0800	10. SOURCE OF FUNDING NUMBERS			
	PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO
	62783A	DY10	15	

11. TITLE (Include Security Classification)
AIRMICS Program Overview: April — September 1991 (UNCLASSIFIED)

12. PERSONAL AUTHOR(S)
Daniel E. Hocking, (Editor)

13a. TYPE OF REPORT	13b. TIME COVERED FROM APR 1991 TO SEP 1991	14. DATE OF REPORT (Year, Month, Day) 1991, December, 15	15. PAGE COUNT • 26

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 second half of Fiscal Year 1991.

20. DISTRIBUTIONN/AVAILIBILTY OF ABSTRACT [X] 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-GCI

DD FORM 1473, 84 MAR
83 APR edition may be used until exhausted.
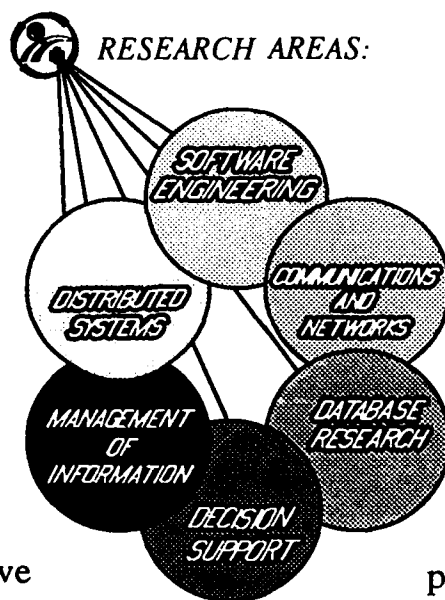All other editions are obsolete.

TABLE of CONTENTS

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 April 1991 through 30 September 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). 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 potential to enhance 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.

RESEARCH AREAS:

SOFTWARE ENGINEERING

COMMUNICATIONS AND NETWORKS

DISTRIBUTED SYSTEMS

MANAGEMENT OF INFORMATION

DATABASE RESEARCH

DECISION SUPPORT

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 — Computer and Information Systems Division (CISD); Communications and Network Sys-

- 1 -

tems Division (CNSD); Management Information Systems Division (MISD); 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.
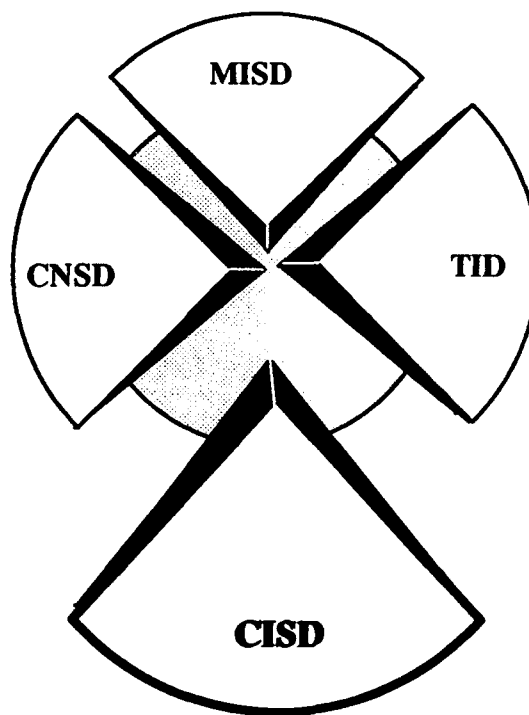
CISD represents AIRMICS at two research centers: The Software Engineering Institute (SEI) as an affiliate member representing ISEC, and the National Science Foundation's Software Engineering Research Center (SERC) located at Purdue University and the University of Florida. Work is underway to create a "research-like" environment for establishing and solving problems associated with software metrics.

