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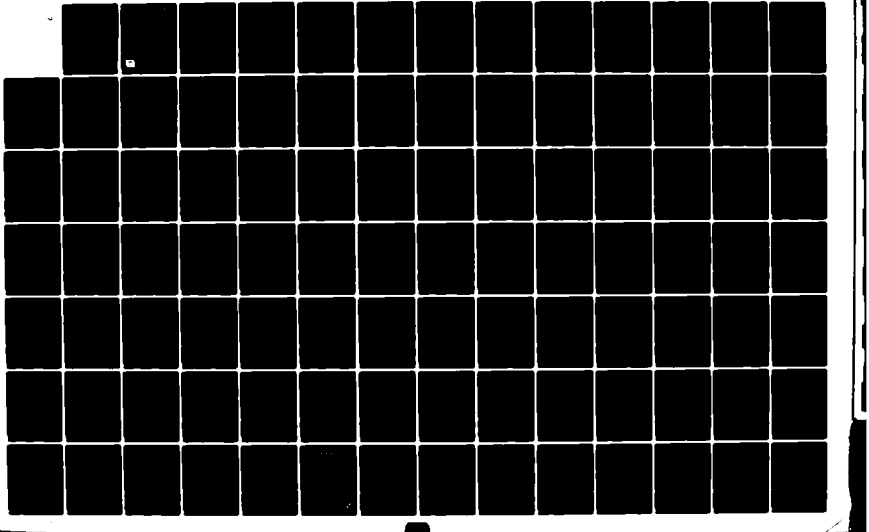

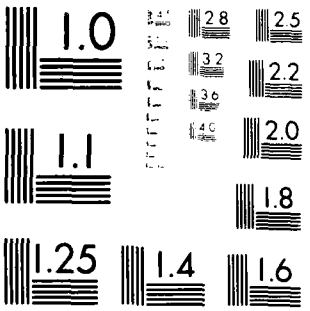

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WIS IMPLEMENTATION STUDY REPORT--
VOLUME II—
RESUMES

AD-A142 571

Thomas H. Probert, *Project Leader*

October 1, 1983

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Prepared for

Office of the Under Secretary of Defense for Research and Engineering

INSTITUTE FOR DEFENSE ANALYSES

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20. ABSTRACT (Continue on reverse side necessary and identify by block number)

This report is the result of a workshop conducted by the Institute for Defense Analyses to develop the functional specifications and estimates of implementation effort for foundation building blocks for Command and Control Systems in WIS. The group concluded that: 1) the development of a modernized WIS incorporating the specified foundation technology building blocks can be accomplished within the time frame proposed, 2) the use of Ada and proposed

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information processing standards are appropriate for use in WIS modernization and are expected to reduce the time required to implement the full system, and 3) it is critical to the success of the WIS modernization that major attention be paid to interface definition and design, system integration and test, and configuration management of the system while under development.

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WIS IMPLEMENTATION STUDY REPORT-- VOLUME II— RESUMES

Thomas H. Probert, *Project Leader*

October 1, 1983

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INSTITUTE FOR DEFENSE ANALYSES
1801 N. Beauregard Street, Alexandria, Virginia 22311

Contract MDA 903 79 C 0018
Task T-4-206

FOREWORD

On June 10, 1983, Dr. Richard DeLauer, Under Secretary of Defense for Research and Engineering, approved the final draft of Department of Defense Directive (DoDD) 5000.31, "Computer Programming Language Policy," and circulated it for coordination. This directive establishes Ada as the single common high order language for Defense mission-critical applications. The World-Wide Military Command and Control System (WWMCCS) is specifically identified in supporting documentation to that directive as a mission-critical computer application.

In anticipation of final approval of this directive, the WWMCCS Information System Joint Program Management Office (WIS JPMO) requested the Institute for Defense Analyses to undertake a project to develop the functional specifications and estimates of implementation effort for foundation building blocks for Command and Control Systems. These software capabilities will be used to support the operation of the WIS and will be developed in Ada.

These eleven key foundation building blocks have been divided into two groups: near-term areas for which the specified packages will be operational by January 1986 and mid-term areas for which the specified packages would be operational by January 1989. Near-term areas are characterized by encompassing mature technology that is currently embodied in operational systems. Development of packages for these areas should capitalize on existing software requirement definitions and design specifications. Mid-term areas are characterized as or near the current state of the art and will require significant requirements analysis, architecture and design specification activities.

The participants in this analysis, specification and planning study were chosen according to three criteria: they are all recognized experts in respective key technical areas, they all have had direct implementation experience, and they were all chosen with regard to broad representation of the technical and commercial community. Background information for these people can be found in Volume II of this Record Document.

The study was performed in four phases. First, individual experts were selected for their recognized expertise in each of the foundation areas. One expert in each area, working independently, was tasked to produce a working paper describing the state of the art, discussing the technical issues, and venturing predictions for possible extensions to that state of the art. Each report presents an overview, a discussion of functional requirements for the system or for a set of packages for the system, case studies dealing with similar existing systems, analysis of the information including cost and schedule estimates, and conclusions. In the mid-term areas the case studies were replaced by discussion of the state of the art, the state of practice, and forecasts of new products. These reports were collected and distributed to the larger group of selected experts according to their expertise as preparation for the cluster workshops. These reports can be found in Volume III of this report.

In the second phase, four "cluster" workshops were conducted to perform similar analysis for each foundation area. These workshops addressed these foundation areas grouped according to technical similarity and dependence. Each cluster workshop used the submitted expert assessment as a baseline and point of departure. The goal of these cluster workshops was to assess the content of the reports and make recommendations regarding consistency, bias, level of effort, etc., such that the contents of these reports and the workshops could be merged into a final document.

The third phase entailed the analysis of all the cluster workshop reports in a meeting of the cluster chairpersons. This was conducted to eliminate areas of redundancy and assess the effort required to integrate all the foundation areas into a coherent system description and estimate of total effort. These conclusions can be found in the Executive Summary, Volume I of this report.

Finally, this Record Document has been prepared by the IDA project management, cluster chairpersons and Computer and Software Engineering Division technical staff.

Thomas H. Probert
Project Leader

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JOHN W. ANDERSON

John W. Anderson is a Vice President of Sigma Associates responsible for the analysis, recommendation, and implementation of voice network equipment and services and for the migration of automated office systems into the communications system.

Mr. Anderson was previously Assistant to the Senior Vice President of Engineering and Operations of Satellite Business Systems where he was assigned responsibility for analysis and solution of specific operational problems. At SBS, he also developed the product strategy for SBS's shared resource private network; managed the implementation of the first SBS customer network; and was responsible for the operating plan for SBS's local distribution system.

Before coming to SBS in 1979, Mr. Anderson was with AT&T's Long Lines Division for 14 years where his assignments included National Account Management for the Aerospace and Building industries as well as special project liaison for the White House Communications Agency.

Prior to joining Long Lines in 1966, Mr. Anderson worked for a GT&E subsidiary responsible for the design, installation and maintenance of PBX systems.

SIGMA ASSOCIATES - SUITE 600 - 8400 WESTPARK DR. - P.O. BOX 3463 - McLEAN, VIRGINIA 22103 - (703) 734-4922

WILLIAM G. BAIL

William Bail, the Deputy Director of the Washington Division, has over 16 years of experience in both management and line positions in software engineering. He is expert in high order languages and compilers as well as systems analysis and design, software integration and configuration management, and other software areas related to the VHDL project.

B.S. Mathematics, Carnegie Insitute of Technology, 1966
M.S. Computer Science, University of Maryland, 1973
Ph.D. Candidate in Computer Science, University of Maryland

"Program Complexity using hierarchial abstract computers". Presented to the National Computer Conference June 1978, and published in the proceedings.

"A measure of Program Complexity". Presented to the ACM Computer Science Conference, February 1975.

"Optimization of Structured Programs". Software: Practice and Experience. Jan-March 1974 (co-authored with M.V. Zelkowitz).

"A Report on a Code-Optimizer for SIMPL-X". University of Maryland Technical Report 1973.

"The Use of Automated Support Tools for Configuration Management in the Development of Large System Software Packages". Presented to the NSIA Conference on Software Technology and Management, November 1981.

Intermetrics, Inc. - Washington Division Deputy Director

Project Manager of contracts with the Navy involving maintenance and enhancements of the SPL/1 compiler system, development of test systems for the verification of SDEX/M and the timing and architecture of the AN/UYK-20 and AN/UYK-44, and suporting the development of the MTASS/L programming environment.

On the MTASS/L contract, Project Leader for the Intermediate Language Task and the Systewms Integration Task. The subtasks of Systems Integration include: preparation of systems integration plan, development of the system interface design specification, maintenance of systems configuration management system, and review of component tests and test procedures for conformance to systems requirements.

Manager of a project to develop report surveying the types and capabilities of compiler-embedded software development tools. This report was developed under a contract to the National Bureau of Standards. Project Manager of an effort to develop for the National Bureau of Standards a set of compiler validation tools for FORTRAN 77, to determine conformance of a compiler to the ANSI 77 Standard.

Currently developing an MIS to maintain accounting and manpower

allocation levels for Intermetrics' Bethesda office. This system is being developed on the VAX-11/780 in FORTRAN, and provides various acquisition and display techniques, including printed tables, histograms, and cursor-controlled graphics to CRT terminals.

Designed and implemented an accounting system for the VAX11/780. This system uses the VAX raw accounting file, and sets up a data base of monthly usage activity, from which summary reports can be produced.

Participated in the design and development of a high-precision interactive calculator for the VAX 11/780. This tool was developed under contract to NBS, and was used in the verification of FORTRAN 77 Intrinsic Functions. The calculator through the use of the VAX file system, allows the user to define his own operators, and provides recursion as a control flow tool.

Formerly responsible for Language enhancements and compiler modifications for the SPL/1 Language code generator which is hosted on the PDP10, VAX 11/780, and DCD6600, and targeted for the PROTEUS(AN/UYS-1) computer. This program is written in FORTRAN.

University of Maryland - Graduate Student - 1977 to present

Currently conducting research in two areas: program complexity measures, and language and compiler design for reliable software. Program complexity research directed at software design characteristics, and the development of automated software measurement tools. A complexity measure was developed which will untimately be incorporated into a compiler. This work has resulted in the publication of the paper, "Program Complexity using hierarchical abstract computers".

Designed and implemented a code-optimizer for the Pascal-like language SIMPL. The optimization method used was unique, and can be classified as a recursive descent technique. The optimizer was implemented in SIMPL, and is described in the publication, "Optimization of Structured Programs", co-authored with Dr. Zelkowitz.

Designed and implemented a code-generator for the language SIMPL, which was developed at the University of Maryland. This code-generator was hosted on the Univac 1108, and produced code targeted for the PDP11/45. SIMPL is a go-to-less block-structured language designed for systems implementation.

Vitro Laboratories - Senior Mathematician - 1966 to 1979

In charge of a section of programmers who were writing support programs to aid in the acquisition and anlysis of submarine system test data. Lead programmer in charge of the design and implementation of a static software monitor used to obtain usage profiles of production CMS-2 programs. This efort was part of a research project at Vitro to determine software reliability influence factors within the context of Navy software and to investigate methods for the automatic evaluation of software.

Responsible for the establishment of software engineering guidelines

for the standardized development and documentation of production FORTRAN programs. In charge of a research project to investigate the feasibility of applying theoretical program certification techniques to a production environment.

Responsible for the creation of a software testing environment for the data analysis programs created at Vitro by TRIDENT Weapons and Navigation systems test and evaluation. Responsible for specification of comprehensive documentation requirements designed to improve not only software quality but also communications between the program managers. Responsible for the analysis of the differences between CDC MP-60 FORTRAN and IBM 370 FORTRAN G, and for the preparation of a guide for programmers to aid in the conversion of programs from the 370 to the MP-60.

Responsible for the design and development of support programs used to acquire and to extract Navigation and Weapons Systems test data recorded on variously formatted magnetic tapes. Responsible for the design and implementation of a prototype executive for the M42 configuration of the CDC 5600 processor in an MP-60 emulation. This machine operates on a TRIDENT submarine in conjunction with M40/M41 instrumentation system and provides on-board analysis capabilities. Responsible for the design and development of test data analysis programs to perform system verification of ship's Navigation and Weapons systems.

Susan J. Bailey

Fourteen years experience in computer systems design and implementation in all phases, specializing in word processing and newspaper systems, especially for mini- and microcomputers. Project management, consulting, and most recently, direct experience running a small software company.

EXPERTISE

Word Processing, Office Automation, and Newspaper Systems

Currently involved in bringing to market a sophisticated word processor for the IBM PC, conceived, designed and implemented by the two of us at Newburyport Computer Associates over the past two years. The program was originally written in PASCAL, then translated to 8086 assembly language and enhanced for the PC.

In Holland as a consultant to Philips, did research in office automation and word processing and developed and taught a course in the implementation of text processing systems.

In separate contracts in Holland and in Germany, participated in the specification, design and implementation of a Z-80-based word processing system and a PDP-11/45-based newspaper system.

At Hendrix Electronics in Manchester, N.H., participated as a consultant in the system specification and design of a 300 terminal Editorial and Classified system for a large metropolitan daily. The work included feasibility and design studies.

Was awarded a contract to completely specify and build a combination graphic arts and word processing system (called "GAT", then later Telex 2100). The 3-terminal system was based on dual 8080's sharing common memory, with a small typesetter on-line. The project involved direct interaction with several hardware manufacturers in order to decide on the typesetter during the specification stages.

While Project Manager of the Composer 1550 at IMLAC Corporation in Needham, Mass., worked with engineers and marketing people to develop that product, a standalone composition system for commercial printers. Also was exposed to graphics in other projects for Imlac.

Have worked at DEC two separate times, first as a programmer in the early seventies in the Typeset-11 group, and later as a consultant to the WPS-8 (word processor) project. In the course of my typesetting programming career, I have implemented four hyphenation/justification programs.

Data Bases, Systems Programming, and Other Applications

As a contractor at Polaroid Corporation, was responsible for the design and setup of their data base for film research on the PDP-11/70, using DBMS-11. This involved consultation with other users and with DEC as well as design and coding. Support of a 24-hour on-line data gathering simultaneous with a time-sharing user base involved sysgens

and other systems work contributing to exposure to the internals of RSX-11M.

As an employee at the Foxboro Company, worked with small Interdata machines in several process control projects involving ROM programming.

At Computer Response Corporation in Washington, D.C., worked on the Univac 1108 Exec and on two separate data base massaging programs in Fortran.

EDUCATION

BA University of Pennsylvania, Natural Science, 1967.

University of Maryland, Computer Science, 1967 - 1969. Completed 33 credits toward an MS.

MACHINES, LANGUAGES, OPERATING SYSTEMS

Assembly language for 8080, Z80, 8086, PDP-11, Imlac, Interdata.

PASCAL, FORTRAN, ALGOL.

RSX-11M, RSX-11-D, CP/M, MS-DOS.

Ralph O. Brown Jr.

Summary:

Since 1972 I have been working full time specifying, designing and programming interactive and real time software products using mini and micro computers. Most of these have involved extensive interaction with engineers and marketing people. Generally these have been total developments from conception to running system. In several of these projects my responsibilities have included supervising or coordinating small teams of analyst/programmers.

Expertise:

Office Automation, Word Processing and Typesetting

I have participated in three word processing projects where I did a major part of the design and implementation. I was part of a design team in Holland at Philips Data Systems exploring new concepts for an integrated data processing/office automation series of systems for a year and a half.

As a consultant to Itek Corp. I was mainly responsible for the design and implementation of the original Quadritek standalone typesetter.

For the last two years I have been designing and implementing a word processing system first in Pascal and then in 8086 MACRO for the IBM PC.

At DEC I was responsible for the software on the original VT-20 editing station.

As a consultant at Hendrix Electronics I participated in the specifications for a very large newspaper editorial system (300 terminals and 4 PDP 10's).

In addition to the consulting at Philips, one of the word processing systems I designed and helped implement was at Datic Electronica in Germany. With these experiences, I have a feel for the requirements of systems that are targeted for both the European and American markets.

Interactive Graphics

At Polaroid Corporation I designed and implemented an interactive system using a PDP-11/70 and Tektronix 4027 color graphics terminals to allow scientists to look at experimental data in a variety of ways.

At Bolt Beranek and Newman I worked with the Prophet system (similar to RS-1) which is a database, graphics and molecular modeling system for use by chemists. This allows very flexible graphical access to the data in the system.

Micro-Computer Operating Systems and Drivers

The IBM PC word processor project as well as consulting on other similar machines has required knowledge of MS-DOS interrupts and other internals including writing drivers for MS-DOS 2.0

The system for Datic required designing a multi user interrupt-driven operating system for the Z80/8080 microcomputer with a mechanism for multiple tasks to share code reentrantly.

On another contract I designed and implemented a Z80 based controller which was built into a letter quality printer to control the motors and magnets in the print mechanism.

As part of the project at Hendrix I wrote a test driver for RSX-11M to run a Megastore core memory disk emulator.

Specific Machines, Languages, Operating Systems:

PDP-11 MACRO, FORTRAN, RSX-11M
Z80/8080 - MACRO, CP/M
8086/8088 - PASCAL, MACRO, MS-DOS, CPM/86
UCSD PASCAL

Education:

Massachusetts Institute of Technology, BS Mechanical Engineering, graduate courses in Electrical Engineering and Computer Science at MIT and Boston University.

SOFTECH

Staff Resume

WILLIAM R. BUSEMAN

System Consultant

EDUCATION - B.S., Forestry and B.S., Computer Science, West Virginia University.

SUMMARY OF EXPERIENCE - Mr. Buseman has many years of experience in various aspects of the Computer Sciences field. He designed and implemented work in applications systems, operating systems, and language compiler and support systems. Mr. Buseman also has experience as a technical support representative.

PROFESSIONAL EXPERIENCE -

SofTech, Inc. As manager of the Support Software Section, Mr. Buseman is responsible for the administrative management of projects in that section. This includes M-System RSS Support, Common Realtime Operating System support for both the Advanced Signal Processor and the Enhanced Modular Signal Processor, and for the development and maintenance of the MTASS/L AN/UYK-7 and AN/UYK-43 simulator. Previously, as manager of the Software Engineering Section for SofTech's Washington office, Mr. Buseman was responsible for the technical management of all projects in this section. This included software tools definition and development, programming language support, programming language usage, and software engineering environment usage. Mr. Buseman also was responsible for a CMS-2 to Ada transition study undertaken to research the problems involved in the transition from the use of CMS-2 to the use of Ada as a vehicle for developing embedded computer systems. The study recommends the approach to take toward that transition and identifies and solves the problems that are likely to be encountered. In addition to the above study, Mr. Buseman was responsible for various other projects involving the Ada language system.

General Electric Information Services Company (GEISCO) (3 years).
Mr. Buseman was a member of the support team responsible for the maintenance and enhancement of the IBM hardware-based computer service offering. He designed and implemented major extensions to the MVS operating system needed to support resource accounting and security. He worked in both the SCP and JES 2 areas.

Mr. Buseman was a member of the LIS language support team responsible for the language support software. Mr. Buseman's area of responsibility included runtime support, programming environment support, compiler support, and tools support.

Use or disclosure of proposal data is subject to the restriction on the Title page of this Proposal

Staff Resume

SDL International (2 years). Mr. Buseman was responsible for technical support of the customers in the Washington, D.C., branch office. This included both pre- and post-sales support, benchmarking, negotiations, consultation, and education of customers and prospective customers.

National Steel Corporation (2 years). Mr. Buseman was a member of the analysis and programming staff at the corporate data center. He was responsible for the design and implementation of various applications systems. Mr. Buseman was the project leader on a DOS to OS operating system conversion effort. This project involved the conversion of all applications to run on the new operating system.