During the last six months, AIRMICS conducted tasks on several projects in the software engineering area and one in the database area. For software engineering, AIRMICS and the Software Development Center–Atlanta (SDC–A) jointly began to develop a software re–engineering strategy and investigate the impact of new software engineering principles on the current software life cycle model. SDC–A supplied a representative STAMIS application and AIRMICS performed an evaluation of tools needed to facilitate the conversion of the STAMIS from COBOL to Ada. This project examined the use of reverse engineering tools and methods, performed comparison of software design methods (functional vs. object–oriented), identified criteria for selecting Computer–Aided Software Engineering (CASE) tools within a STAMIS development environment, assessed Ada training provided by the Department of Defense, and established a framework to examine the maintainability and reusability of code. The object–oriented design has been implemented and fielded at 45 Army installations. To date, no errors have been reported and the cost savings are estimated to exceed three million dollars over an assumed ten year life of the system. AIRMICS plans to perform a second re–engineering effort on a larger system to assess repeatability and scalability.

In September 1990, AIRMICS started developing a method to predict software reliability in the operational phase of a system and to assist determining the operational readiness of software at major reviews. With the sponsorship of the Operational Test and Evaluation Command (OPTEC), AIRMICS is developing a prototype tool which implements this new method. This project is in its final phase of development.

AIRMICS has started another project associated with the reliability issue, also sponsored by OPTEC. In this project, AIRMICS will investigate software reliability metrics applications via classification analysis and supporting automated tools. The most appropriate tools and techniques found should be the cornerstone for the OPTEC Continuous Evaluation and Optimal Test and Evaluation programs.

In the database area, the prototype development of ANSWER (Army's Non–Programmer System for Working Encyclopedia Requests) is scheduled to be completed March 1992. The current system enables users to register, integrate and browse schemas from multiple heterogeneous databases.

Gateways to Oracle and Informix database management systems (DBMS) are available. The query processing module helps users prepare correct SQL statements and then processes them. This system demonstrates that the concepts behind integrating heterogeneous databases and then accessing the integrated schema as one logical database can be accomplished.

Another CISD project deals with Ada's ability to access relational databases. Under the sponsorship of the Ada Joint Project Office, AIRMICS will develop an extension module to allow Ada programs to make SQL queries to Oracle databases. The Ada module will follow the SAMeDL standard outlined by the Software Engineering Institute. SAMeDL is a method for building Ada applications which access DBMSs whose data manipulation language is SQL. The initial target application will be SIDPERS 3.

CISD also provided recommendations to the Data Management Directorate of ISSC on the Army Data Dictionary and the Army Dictionary Support System. Efforts are underway to help DMD find a method by which it can quickly and easily locate standard data element names stored in the Army Data Dictionary. To solve this problem, AIRMICS is investigating commercial products and techniques which can analyze, classify, and store the meaning of data element names so that a user can efficiently retrieve the desired data. While this effort will focus on providing easy access to data element names in the Army Data Dictionary, the system can be used by other DOD organizations with similar problems.

A DARPA–sponsored project to advance the state–of–the–art in automated communications and networking, the Defense Data Network (DDN) became the responsibility of Defense Information Systems Agency (DISA), formerly Defense Communications Agency (DCA). DISA assigned the task of conducting a scheduled baseline assessment of the DDN software to the Naval Telecommunications Systems Integration Center (NAVTELSYSIC). To accomplish this assessment efficiently, AIRMICS provided NAVTELSYSIC with technical support and coordinated a detailed evaluation of the DDN system. AIRMICS efforts ensured this project was completed ahead of schedule.

CISD participates in working group meetings and provides input to the DOD Software Technology Plan. This plan provides a coordinated strategy to strengthen the DOD software base to more effectively address defense

requirements. In this effort, CISD represents the IMA Research, Development, Test, and Evaluation (RDTE) interests. CISD also participated in DOD's Project Reliance, 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. Project Reliance completed a Tri–service strategy in January 1991 and the responsibility for implementing the recommendations has been given to the Joint Directors of Laboratories (JDL). Several technical panels have been established to support this effort and CISD is a member of the Computer Science Technology Panel and is chairing the subpanel on Information Engineering.

If you are interested in any of the above areas discussed in this report, or have questions relating to CISD, 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.