Use or disclosure of proposal data is subject to the restriction on the Title page of this Proposal

Eric Bush
47 Pond Street
Marblehead MA 01945
631-5930

EDUCATION

1973-1980: Ph.D. Harvard University, Dept. of Philosophy
Areas of specialization: Theory of Knowledge, Philosophy of Language, Philosophy of Psychology.

1969-1973: M.A. Ohio State University, Dept. of Philosophy.
B.A. Ohio State University, summa cum laude and with distinction in Philosophy.

EXPERIENCE

1974-1978: Teaching and Research at Harvard. Dissertation topic: regimentation and simplification of functional systems.

1979-1980: Analyst/Programmer, First National Bank of Boston. Financial applications and software tools development in PL/I, Assembler, and COBOL.

1980-1981: Senior Engineer, Software, Honeywell Information Systems, Cambridge Information Systems Laboratory. Developer for Multics Assembler. Co-developer for Multics PL/I compiler. Member ANSI standards committee (X3J1) on PL/I. Research (in LISP) on automatic compiler generation via LR(k) parser generation technology and denotational semantics.

1981-1983: Founder and General Partner, Language Technology Co. (See attached literature).

1983: Consultant to Arthur D. Little Inc. on artificial intelligence.

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PROJECT MANAGEMENT/RESEARCH AND DEVELOPMENT

CAREER HISTORY Over 14 years experience in computers, electronics, and Army Command, Control, and Sensor Systems. Demonstrated ability determining requirements, writing specifications, and directing development. Consistent track record of success and advancement in technical management.

EDUCATION B. S. Engineering, United States Military Academy
M. S. Electrical Engineering, North Carolina State
Graduate Courses, Computer Science, GWU

PROGRAM MANAGEMENT 1980-Present: Director, Battlefield Automation Management Division, US Army Materiel Development and Readiness Command, Alex, Va. Established office, recruited staff, directed technology program. Chaired Army Command and Command System Engineering technical group for system interface specifications. Determined technical requirements, costs, and wrote Army plan for Ada Language System and Military Computer Family. Army Ada Program Director, directed Army program for DoD software initiative. Presented programs to Army Science Board Panels, Defense Science Board Task Force, and Industry Association Technical Committees. Army representative to Joint Logistics Commanders' policy group for computer resource management.

RESEARCH & DEVELOPMENT 1978-1980: Command and Control Team Chief, Office Deputy Chief of Staff Research, Development, and Acquisition, Department of Army, Pentagon. Directed six professionals. Prepared, defended Army R & D and Procurement budget for Command, Control, Sensor and computer related advanced developments. Briefed House and Senate Armed Services Committee Staffs. Programs included TACFIRE, Battery Computer System, Ada and Military Computer Family. Member NATO Armaments Development Panel for Command and Control system standardization. Developed and maintained personal contacts with foreign NATO military personnel.

PROJECT MANAGEMENT 1977-1978: Department of the Army System Coordinator for Army's tactical Command and Control system at Corps and below. Budgeted and coordinated all program development, testing against requirements and life cycle costs. Prepared distribution plan. Prepared and coordinated all documentation for Army and Defense System Acquisition Review Council meetings. Program now in production.

GENERAL MANAGEMENT 1975-1977: Commander, Advanced Individual Training Battalion and School, Fort Jackson, SC. Directed training battalion and Army School of 150 instructors and administrators teaching logistics management. Conceived procedure to accelerate talented students. Reduced training time and associated cost. Increased graduates proficiency. Rewarded for achievement.

ASSISTANT PROFESSOR	1967-1970: Assistant professor, Department of Electrical Engineering, United States Military Academy. Designed high frequency propagation, reception demonstration system. Developed undergraduate electrical engineering program taught by 12 instructors. Directed individual research programs. Implemented laboratory for computerized solutions to signal processing and system engineering problems in control systems.
RELATED EXPERIENCE	2 years, operational command and control center. 1 year, Infantry Communications Officer. 4 years, Infantry units.
CLEARANCES	TS, SCI

WILLIAM E. CARLSON

4733 Bethesda Avenue, Suite 415, Bethesda, MD 20814

(301) 657-3775

EDUCATION: Electrical Engineers Degree - Computer Systems,
Massachusetts Institute of Technology, 1971

M.S. - Operations Research,
Massachusetts Institute of Technology, 1971

B.S. - Electrical Engineering,
Massachusetts Institute of Technology, 1968

PROFESSIONAL POSITIONS:

1983 - Present: Director of Washington Operations for Intermetrics, Inc. Manages a staff of 25 professionals engaged in leading edge software development, including the VHSIC hardware description language, optimizing compilers, and advanced programming environments. Also serves as corporate contact for technical programs supporting Washington area customers in any of Intermetrics 12 offices.

1980-1983: Vice President and General Manager, Advanced Systems Division, Western Digital Corporation in Irvine, CA. Responsible for the product definition and engineering development of an advanced computer system aimed at the single and multiuser engineering work station markets. The system featured a high performance 32-bit internal bus optimized for multiprocessing, high resolution bit mapped graphics displays, and an enhanced UNIX-leased operating system for graphics processing and networking.

1975-1980: Program Manager, Defense Advanced Research Projects Agency, Washington, D.C. Managed R&D programs in software technology, distributed computing, intelligent systems and database management. Also participated in the formulation of overall Department of Defense computer resources management policy. As DARPA's Ada program manager, played a key role in the development of Ada.

1971-1975: Air Force Officer, Computer Systems Analyst in the Pentagon. Led development of an interactive COBOL compiler and interactive index sequential processor which were adopted by the World-Wide Military Command and Control System (WWMCCS). Managed programmers providing information services to OSD and Headquarters Air Force, and performed special technical studies for the Air Force Director of Data Automation.

Resumé

of

RALPH E. CRAFTS

PROFESSIONAL SUMMARY:

17 years of experience in computer/electronics technology, information systems design, micrographic storage and handling technologies and corporate/small business management. Military background includes computer/radar technologies, tactical jet operation and management, and nuclear weapons training and qualification.

EDUCATION:

University of West Florida	B.A., Accounting/Financial Analysis, Magna Cum Laude
U.S. Marine Corps Electronics/Computer Schools	Solid state digital computer technical training
U.S. Marine Corps Marine Tactical Data System (MTDS)	Technical training, trouble-shooting and repair
U.S. Marine Corps Officer Candidate School and Basic School	Officer training, advanced tactics, weaponry, leadership and logistics training
Naval Flight Program	High performance tactical jet flight training
U.S. Marine Corps Nuclear Warfare & Weapons Training Center	Advanced airborne nuclear warfare/tactics training

PROFESSIONAL EXPERIENCE:

INTELLIMAC, INC. - Vice President, Operations & Marketing

- Responsible for marketing, planning, sales, and administration. Coordinator for advertising, public relations, budgetary and financial analysis. Responsible for contract negotiations, licensing, and exporting. Provides upper management input for top down systems analysis and design for Ada software projects. Serves on National AdaTEC policy subcommittee.

SCOTT PAPER COMPANY - Projects Accountant/Reprographics Manager

- o Designed, developed, and implemented a sophisticated, computer assisted micrographic information system for massive source document records base. Designed and installed contemporary office environment system for administrative area. Planned the functional design and acquisition of Word Processing Center. Provided preliminary cost/benefit analysis and basic design of a sophisticated COM (Computer Output Microfilm) system for computer generated information.

U.S. MARINE CORPS - Captain

- o Began career as a Computer/Radar Technician in the Marine Tactical Data System (MTDS). Wrote a number of texts for Digital Computer Fundamentals courses. Honor Graduate of Officer Candidate School, with distinction of being youngest peacetime commissioned officer (age 19). Completed Naval Flight Training Jet Syllabus with nomination for the Orville Wright Achievement Award for Aviation Excellence. Promoted to Captain at age 22. Overseas tour included all of the Far East and involved duties requiring the supervision of 250 enlisted men and six officers in a tactical Marine jet squadron. Subsequent stateside duty as a flight instructor included scheduling, training, program development, and text writing.

PRINCIPAL PUBLICATIONS & LECTURES:

"Digital Computer Fundamentals," technical text, U.S. Marine Corps, San Diego, CA, 1966.

"Boolean Algebra and Binary Number Systems in the MTDS Environment," technical text, U.S. Marine Corps, San Diego, CA, 1966.

"Cost of Capital--A Macro Financial Approach," University of West Florida and Management Accounting Magazine, 1978.

"The Real Causes of Inflation--A Monetarist View," University of West Florida, 1979.

Conference on Micrographic Information Systems, with an emphasis on future development, computer assisted retrieval, and marketing strategies, 3M Company, St. Paul, MN, 1980.

Structured Analysis Seminar for Industrial Applications, M.A.N. Truck & Bus Corp., 1981.

"Applications Software in Ada: A Reality," Ada Letters, Spring, 1982.

"Ada Debuts in Application Program," Defense Electronics, July, 1982, pp. 67.

"Ada Applications Software: The First Two Years," Presented at Federal DP Expo, April, 1983.

"Ada for Commercial Applications Software," presented at IBM, May, 1983.

"Ada Applications Software: The First Million Lines," presented at National AdaTEC, June, 1983.

PROFESSIONAL AFFILIATIONS & AWARDS:

- o Phi Kappa Phi Honor Society
- o Orville Wright Achievement Award
- o Association of Computing Machinery
- o National AdaTEC
- o Washington, DC Chapter AdaTEC
- o National AdaTEC Subcommittee on Policy

BIOGRAPHICAL RESUME

NAME: Clifford I. Cummings
HOME ADDRESS: 10303 Conejo Lane, Oakton, Virginia 22124
TELEPHONE: 938-0073
BIRTH DATE: June 23, 1923
BIRTHPLACE: San Diego, California
MARITAL STATUS: Married - 4 children

EDUCATION:

BS in Physics, 1944, California Institute of Technology
Harvard and MIT Radar Schools, 1944-45

MILITARY SERVICE:

February 1944 to September 1946, U.S. Army Signal Corps, Radar Officer, 1st Lieutenant

EXPERIENCE: Chronological Summary

September 1946 to September 1963	**Jet propulsion Laboratory, California Institute of Technology,** including:
1946 to 1949	Responsible for development of JPL FM-FM telemetering system and its utilization in WAC Corporal and Corporal missile. Also responsible for range instrumentation equipment.
1949 to 1952	Responsible for development of radar equipment for use in Corporal missile guidance.
1952 to 1954	Section Chief of Guidance Systems Section with overall responsibility for the Corporal guidance system. Section consisted of 70 engineers and technicians.
June 1954 to January 1956	Corporal Technical Coordinator with responsibility to provide technical coordination of the entire Corporal missile system. This included coordination of the two industrial contractors and the military support and user organizations.
February 1956 to December 1957	Jupiter Project Director with responsibility to direct entire Jet Propulsion Laboratory Radio Guidance development effort and integrate it with the Army Ballistic Missile Agency Jupiter weapon effort. Also direct industrial co-contractor effort.

EXPERIENCE (cont.)

July 1956 to December 1957	Division Chief of Systems Engineering Division with technical and administrative responsibility for three sections including Guidance Systems, Field Operation and Test, and Military and Industrial Services. This involved approximately 250 engineers and technicians.
January 1958 to June 1958	On assignment from Jet Propulsion Laboratory to Weapons Systems Evaluation Group, Office of the Secretary of Defense, Pentagon.
July 1958 to December 1958	On assignment from Jet Propulsion Laboratory to Advanced Research Projects Agency, Office of the Secretary of Defense, Pentagon.
January 1959 to June 1959	Jet Propulsion Laboratory representative to National Aeronautics and Space Administration, Washington, D.C.
July 1959 to December 1962	Lunar Program Director
December 1962 to September 1963	Special Assistant to Director of the Laboratory
September 1963 to May 1966	**Electro-Optical Systems, Inc.** Manager, Program Management and Systems Engineering. Responsible for systems analysis, design, integration, test, field operation and reporting on subsystems and systems developed by EOS as subcontractor or prime contractor in military and space fields. Emphasis of the work was on system application of technical achievements by EOS divisions.
June 1966 to January 1967	On special assignment to the Foreign Missiles and Space Analysis Center of CIA.
January 1967 to July 1967	Chairman of Reaction Panel, STRAT-X study.

EXPERIENCE (CONT.)

September 1967 to April 1968	Special Assistant to the Director of Defense Research and Engineering for Threat Assessment and Assistant Director for Intelligence, Reconnaissance and Electromagnetic Warfare, Office of the Secretary of Defense.
April 1968 to July 1983	Xerox Electro-Optical Systems Manager, Intelligence and Reconnaissance (Washington Office)
July 1983 to Present	Jet Propulsion Laboratory Manager, East Coast Defense Programs Support Office

JAMES B. DEMPSY

Mr. Dempsey has over twenty five years in the management, engineering and development of large scale software systems for commercial and military applications with particular emphasis on telecommunications, real time control and software development support systems. He is currently the Special Products Planning Manager at GTE R&D, Phoenix and the Program Manager for the WIS-JPMO/TE program, the Distributed Software Engineering Control Process, a WIS Transition Precursor project.

Jim's eleven years with GTE started as Software Systems Manager for the DoD Tri-service, AN/TTC-39 voice/data, tactical switching system; first in the competitive prototype development and subsequently in the production development program.

At GTE R&D he managed the Specifications and Planning Group for GTE's switching products. Also as staff to the Executive Director, he has served as GTE liaison to the United States Independent Telephone Association (USITA) and as a member of the corporate Software Steering Committee which acts on corporate needs for software development tools, methodologies, standards and support environments. His work as Planning Manager spans several software intensive programs for internal, commercial and Government projects.

Before joining GTE, Mr. Dempsey was Software Products Planning Manager at RCA, planning new systems and software with emphasis on data communications and on-line information systems. In this software planning activity his group planned new software systems, established their requirements and directed production of custom software applications for specific end-user environments.

His earliest systems work was with RAND Corporation at the M.I.T.-Lincoln Laboratory in the development of the system software for the distributed multicomputer, C3 SAGE air defense system. Mr. Dempsey was responsible for some of the earliest work on software-controlled fault-tolerant systems operations, multiple terminal user coordination and on-line training. Subsequently, he consulted at Hughes Aircraft and was the technical liaison between Hughes and Autonetics for interfacing Minuteman with the Hughes automatic test system. He managed the software group that adapted the Minuteman D-37 ground calibration and platform test software and the Hughes' ATE software for compatible operation.

Mr. Dempsey has a Bachelor of Science degree from California State University, and has completed numerous industrial, technical and management programs, at the Ft. Monmouth Army Signal Corps School, UCLA and other institutions.

WBG Inc.

WILLIAM B. EASTON

EDUCATION

Ph.D., Mathematics, Princeton University, 1964.
B. Eng. Phys., Engineering Physics, Cornell University 1961.

EXPERIENCE

General Background. Dr. Easton has over 24 years experience in designing and implementing computer software. He is the chief architect of SYSCOV I™, an integrated system of programming tools that automates much of the programming process. This system is founded on formal grammars and automates programming, program testing, program verification, program documentation, program conversion and data base conversion. Dr. Easton is a founding member of WBG, Inc., and currently serves as its Chief Scientist and Vice President for Research and Development.

Systems Consultant (Three years). Developed a structured-programming preprocessor for COBOL, using formal-language techniques. Continued development and enhancement of a documentation system for COBOL programs, including a comprehensive flow-analysis module. Developed support software for a major system conversion effort. Implemented a number of commercial applications on a contract basis. Prior consulting experience includes installation and modification of a linear-programming system for financial applications and development of efficient algorithms for analysis of printed-circuit artwork.

Chief Programmer (Four years). Developed a documentation system for COBOL programs, using formal-language techniques. Developed a system for conversion of COBOL programs from one computer system to another. This program used formal grammers to specify the input language and the required transformations; the product eventually became operational on several different computer systems, and could translate any COBOL dialect into any other. Developed an automated system for projection of future requirements and preparation of congressional budget submissions for a military hardware improvement program. Responsible for development of a major accounting system for a military supply program. This product was developed so as to permit single-source maintenance of a system operational on three different manufacturers' computer systems.

Associate Professor of Computer Science, Member of Graduate Faculty (One year). Research in privacy and security in computer operating systems. Developed and taught courses in operating systems, a graduate seminar in topics in operating systems, language software and compiler design, and a senior honors seminar in programming techniques. In addition to the above, associated with Rutgers University since September 1968 as an adjunct faculty member. Gave a graduate-level course in Operating Systems from 1968 to 1974 and undergraduate-level course in data processing in 1978.

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1489 Chain Bridge Road, McLean, Virginia 22101 (703) 790-5761

Senior Mathematician (Ten years). Developed timesharing operating system, in cooperation with others. Developed a compiler for a systems-programming subset of the PL/I language. Developed a Basic-language compiler and subsystem. This product was later purchased by a major manufacturer for incorporation in the standard system software. Responsible for development of a military logistics information system. Participated in and developed software for experiments in on-line theorem proving and man/machine interaction.

Various Experience (Five years).

Experience during this period included simulation studies of missile flight, impurity diffusion in crystals, and pi-meson/nucleon collisions. In addition, developed a number of software products, including an assembler, a loader, and an on-line editor.

SOFTWARE AND HARDWARE

Computers	Application Languages	Operating Systems and Utilities	DBMS and Proprietary Software
IBM 360	COBOL	OS	SYSCOV I™
IBM 370	FORTRAN	DOS	CICS
IBM 43XX	PL/I	IBSYS	IMS
IBM 33XX	ALGOL	FMS	IDMS
IBM 650	ALGOL-68	TOPS-10	IDS
IBM 704	BLISS	GCOS	IDS-II
IBM 1401	Assembler	TDOS	TOTAL
IBM 7040		MVS	WYLBUR
IBM 7080		EXEC 8	TSO
IBM 7090			FORTE
DEC PDP8			
DEC PDP10			
Decsystem 20			
Honeywell 6000			
Honeywell Level 66			
CDC 6600			
CDC Cyber			
RCA 301			
RCA Spectra 70			
Burroughs 3500			
Burroughs 4700			
Burroughs 6700			
UNIVAC 1108			

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PUBLICATIONS

Easton, W., "Process Synchronization without Long-term Interlock, "Third Symposium in Operating System Principles, Stanford, 1971.

Easton, W., "Powers of Regular Cardinals," Annals of Mathematics Logic, (1970) 139-178.

Bennet, J., Easton, W., Guard, J. and Mott, T., Jr., Toward Semi-Automated Mathematics: The Language and Logic of Sam III, Scientific Report No. 2, Contract No. AF 19 (628) 3250, Air Force Cambridge Research Laboratories 1964.

Mott, T., Jr., Guard, J., Bennett, J., and Easton, W., Introduction to Semi-Automated Mathematics: The Language and Logic of Sam III, Scientific Report No. 2, Contract No. AF 19 (628-486), Air Force Cambridge Research Laboratories, 1963.

Easton, W., Zone Safety for a Short-Range Missile (U), Technical Report TR-980, Diamond Ordinance Fuze Laboratories, 1961.

Glang, R. and Easton, W., "Donor Concentration at the Surface of a Diffused N-type Layer on P-type Germanium, "J. Electrochem. Soc., 107 (1960) 758-763.

Easton, W., "The Radio Proximity Fuze," The Cornell Engineer, 23 (Jan. 1958) 31-33.

Easton, W., "IGY Gravity and Seismology," The Cornell Engineer, 23 (Nov. 1957) 64-68.

Easton, W.and Moore, S., "Low Temperature Experiments at Cornell," The Cornell Engineer, 22 (Dec. 1956) 22-23 and 67.

Easton, W., "Cornell... Pioneer in Nuclear Research," The Cornell Engineer, 23 (Oct. 1957) 14-18.

PREVIOUS AFFILIATIONS

Software Automation, Incorporated
Structured Methods, Incorporated
Galler Associates, Incorporated
Sage Systems, Incorporated
Rutgers University
Applied Logic Corporation

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ALBERT JOHN EVANS, JR.