CNSD's efforts in communications and distributed systems support 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.
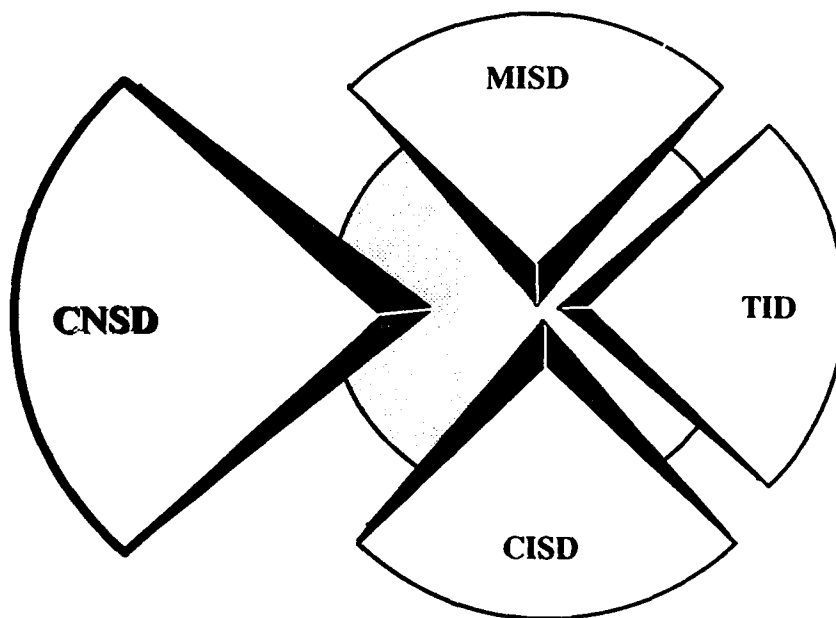
The projects conducted by CNSD develop tools, techniques, and prototypes for the design, implementation, transition and maintenance activities of various technologies of importance to the Army. In communications, CNSD conducts projects in ISDN, FDDI, and LAN/WAN. In distributed systems, CNSD actively 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 concerns 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.

One of the CNSD tasks in the ISDN area is the "Technical Issues in Evolving to ISDN". This project focuses on issues about ISDN network management. This task will develop techniques, procedures, models, and performance metrics used to qualitatively measure, analyze, and demonstrate the management of ISDN. CNSD is participating in meetings and providing inputs to the DOD ISDN Profile as well as the DOD ISDN Network Management in ANSI T1M1.

CNSD has an DOD Small Business Innovation Research (SBIR) funded project titled "ISDN Applications in the Army Environment." This effort will identify, define, and demonstrate practical end–user IMA applications that will use the capabilities offerred by ISDN in the current and future Army communications architecture. This project is in Phase I of the SBIR program.

CNSD is a major experimenter on the Advanced Communications Technology Satellite (ACTS) under development by NASA for launch in 1992. As ISDN is deployed throughout the Army, the lack of an ISDN signaling infrastructure connecting Army installations will prevent the use of ISDN services between installations. AIRMICS is designing a series of experiments using a ground–satellite ISDN interface that will connect three ISDN Army installations by satellite. The experiments contain several scenarios representing Army applications including both fixed locations and mobile end users. NASA sponsors this work. CNSD performs this work on the basis of a competitive proposal process which solicited experiment proposals from all services. CNSD also participates in several ACTS ISDN Working Group meetings and presented the AIRMICS–CNSD experiment planned to be on the satellite when it 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 to identify the assistance AIRMICS will provide

Redstone in this important work and these led to the planned implementation of an ISDN help desk in the Redstone Arsenal Information Center for FY92.