Mr. Evans has extensive educational experience in a variety of programming languages as well as electrical engineering. Specifically, he is conversant with computer applications in the areas of both hardware and software microcomputer applications, and biomedical, engineering and instrumentation.

At INCO, Inc., Mr. Evans serves as manager of the Systems Engineering group for the Modular Architecture for the Exchange of Intelligence (MAXI) project for the Air Force Intelligence Service (AFIS). In this position, Mr. Evans is responsible for all design work and technical studies for the project. Previously, Mr. Evans headed development of a major enhancement package under a separate contract and has specifically developed numerous applications and interface tasks for the MAXI system. In addition, he has authored various documents and proposals for the project.

Earlier Mr. Evans was involved in a number of practical computer applications while he pursued a masters' degree in engineering. As his Masters' thesis he divised a method to facilitate the investigation of frequency perception of humans to speech. The solution was to digitally store taped speech on disk (PDP 11/20) as a permanent file. Words could then be randomly accessed, suffused with control, and retaped for subject experimentation. A digital attenuator was interfaced to the existing computer for programmable noise infusion. He was also involved with microcomputer interfacing with both hardware and software on the Intel 8080 and Motorola 6800 microprocessor systems.

Prior to his graduate education, Mr. Evans was employed by Unified Industries, Inc., Alexandria, Virginia as an electrical technician. His responsibilities entailed the maintenance and installation of the Washington, D.C. METRO farecard automatic fare systems which is a microprocessor controlled system.

Mr. Evans has an M.E. in Biomedical Engineering from the University of Virginia and a B.S. in Biology from Hobart College.

ANDREW B. FERRENTINO

Mr. Ferrentino, president of Software A&E, Inc., has over 19 years of experience in the analysis, design, implementation, and management of large-scale communications and computer systems. He is a recognized expert in the application of advanced software engineering technology to the development of large software systems. As president of Software A&E, he is responsible for the business development and contract performance of projects addressing development of state-of-the-art software engineering methods, specification of software engineering environments, the application of advanced design techniques to large systems, development of verification and validation techniques, and development of expert systems.

His previous experience involved high level management positions in Satellite Business systems and American Satellite Corporation where he was responsible for the development of applications of satellite data communications. These included Office of the Future as well as standard DP telecommunications applications.

Prior to his experience with SBS and AMC, Mr. Ferrentino spent 13 years with the IBM Federal Systems Division in key technical and management roles in the development of complex computer-based systems. These systems spanned the IBM product line in computers, operating systems, and support systems. They were typically real-time, on-line systems with sophisticated data base operations, such as Police Dispatching Systems and on-line newspaper composition and layout systems.

Mr. Ferrentino received his M.S. degree in Mathematics from Lehigh University in 1974 and B.S. degree in Mathematics from Middlebury College in 1962.

DR. LAWRENCE J. FOGEL

Ph.D., Engineering/Biotechnology, University of California at Los Angeles, 1964
M.S., Electrical Engineering, Rutgers University, 1952
B.E.E., New York University, 1948

Dr. Fogel is Vice President for Corporate Development, TITAN Systems, Inc. Prior to joining TITAN, he was President of Decision Science, Inc. from 1965 until July, 1982, when, through merger, Decision Science became a Division of TITAN Systems, Inc. He created Evolutionary Programming, an artificial intelligence technique that led to the Adaptive Maneuvering Logic. This logic was then used to generate optimal interactive behavior in simulated aerial combat, as well as naval and tank warfare. The logic was then expanded in scope to serve as a foundation for structuring the purpose of larger scale organizations so that alternative resource commitment can be evaluated in quantitative terms. A computer program based on this concept is currently being used for training the Defense Systems Management College. Other agencies currently reference this technique to improve the effectiveness of management. Dr. Fogel also served as Program Manager for various projects relating to predictive epidemiology.

Prior to joining Decision Science, Inc., he held the position of Senior Staff Scientist with General Dynamics/Astronautics. There he served as Assistant to the Director of Research while conducting research in artifical intelligence. He devised the Reliability Data System adapted for the Atlas Weapon System, planned the internal research and development activities, and acted for the Director of Research and Advanced Technology in his absense.

Before joining General Dynamics/Astronautics, Dr. Fogel served as Special Assistant to the Director for Research, National Science Foundation. There he prepared a number of technical papers including one entitled "Investing in Scientific Progress."

Prior to this assignment, Dr. Fogel served as Head of the Reliability Group, General Dynamics/Convair, supervising the reliability analysis of the 880 Jet Transport. This followed his serving as Design Specialist responsible for the man-machine aspects of cockpit design for the F-102/F-106 Interceptor Weapons Systems. Dr. Fogel holds five patents in this regard.

Before this Dr. Fogel served as Senior Research Engineer at Stavid Engineering, Inc., and Davenco, Inc., where he was concerned with computational aspects of guidance and

control, air traffic control, and human factors engineering. Prior experience included the design of aircraft antennas for the Coles Signal Laboratory, U.S. Army Signal Corps, the preparation of waveguide specifications for the Armed Services Electro Standards Agency, and direction finder antenna design for the Watson Laboratories, USAF.

Dr. Fogel has taught for UCLA, USC, U.S. International University, and is currently a member of the Graduate Faculty of the School of Business Administration, San Diego State University, and for five years he was an invited member of the Creative Science Program, New York University, and chaired the Prospective Programs Panel for the Office of Technology Assessment, Congress of the U.S.

He contributed extensively to the technical literature and authored six books. He also served as Editor-in-Chief of the Journal of Cybernetics, edited a technical book translated from Russian, and for six years wrote a monthly column on radio controlled soaring for Model Builder Magazine (a readership of 55,000). He was President of the American Society for Cybernetics, the National Soaring Society, and he is a Life Member of the New York Academy of Sciences.

JOSEPH M. FOX

Mr. Fox is Chairman of Software A&E, a software firm specializing in Software Engineering and Artificial Intelligence products and services.

In 1978, Mr. Fox chaired the Navy Embedded Computer Review Panel for the Assistant Secretary of the Navy. In 1979, he was a member of the Department of Defense Instruction Set Architecture Panel. In 1981, he was a member of the DoD Defense Science Board Ad Hoc Committee on Embedded Computers.

Mr. Fox was with IBM for 21 years, and from 1969 to 1977 was Vice President of the Federal Systems Division, managing the largest group of programmers in IBM. In this position, he managed a profit center with an annual revenue of 130 million dollars per year and was responsible for marketing, production, engineering, contracts, legal, finance and personnel. Some of the major systems developed under the direction of Mr. Fox include the following:

- FAA En Route Air Traffic Control - U.S. and U.K.
- Apollo Ground Control, Lunar Landing, Skylab, etc.
- On-line Banking Systems in Europe and Japan
- Japanese Newspaper Automation
- Military Command and Control Systems around the world
- New York City Police Dispatching System (911)
- Safeguard Anti-Ballistic Missile System
- New York Stock Exchange Automation
- Exxon Oil Refinery Automation - Canada and Belgium

During his IBM career, Mr. Fox held various sales and management posts in both the commercial and government markets. He was, in 1966, Manager of Product Requirements - Large Scale for the IBM Data Processing Division. In this position, he was responsible for the statement of the requirements for the high end of IBM's computer line.

He has been a developer, marketer, user and manager in all phases of Data Processing.

For three years, Mr. Fox was a Director of the Montgomery General Hospital, Olney, Maryland and was Chairman of its Quality of Care Assurance Committee for two years.

Mr. Fox is on the Board of Directors of Infodetics, Anahiem, California.

He is the author of Executive Qualities, Addison Wesley, and Software and Its Development, Prentice Hall.

September 1983

RESUME

NAME: Graulich, Mark G.

TITLE: Program Scientist
Vector Research, Incorporated
P.O. Box 1506
Ann Arbor, Michigan 48106

EDUCATION: MS, Industrial and Operations Engineering, The University of Michigan, 1977 - 1978

BS, Industrial and Operations Engineering, The University of Michigan, 1973 - 1977

EMPLOYMENT: Vector Research, Incorporated, Ann Arbor, Michigan, May 1977 - present

ISDOS Project, The University of Michigan, Ann Arbor, Michigan, 1976

The University of Michigan, Ann Arbor, Michigan, 1975

RESEARCH EXPERIENCE: Designed and is currently developing the interactive decision support system for the military health services system (MHSS) resource anlaysis and planning (RAPS) model.

Designed and implemented a decision support system for U.S. Army personnel planning, including the application of optimization techniques for long-range planning.

Participated in the formulation of a model to predict system performance in the division-level Tactical Operating System (TOS), and developed an interactive software package to support analysis of the impact of candidate management procedures on TOS performance.

Graulich, Mark G.

RESEARCH EXPERIENCE (Continued):

Implemented the methodology for the evaluation of alternative modernization strategies for theater nuclear forces for OATSD(AE).

Developed a methodology for the quick assessment of contingency force operations using mathematical programming techniques.

Studied the impact of improved intratheater airlift capability on contingency force effectiveness in Southwest Asia.

Developed the necessary software for an interactive mathematical programming analysis package to investigate long range planning problems using mathematical programming techniques. This package is currently operational on IBM, UNIVAC, Hewlett Packard, and Perkin Elmer systems.

Designed and implemented several mathematical programming algorithms to support the mathematical programming analysis package. These algorithms were designed to handle large-scale linear programming problems with bounded and integer variables, as well as transportation/transshipment problems.

Participated in the model development of the command and control, communications, intelligence, and electronic warfare processes in division- through theater-level campaigns. Participation included development and testing of computer software modules for implementation of the mathematical methodology.

Studied the applicability of classical queueing models to describe the performance of networks of queues and queues that exhibit aberrant behavior.

Developed a set of prototype medical health production function staffing models from analysis of a preliminary USM data set to support the development of program estimating equations for the Air Force PRISM Analysis Model.

Developed analytic techniques to determine optimal medical provider mix for various prototype production function staffing models, using alternative sets of optimization criteria.

Graulich, Mark G.

RESEARCH EXPERIENCE (Concluded):

Studied the impact of alternative fire support allocation strategies on force effectiveness.