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

In January 1991, CNSD started Phase II of a project to develop an Environment for Simulation of Distributed Systems (ESDS). The first meeting for Phase II was conducted at AIRMICS with ISEC–SED and ISEC–SAO participating by using the video–teleconferencing network. A preliminary version of ESDS will be demonstrated in November 1991 with very limited functionality but with a working user interface. The Small Business Innovation Research Office will fund this project in two, one–year increments that began in January 1991. The final software product will be used as a development and support environment in analyzing, 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 makes 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 engineer a unified distributed system . 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 focuses on measuring performance of new technology in an open systems environment. Performance of X–windows and X–terminals are important issues under investigation. In addition, the impact of distributed databases on network traffic is also being investigated.

The Distributed Systems project also develops 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 AIRMICS plans to integrate it into the ISA 97 Architecture Test Bed Project. The project also focuses on developing a tool that helps evaluate and develop open–environment systems to allow multiuser access to information independent of their location.

CNSD represents AIRMICS in 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 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 started several projects to support PM–ISM and PEO–STAMIS. These projects will add to the capability of performing rapid prototype development through AIRMICS becoming proficient in the use of ACE technology software, then transferring this knowledge to other areas of the Army. The PUBlications Stock System (PUBSS) will support ordering forms and publications for all installations in the Army. System development work on this project continued this period. The system has been developed to meet the standards of PM–ISM including system qualification testing and documentation. The system is expected to be delivered in November 1991.

CNSD works with the Navy to investigate the compatibility and conformance to Government Open Systems Interconnection Profile (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 and developing a transition plan to GOSIP–compliant and fiber–based networks.

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

CNSD activities in the ISA97–Compliant Architecture Testbed (ICAT) to install POSIX–compliant operating systems and GOSIP–compliant data communication protocols on a network of disparate hardware platforms continued during this period. Major issues to be considered in this project include the interoperability and portability of applications, database and communication transition strategies, and analysis of user demands for information services and resources. Results from this project already appear promising to help the the Army evaluate open–system proposals or acquire open–system technologies.

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.

```
            MISD



CNSD              TID



      CISD
```
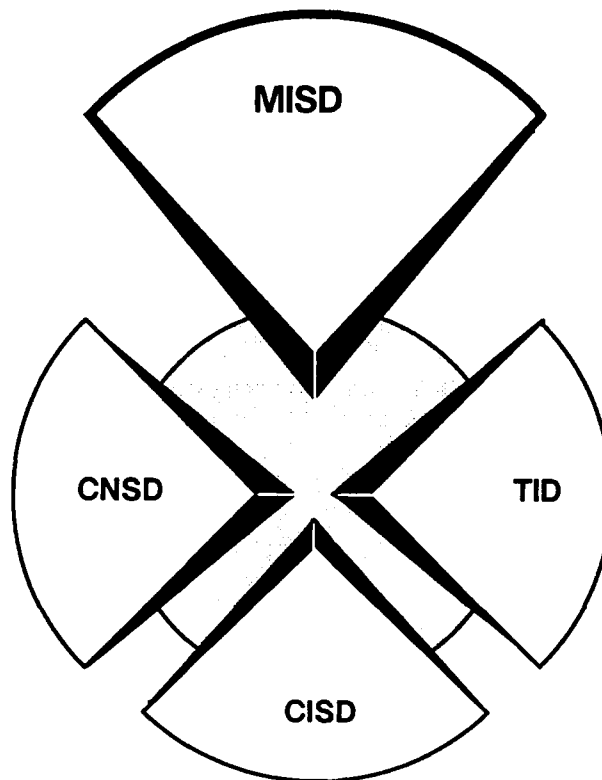
In the Management of Information area, MISD develops concepts to support the use of technology in the management and operations of information intensive segments of the Army. This area brings together several diverse projects. These projects include work on the evolution of Information Centers (IC) to support the entire Information Mission Area (IMA), membership in the Center for Information Management Research (CIMR) 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-DCSPLNS, ISEC-PID, ISEC-SID, and the 7th Signal Command.

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 SADBU, 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 the HBCUs. Network sites operate at Fort Huachuca, Fort Belvoir, PERSINSCOM, AIRMICS, the US Naval Surface Weapons Center, and Clark Atlanta University. Morehouse College, Morris Brown College, and Spelman College all have access to the VTC network through Clark Atlanta University.