Developed the necessary software to perform the logic that provides for the automatic processing of incoming messages to the CORPS Tactical Operating System (TOS) simulation.

Analyzed and summarized the data generated by a mathematical model whose purpose was to examine the effect of future health system changes on the nation's requirement for registered nurse personnel.

Designed a computerized documentation system used by the United States Air Force. This system uses a data base to generate complete system specifications for Air Force operating systems.

Responsible for the design, construction, and implementation of a statistical data base for the analysis of data collected in a study of the toxic effects of mercury.

Extensive programming experience in COBOL, PL/1, and FORTRAN, including major modifications to a large-scale computer software package used by the United States Air Force, the Chase Manhattan Bank, and many other large businesses.

TECHNICAL REPORTS:

Contingency Force Analysis (CFA) Programmer's Manual, VRI-CFAM-1, TR82-2, 29 June 1982.

Contingency Force Analysis (CFA) Package User Manual, VRI-CFAM-1, TR82-1, 7 June 1982.

Analysis to Screen the Number of Contenders for the SEMA-X Platform, VRI-AVRAD-1, FR82-1, 8 March 1982, SECRET-NOFORN.

Contingency Force Analysis Methodology, (DRAFT), VRI-CFAM-1, FR81-1, 4 November 1981.

Assessment of OATSD(AE) Theater Force Modernization Plan, VRI-ATSD-1, FR81-1, 29 August 1981, UNCLASSIFIED.

Graulich, Mark G.

TECHNICAL REPORTS (Concluded):

Guidelines for Managing the Flow of Information in Automated Battlefield Command and Control System, VRI-ARI-3, FR80-2, 31 March 1980.

TOS Model Description, VRI-ARI-3, FR79-3, 30 November 1979.

Robustness of the M/M/1 Queue, VRI-ARI-3, WP79-2, September 1979.

Quick Response Assessment of TNF Modernization Plans, DRE-2, FR79-1, 26 September 1979, SECRET-NOFORN.

A Design/Decision Aid (DDA) for the Tactical Operations System (TOS) Division Computing Center (DDC), VRI-ARI-3, WP78-4, 10 November 1978.

Theater Force Evaluation by Combat Simulation Volume III: CEM/IFECS Programmer's Manual, VRI-CAA-2, FR78-2, 29 September 1978.

Theater Force Evaluation by Combat Simulation, Volume IV: Input Data, VRI-CAA-2, FR78-1, 31 July 1978.

Decision Rules Multi-Source Correlation and Association Procedures in FAP#1, #2, and #3, Volume I: Executive Summary, Volume II: User/Planner Manual, Volume III: Analyst/Programmer Manual; VRI-TOSEAD-1, FR77-1, 15 September 1977.

The Impact of Health System Changes on the 1985 Requirements for Registered Nurses by State, VRI-HRA-1, FR77-1, Part II, June 1977.

HONORS: Member of Alpha Pi Mu Honorary Fraternity, graduated Summa Cum Laude.

Mr. Mark G. Graulich (Program Scientist)

Mr. Graulich has an MS in Industrial Engineering from the University of Michigan with an Operations Research concentration.

His current principal interest is decision support systems for defense use in the planning and programming process. He has developed several such systems which have been used to evaluate alternative strategies for theater nuclear force modernization, U.S. Army personnel long-range planning, military health services resource allocation and planning, contingency force planning, and command and control system design and evaluation.

Mr. Graulich has also participated in the development of models representing various combat, environmental, and health care delivery processes. These processes include the contribution of C^3/Intel/EW systems to force effectiveness, the optimal allocation of support fires, tactical operating system (TOS) control and information processing techniques, the impact of intratheater airlift capability on combat outcome, screening methods for mercury poisoning, and health care production functions and optimal staffing patterns.

In addition, Mr. Graulich has an extensive background in computer programming and has developed software tools in the areas of interactive computer graphics, configuration management, language processing and syntax recognition, optimization methods, list processing techniques, and database management systems.

ROBERT F. GURWITZ -- Senior Computer Scientist

Education: Sc.M., Computer Science, Brown University, 1979; Sc.B., Computer Engineering, Brown University, 1977.

Professional Experience: Bolt Beranek and Newman Inc., June 1980 to present; Research Associate, Brown University Department of Computer Science, June 1978 to June 1980; Research Assistant, Brown University Department of Computer Science, September 1977 to June 1978; Systems Programmer, Brown University Department of Computer Science, June to September 1977.

Professional Responsibilities and Projects: Mr. Gurwitz is currently a Senior Computer Scientist with the Computer Systems Division of Bolt Beranek and Newman Inc. He is currently Principal Investigator of the Large Scale Simulation Network (SimNet) Project, a DARPA funded effort to develop distributed multi-player simulation technology centered around a tank battle simulator. He has been involved in a number of UNIX development and support projects as leader of the UNIX group in the Communications Systems Division, most notably the development of host networking software for the DARPA supported Berkeley version of UNIX. His implementation of the DoD TCP/IP protocols is in wide use at many UNIX sites around the country. As part of this work, he is a member of the DARPA Berkeley Steering Committee, which provides guidance in the development of the Berkeley UNIX Software Distributions. He has also been involved with the DARPA Internet Program while at BBN, as a participant in the DARPA Internet Working Group.

Previously, as a Staff Research Associate in the Brown University Computer Science Department, he managed the Brown University Graphics Project. At Brown, he did research in computer graphics and man-machine interaction, as well as systems and applications programming in support of the Project. He participated in the design and implementation of high-performance vector and raster-scan graphics systems, including microprogramming of a high speed transformation processor, design and implementation of graphics packages (including an early implementation of the SIGGRAPH GSPC Core Graphics System), and development of a number of applications combining animation and discreet simulation for educational purposes.

Societies: Sigma Xi, Member IEEE, ACM.

Publications:

"Protocols and Their Implementation: A Matter of Choice" (with J. Haverty), Data Communications, March 1983, pp. 153-166.

"MIDAS: A Microprocessor Display and Animation System" (with R. Fleming and A. van Dam), IEEE Transactions on Education, E-24(2), May 1981, .pp. 126-132.

"VAX UNIX Networking Support Project Implementation Description," DARPA Network Working Group IEN 168, January 1981.

"BUMPS: A Program for Animating Projections" (with R. Thorne, A. van Dam, and I. Carlbom), Proceeding of SIGGRAPH '80, Computer Graphics, 14(3), July 1980, pp. 231-237.

"Future Technical Documentation Delivery Systems for Naval Maintenance and Repair" (with S. Feiner, R. Fleming, and A. van Dam), Final Report for Office of Naval Research Information Systems Division, September 1979.

"A New Medium for Technical Documentation," Sc.M. Thesis, Brown University, October 1978.

SAMUEL S. HARBAUGH Ph.D.
Box 295
Palm Bay, FL 32905
(305) 723-7983 (Home)

EXPERTISE

Real-Time Computer Systems design and implementation
Modeling, simulation, performance prediction calculations
Software engineering, structured design methodology
Technical management of large software projects

DEGREES

Carnegie - Mellon University	Ph.D. (EE)	1964
Carnegie - Mellon University	MSEE	1962
Carnegie - Mellon University	BSEE	1958

EMPLOYMENT HISTORY

Harris Corp., Gov't. Comm. Sys. Div.	Melbourne, FL	1979 - Present
Florida Institute of Technology	Melbourne, FL	1974 - 1979
Harris Corp., Controls Div.	Melbourne, FL	1969 - 1974
Allegheny - Ludlum Steel Corp.	Pittsburgh, PA	1964 - 1969
Norbatrol Electronics - Part Time	Pittsburgh, PA	1961 - 1964
Western Electric/Bell Telephone Labs	Winston-Salem, NC	1958 - 1961

EXPERIENCE

Currently at Harris Corporation, Dr. Harbaugh is in charge of a software R&D effort funded by the DoD to produce an Ada binding of the ANSI standard Graphical Kernal Standard (GKS). In addition, prototype Ada software is being produced using Telesoft Ada on IBM XT computers. Communications with customers and reviewers is conducted through VAX computers on the Defense Data Network (old ARPANET). Dr. Harbaugh conceived this project and, in conjunction with a graphics expert, submitted an unsolicited proposal for this work. Subsequent phases of funding are expected to result in ANSI standard Ada computer graphics software components for use on all DoD projects.

In July 1981, Dr. Harbaugh joined a 12 man design team formed upon receipt of the $11.7M Phase I Real Time Automatic Control Systems (RTACS) Contract. RTACS is an extensive Communications Satellite Control System involving many interconnected computers. His immediate responsibilities are the software development methodology and the requirements and design of a Software Development Facility (SDF). The RTACS software is approximately 150,000 lines of code in Ada. He is leading and actively participating in the development of Ada as a design language. The SDF involves 2 VAX computers communicating via DECNET and a set of software development, word processing and management tools. He is also responsible for technical management of the software activities of two subcontractors. His future responsibilities are expected to grow in the software area, as the project grows into a $150M Phase II.

Previous to RTACS he led an intensive 2 month, 2 man investigation into timing and sizing problems of a spacecraft ground control computer system. He performed system modeling and timing and sizing measurements using software and hardware monitoring schemes. He analyzed the performance problems and recommended redesign strategy to support first launch.

at Harris Corp., Dr. Harbaugh was chief software engineer of the Satellite Data Handling System (SDHS), a $20M system for weather forecasters at Air Force Global Weather Center, Omaha, Neb. It involves 105 color graphics displays, a 69 gigabit satellite image data base, a 900 megabyte meteorological data base and 17 CPU's inter-connected via a 20 Mbps fiber optic bus. SDHS interfaces with 10 other existing computer systems. The software includes a virtual operating system with additions for networkwide services, TOTAL data base management system and 170,000 lines of unique code programmed mainly in structured FORTRAN. As technical manager, he has been involved in all aspects of producing specifications and deliverable documentation. In addition to his technical responsibility for all software, Dr. Harbaugh has designed the system wide communications and contributed heavily in the meteorological data base area.