The expansion of the AIRMICS mission to include the entire Information Mission Area, created the need to cover many new technology areas. The CIMR links the Information Management program at the University of Arizona with the Computer Science 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, ISEC-SID, and the Corps of Engineers.

Three projects were continued from the previous year to support PM-ISM: (1) The Economic Justification of Information Systems project will develop a baseline work profile study of offices prior to the implementation of

information systems, do a follow–up study once the system is 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. Data has been collected on one Army Information System and is being analyzed. (2) Computer–based instruction/training techniques have been applied to one ISM module (Central Issue Facility (CIF)). Initial testing, with CIF, shows significant improvement in training when the dynamic help approach is used. Research results are being generalized so they can be applied to any ISM module. (3) The Computer Aided Design (CAD) for Information Management project identifies ways to improve decision making at multiple levels, dealing with data about automation and communications resources. This project demonstrates combining graphical and non–graphical data at a local level, using commercial PC–based software, and up–load of the data to update a mainframe database which can then be read by higher headquarters as needed. It also allows 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 has been completed. Results have been so good that the number of test sites has been increased from three to twelve. In addition to the PM–ISM, this project is supported by 7th Signal Command DCSOPS and the DOIM at Fort McPherson.

AIRMICS just completed a project to develop a rapid prototyping and development capability at Historically Black Colleges and Universities (HBCUs). We trained several schools (Morris Brown College, Clark Atlanta University, and Virginia State University) to use AT&T's Application Connectivity Engineering (ACE) for rapid development of Army data processing systems. This project had 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 to create systems quickly which integrate information from otherwise incompatible systems. The traditional method for developing systems is too slow and too costly to meet this need. Traditional methods, intended to insure accurate collection of data, are not needed in this particular situation because these systems use data already collected, edited, and stored by larger systems. The first application chosen for prototyping was a TRADOC application called TRADOC Resource Manager's

Information and Decision System – Test (TRMIDS–T). TRMIDS–T collects resource data from several different databases and allows decision makers and their analysts to view, analyze and manage the data. The TRMIDS–T prototype has been completed and installed at Fort Monroe. AIRMICS cooperated with ISC–DCSOPS and TRADOC on this project. Additional projects have been started using the rapid prototyping capability to develop other applications, using additional HBCUs, for PM ISM and TRADOC.

MISD continued its efforts in the Small Business Innovation Research (SBIR) program. A Phase I project, started at the end of last year, developed the capability 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. Another SBIR project began Phase II during the year. This project will 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. This project will define the features 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. This project was supported by PM–ISM, ISEC–SED, and FORSCOM who served as a testbed for the software during Phase I.

MISD continued providing support to a variety of other Army organizations. The Army Management Staff College requested we continue teaching a class on Decision Support Systems and Expert Systems. We taught the class three times 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 produced a prototype interface that facilitates direct pictorial communication between user and machine. This project was completed on 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. MISD provided support for a sub-group of the Army Science Board looking at infrastructure needs of HBCUs.