Previously, as Associate Professor of Electrical and Computer Engineering at Florida Institute of Technology, Dr. Harbaugh taught computer system design, computer communications, and control systems courses. He was instrumental in designing the Computer Engineering curriculum and was its coordinator. He was involved in the following funded research projects:

- Principal investigator for research of design methodology at Digital Equipment Corporation.
- Researched impact of LSI on Navy airborne weapons delivery computer.
- Researched impact of LSI on Navy avionics systems.
- Directed study of local governmental energy usage.

In addition, Dr. Harbaugh performed extensive private consulting as follows:

- DBA Systems, Inc.: Member of 3-man software design team for a $1.5M automated communications switch. His particular contribution was throughput analysis, data base design, disk access optimization and switchover/recovery. Later he coded and debugged the data base manager and disk optimizer in FORTRAN using structured programming techniques. Also, for DBA he performed software design for a test set for the multiplexer/demultiplexer portion of NASA's spacecraft tracking and data network, studied by simulation the statistical mixing of computer data and voice on telephone circuits, and participated in proposal activity for the gateway node portion of the integrated Autodin system.
- Harris Corp., Composition Systems Div.: Modeling, simulation and performance calculation of on-line newspaper text processing computer system. Design and tradeoffs, particularly, PDP-11/35 vs PDP 11/60, PDP 11/70; Cache memory effectiveness; optimum use of core I/O buffers; design of swapping for task code and workspace; disk load balancing; design of on-line statistics gathering and performance monitoring.
- Wordsmith, Inc.: System design and specification of communication protocol for portable data collection terminal.
- Harris Corp., Controls Div.: Studied technological trends of real-time computer systems in the electric utility industry.
- Documetions Inc., Docuprint Div.: Design of printwheel and carriage position control system for typewriters.
- Instructor for seminar "Applying Microprocessors to Digital Process Control" marketed nationally to practicing engineers through Penton Learning Systems. Dr. Harbaugh conceived and developed the seminar and, with a mechanical engineering co-instructor, has presented it to over 200 attendees in 10 cities.

In June, 1969, Dr. Harbaugh moved to Florida to join Harris Corp., Controls Division. He started as manager of the newly formed Product Development department, and during the next five years also held positions of Manager of Product Planning and product market manager. He was system engineer for the development of Microplex, a computerized control system for electric utilities. He instituted competitive analysis, market level and price erosion models for product lines. As manager of product planning he conceived a unique modular microprocessor based remote terminal for electric utility and pipeline supervisory control and data acquisition systems. This product is highly successful and continues to be the mainstay of all systems sold today.

Upon completion of his Ph.D. work, Dr. Harbaugh joined Allegheny - Ludlum Steel to institute computerized process control. Beginning as a solo effort on a 3-stand cold rolling mill control system, the activity grew to a group of five technical personnel putting on line eight computer control systems. This work resulted in five patents, and the establishment of a competent technical group which today continues to implement computer process control.

While doing graduate work, he served as a Consultant to Norbatrol Electronics. He was solely responsible for control systems engineering, notably on a tandem hotstrip mill control system. Graduate work was supported by an Allegheny - Ludlum fellowship. Thesis involved modeling, optimum control design, and simulation of a tandem hotstrip rolling mill.

Previous to his graduate work, Dr. Harbaugh was employed for three years by Western Electric Co. where he served as Manufacturing Engineer and Development Engineer with Bell Telephone Laboratories on various weapon system components utilizing magnetic amplifiers in control systems.

PUBLICATIONS

Predicting the Performance of an Interactive On-Line Computer System - Southeastcon '78, April, 1978.
Modeling and Simulation of a Newspaper Text Processing System - Ninth Annual Pittsburgh Conference - April, 1978
A Rolling Mill Computer Control System IFAC/IFIP Symposium, 1968
Application of DDP-116 to Basic Oxygen Furnace Control Proceedings of CAP - 1966
Modeling and Control of a Multi-Stand Hot Strip Rolling Process - ISA - October, 1965
Modeling and Control of a Multi-Stand Hot Strip Rolling Process - Doctoral Thesis, 1965

PRIVATE REPORTS

Numerous reports, product specifications, etc. on Modeling, Simulation, and On-Line Statistics Gathering.
Product plan for electric utility supervisory control and energy management computer system.
Product plan for electric utility substation remote terminal utilizing microprocessor common control.
Market analysis and competitive performance in electric utility supervisory and energy management market place.

STUDENT'S THESES (MASTER'S LEVEL)

A Remote Access Computerized Electric Utility Maintenance Information System.
Omega Phase Difference Receiver Utilizing Microprocessor Logic.
Microprocessor Implementation of Binary Synchronous Communications Protocol.
Backup Battery System for Microcomputer Based Portable Data Logger.
A Microprocessor Based Computer System Measurement Device.
Computer Network Communication Subsystem.

PATENTS

System for Automatically Decelerating a Rolling Mill, U.S. Patent No. 3,563,992.
Control System for Consumable Electrode Furnace, U.S. Patent No. 3,386,920.
Voltage Controlled Variable Frequency Relaxation Oscillator, U.S. Patent No. 3,427,562 .
Automatic Determination of ARC Furnace Operating State, U.S. Patent No. 2,432,604.
Automatic Start Circuit for Computer, U.S. Patent No. 3,470,538.
Inverter Circuit with Variable Saturable Reactor Frequency Control, U.S. Patent No. 3,253,325.

PERSONAL

D.O.B. 2/17/37; Holds current FAA 3rd class medical certificate, private pilot license, and secret clearance.

RICHARD J. HARRINGTON

Mr. Harrington is a senior computer scientist at Software Architecture and Engineering, Inc. His experience includes senior technical and management positions in computer hardware, high level language, and operating systems development projects, as well as research projects in a variety of areas of computer science.

Mr. Harrington's previous position was in the Naval Material Command's Tactical Embedded Computer Program Office where he served from 1979 to February, 1983 as the Chief of Naval Material's senior acquisition and policy manager for embedded computer hardware. He developed the Naval Material Command's policy for all areas of embedded computer hardware use in tactical digital systems. In addition, he was responsible for overall Naval Material Command planning and execution of militarized computer hardware development programs, including:

- AN/UYK-43 Navy Embedded Computer System (NECS)
- AN/UYK-44 Militartized Reconfigurable Processor (MRP) and Computer (MRC)
- AN/UYS-2 Enhanced Modular Signal Processor (EMSP)
- Next generation Navy Embedded Computer Program (NECP)
- Advanced Multiplatform Embeddable Computer (AMEC)

Mr. Harrington's other experience as a civilian with the U. S. Navy at the Naval Research Laboratory and the Naval Sea Systems Command includes the following:

- Program/acquisition manager and principal engineer for the AN/UYK-44 parallel full scale development program. Previously led the design team that developed AN/UYK-44 specifications and acquisition package.

- Member of the design teams that developed the AN/UYK-43 and AN/UYS-2 specifications and acquisition packages.

- Led the design team that developed the performance specification for the standard executive for the AN/UYK-20, AN/AYK-14, and AN/UYK-44 computers (SDEX/M).

- Program/acquisition manager and chief scientist for the SPL/I high-level language and Common Real-time Operating System (CROS) developments for the AN/UYS-1 Advanced Signal Processor (ASP).

From 1970 to 1976, Mr. Harrington was at Brown University in Providence, RI as a project supervisor and research associate in the areas of distributed processing, computer architecture, communications, computer graphics, text processing, and operating systems.

Mr. Harrington received his ScB (magna cum laude) and ScM degrees in Applied Mathematics from Brown University. He is a graduate of the Program Management Course at the Defense Systems Management College.

THOMAS J. HOGAN

Mr. Hogan has over eight years experience in data processing, including government, military, commercial, and medical applications. He has programmed PDP-11, PDP-15, DEC system 10, Honeywell 6060, GE635, and Univac 1108 computers. He is familiar with the RSX-11D, GCOS III, and EXEC-8 operating systems, the IDS, System 1022, and MIIS data base management systems, and FORTRAN, COBOL and PDP-11 assembler programming languages.

At INCO, Mr. Hogan currently serves as the Command Support department manager. In this capacity he is responsible for the technical and administrative management of the USREDCOM, QASIS, and MAC projects. Specific duties concern the monitoring of project resources and assuring that all contract deliverables (CDRL Items) and development work (SOW items) are completed in accordance with contract requirements. Prior to his appointment as department manager, Mr. Hogan served as the Project Manager for MAXI.

Previously at INCO, INC., Mr. Hogan was assigned to the enhancement of the Standard Software Base (SSB). He served as the development task leader for all new SSB software. Software developed includes new network interfaces at USAFE and to the DIAOLS; an SSB interface to the NMIC MSS and the unification of CATIS and SSB software. He was also responsible for a group of programmers upgrading SSB applications to utilize improved data structures and to provide improved interfaces to the terminal users. For this effort, Mr. Hogan designed a new and efficient technique for maintaining queues of messages for each system user, including a dramatic increase in the number of messages that may be stored in each queue and provision for more flexible access. He also personally coded and tested an improved message editing SSB application program, utilizing the capabilities of the Terminal Transparent Display Language (TTDL) and cathode ray tube (CRT) terminals to provide a sophisticated and streamlined user interface. In addition, Mr. Hogan has converted several other SSB application programs, and has written several SSB global routines used by all programs within the system.

During 1977, Mr. Hogan was with COMPU-SERV Data Systems, Inc., as an account representative and was responsible for technical assistance to government accounts in the Washington, D.C. area. Specific programming accomplishments included a generalized recovery utility for System 1022 data bases and a government budget reporting system. Programming languages used were FORTRAN and COBOL on the DEC system 10.

Previously at INCO, INC., Mr. Hogan was assigned as a programmer/analyst on the staff developing the Army Standard Ground Order of Battle System (ASGOBS). His major accomplishments involved the analysis of user requirements and publication of the System Specifications for the ASGOB System as well as the Data Base

Specification for the system. Programs were written in FORTRAN and COBOL/IDS for the Honeywell 6060.