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 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 the last twelve-month period, AIRMICS reviewed more than 1900 project plans with IR&D investments exceeding 2.3 billion dollars. In these reviews, over 100 IMA-related projects with IR&D investments exceeding 58.5 million dollars were identified. These results will be summarized in the annual IR&D Summary Report.
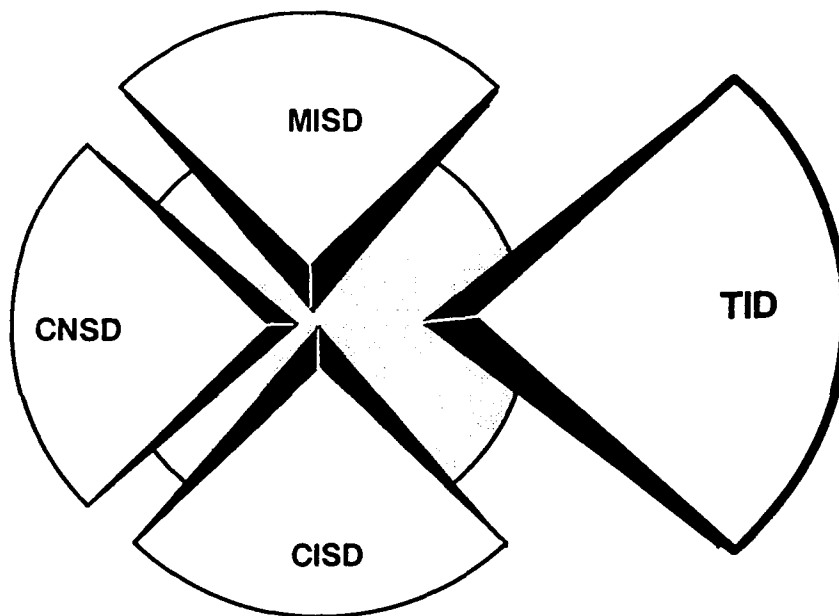
TID also represents ISC and ISEC on the Advisory Board for the Annual Conference on Ada Technology (ANCOAT). The 10th ANCOAT will be held in Washington, DC in February 1992. Abstracts of papers were reviewed and 42 papers accepted for publication in the proceedings with most authors presenting their papers at the conference. In addition, several panels have been scheduled and the traditional futures panel will complete the final day of the conference. Copies of the proceedings will available in limited numbers to organizations within ISC.

TID continues to work with OPTEC and other Army organizations on the Software Test and Evaluation Panel to develop metrics for the measurement of software projects and to develop a unified process in the testing of MAISRC-level systems.

TID is also working with NASA in support of the NASA Technology Utilization System with the plan of making the NASA technology available to Army organizations. NASA is currently bringing all NASA centers into a common system for exchange of technology developed by NASA.

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 (CRDAs). 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. In June 1991, AIRMICS participated in training for the Office of Research and Technology Applications. Additionally, AIRMICS prepared draft CRDAs to fit the research environment at AIRMICS.

If you are interested in any of the above areas discussed in this report, or have questions relating to TID, please contact COL 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 19 full-time technical people and three administrative people. Of the 19 technical people, 8 hold doctorates and 9 have Masters Degrees. The remaining two technical people are working on Masters Degrees. In addition, we have two 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 and 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; AT&T 3B2/1000; Apple Laser Writers; and a Xerox Telecopier); operating systems (UNIX—SUN/OS 4.2BSD and AT&T System V, MS-DOS, and MAC-OS); 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

Research Network

Administrative Network

Z248 + DOS, X11

Sun 3/60 + UNIX, X11

PS/2 + OS2, X11

PC/AT + DOS,X11

PS/2 + DOS,X11

386PC + UNIX, X11

Ethernet

SPARCstation 1+
gateway

ISDN Bridge

ISDN

Z248 DOS + ISDN

SPARC SLC
UNIX, X11

SPARCstation 1+
UNIX, X11

Sun 3/50
UNIX, X11

Sun 3/280
File Server
gateway

GIT backbone LAN
Connected to Internet, DDN, etc.

Ethernet

Figure 1

-20-

H. INDEX and GLOSSARY

H. INDEX and GLOSSARY

H. INDEX and GLOSSARY

Update of the AIRMICS Mailing List

AIRMICS regularly updates its mailing list. If you find an error in your mailing address or change your place of employment or residence, please fill out this form with the correct information. Tear out this half of the page and fold it so that the pre-addressed AIRMICS label appears correctly for mailing. If you are receiving this publication in duplicate and wish to delete one or more copies please copy the mailing label of the one you wish to delete and mail it to us.

☐ Change of Address ☐ New Addition to mailing list

☐ Mr.   ☐ Mrs.   ☐ Ms.   ☐ Other _____

Name: _____
Company: _____
Address: _____
_____
City: _____ State: _____ Zip: __
Telephone: _____

DEPARTMENT OF THE ARMY
AIRMICS
115 O'KEEFE BUILDING
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GA 30332-0800

THIRD CLASS

1