During 1976 he was employed as a programmer by the Systems and Applied Sciences Corporation (SASC). His duties included flow-charting, coding, debugging and testing of subprograms of an Update/Retrieval Utility system for Honeywell-IDS data bases. The system objective was to provide selective field retrieval and updating with the capability of running in either batch or time-sharing modes. The Utility was required to interface wth both IDS and IDS QUERY subroutines. All programs were developed using COBOL in TSS under GCOS III. His responsibilities also included writing, to military specifications, all technical documentation for the Utility.

From 1974 - 1975, Mr. Hogan was a programmer and operator at Medical Information Technology, Inc. (Meditech), Riverdale, Maryland. Meditech uses an in-house Operating System, MIIS (Meditech Interpretive Information System) which runs on two PDP-15 computers. Meditech operates in a teleprocessing environment with all customers using the system from remote access terminals. MIIS is a dedicated real-time system driven by its data files. All files are maintained in a linked tree structure on disk. Mr. Hogan's duties consisted of maintaining customer accounts, operating and troubleshooting both machines, and documenting all night activities of the installation.

Mr. Hogan earned his B.A. in Political Science from the University of Maryland.

ROBERT EMILE JOSEPH

Ph.D., Electrical Eng., University of Maryland, 1974
M.S., Electrical Eng., University of Maryland, 1972
B.S., Electrical Eng., George Washington University, 1970
Aeronautical Engineering, Princeton University, 1968

Dr. Joseph is Deputy Director of the California Systems Engineering Division of TITAN Systems, Inc. As such, he is responsible for the introduction and utilization of "state of the art" technologically advanced products. Areas of application include hardware and software development, total systems integration, systems architecture, networking, fault tolerant computing, artificial intelligence, communications, modeling, simulation, and graphics software.

Currently, Dr. Joseph is directing commercial and military programs in the areas of real-time battle simulation graphics, artificial intelligence, office automation, distributed C^3 processing and network architectures, and computer analysis in the areas of surveillance, target acquisition, tactical missiles and air-land battle.

Prior to joining TITAN, Dr. Joseph was manager of the Advanced Design Division of Science Applications, Inc., where he incorporated technologically advanced capabilities in the areas of: hardware and software microcomputer applications; the design and implementation of a security control system; the development of a distributed C^3I architecture; and the conception and development of a number of special purpose applications including a data acquisition and inventory control management information system (MIS).

Prior to joining SAI, he served as Chief of the Technical Services Division of the Bureau of the Census where he directed and administered the design, development, and construction of electronic, electromechanical and specialized photographic equipment for the Bureau and other agencies.

He represented the Bureau in negotiations and service agreements to provide technical services for other government agencies and foreign governments.

Dr. Joseph was also responsible for the evaluation and implementation of data capture, data entry, and communication systems to ensure utilization of "state of the art" technology in the Bureau's survey processing methodologies; the institution and direction of research and development efforts in the areas of telecommunications, distributed processing, and microprocessor based systems to enhance Bureau processing methodologies and provide a distributed nationwide network to offload edit, graphics, and analytical capabilities from the mainframes. He was involved in the development and implementation of automated microfilm systems and information retrieval systems utilizing archival media; the development, construction, implementation, and field support for all data capture, communications, and microfilm equipment related to the 1980 Decennial Census and the 1982 Agriculture-Economic Census; the development of microcomputer based systems and networks for use in several Bureau data collection surveys; the development, implementation, and technical support of all hardware and software necessary for the Bureau's advancements in data collection methodologies.

Dr. Joseph has received a number of awards and honors for his efforts, including both the Gold and Silver medals from the U.S. Department of Commerce.

Thomas S. Kaczmarek

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Los Angeles, California 90020
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Experience

USC/Information Sciences Institute

Project leader for CUE, a project to provide a consistent underlying environment for software services. This project applys artificial intelligence techniques to software engineering and user interface design. (1982-present)

General Motor Research Laboratories

Initiated and led a four person project on speech technology. Project included work on development of a method for speaker independent recognition, a flexible speech synthesis system, human-factors of speech systems, and industrial applications of speech technology. (1977-1982)

University of Pennsylvania

Designed and developed a new environment for experimentation in digital speech synthesis, phonetics, and phonology. Set up a laboratory and managed a small staff of programmers. Did research on the real-time control of graphic animation and specifying security for an on-line data base manipulation system. Taught several courses as a teaching fellow. (1970-1977)

Marquette University and Brown Deer High School

Taught mathematics. (1968-1970)

Wayne State University, Oakland University, and UCLA

Taught various upper-division undergraduate computer science courses as adjunct faculty. (1971-present)

Education

University of Pennsylvania

- Ph.D. in Computer and Information Sciences 1974-1977--Dissertation Topic: Computational aspects of speech synthesis.
- MSEE in Computer and Information Sciences, 1970-1974--Thesis Topic: The design of a developmental system for the automatic acquisition of English.

Marquette University

- Graduate work in mathematics 1969-1970.

University of Wisconsin-Whitewater

- Bachelor of Science with high honors in mathematics 1964-1968.

Awards, Honors, and Society Memberships

Elected to Who's Who in American Colleges and Universities (1968).

Battalion Commander's Award, ROTC training camp Fort Benning, Georgia (1969).

Ford Fellow at the University of Pennsylvania (1970-1972).

Member ACM, IEEE, and SIGMA XI. Member of Accoustics, Speech and Signal Processing subgroup of the IEEE and served on IEEE-MPA-TC Subcommittee on Speech Recognition and Understanding. Co-organizer for session on speech technology at 1980 Congress for the Society of Automotive Engineers. Served on various technical committees within GM and was chairman of the computer science department's Research Awareness Committee. Selected to attend internal GM course for technical managers. Member of planning committee for IJCAI-85.

Personal

Born: April 17, 1946 Milwaukee Wisconsin; Married with one child; Honorably discharged from the US Army (reserves) with rank of first lientenant; Interests include woodworking, photography, pottery, and active sports--especially tennis.

Publications

"The CUE System," with William Mark and David Wilczynski to be presented at SOFTFAIR '83, Washington DC, July 26-28.

"The CUE/Consul Interface: An Integrated Interaction Environment," with William Mark and Norman Sondheimer, to be presented at CHI '83, Boston, December 12-15.

"A Speaker Independent Isolated Word Recognition System for Restricted Vocabulary Applications", Submitted to IEEE Acoustics Speech and Signal Processing.

"A Procedural Approach to Synthesis by Rule," Proceedings of the International Conference on Acoustics, Speech, and Signal Processing, New Haven, Conn., 1977.

"A Flexible Real-Time Digital Speech Synthesis Facility," with Steven Smoliar, Proceedings of the International Conference on Acoustics, Speech, and Signal Processing, New Haven, Conn. 1977

"MEDEC - A Methodology for Event Description," with Steven Smoliar, University of Pennsylvania, UP-CIS-77-51, 1977.

"LISP 7/16 - Implementation Report," University of Pennsylvania, UP-CIS-76-34.

"LISP 7/16," a LISP interpreter distributed by the Interdata user's group, 1976.

"Windows of the City," a computer generated film produced at The University of Pennsylvania, 1975.

"An Experiment in Interaction between Independent Music and Graphics Processors", with Stephen Smoliar, SIGGRAPH '75, Bowling Green, Ky. 1975.

DR. STANLEY A. KLEIN SYSTEMS ENGINEER

Education:

B.E.S., The Johns Hopkins University, Electrical Engineering	-1959
M.S.E., The Johns Hopkins University, Electrical Engineering	-1965
D.Sc., The George Washington University, Operations Research	-1975

Experience:

1979- ORI, Inc. . . . . .Senior Scientist

Developing system performance feasibility and software cost estimates for a Restricted Access Processor (RAP). The RAP will validate communications between unclassified users and a computer facility serving a joint NASA/DOD requirement. Prepared a requirements analysis and development strategy for a data base and analysis system to support concept planning for future remote sensing systems. Prepared a hardware/software concept and implementation plan for a technical analysis system and coordination data base to support satellite interference management. Reviewed the computer operations of an energy consulting firm, identified management and technical issues, and recommended a solution approach.

Directed development of pilot central directory and system engineering data base for NASA's Application Data Service. ADS will be a computer network providing simplified access to collections of Earth-related data. Contributed to a study of future technology and architectural alternatives for NASA communications. Contributed and directed efforts supporting the replacement of NASA's 360/95 Flight Dynamics system, including development of workload requirements, sizing information and a baseline repository of application programs. Contributed to a sizing study on a processing system for oceanographic satellite data.

1967-79 Computer Sciences Corporation

1973-79 Principal Engineer/Senior Principal Engineer

Performed and directed mathematical modeling, economic analysis, and optimization studies of computer/communications systems for a wide range of applications.

Was project manager of a study to develop data management architectural guidelines for the computer/communications networks performing real-time system optimization and security monitoring of electric utilities. Directed a study to identify exploratory research needs to support future development of a flexible, multi-media, dynamically reconfigurable transparent Navy C^3 network to serve over-the-horizon weapon applications.

DR. STANLEY A. KLEIN SYSTEMS ENGINEER

Memberships:

Institute of Electrical and Electronics Engineers
IEEE Computer Society
IEEE Communications Society
IEEE Power Engineering Society
IEEE Systems, Man, and Cybernetics Society
Operations Research Society of America
The Institute of Management Sciences
Association for Computing Machinery
American Statistical Association
Washington Operations Research/Management Science Council
American National Standards Institute Committee X3T5.5
(on upper layer architecture for Open Systems Interconnection)

Publications: (partial listing)

"Phase slipping in phase-locked loop configurations that track biphase or quadriphase modulated carriers," IEEE Transactions on Communications, October 1972 (with L.C. Palmer).

"Adaptive multibeam concepts for traffic management satellite systems," 1973 International Conference on Communications, June 1973 (with J.J. Bisaga and H.A. Blank).

"Satellite-based oceanic ATC system configurations for ground-segment cost savings," 1974 Air Traffic Control Association Convention, November 1974.

"Monte Carlo estimation in complex optimization problems," D.Sc. dissertation, The George Washington University, September 1975.

"Application of message store-and-forward techniques to the AEROSAT system," 1976 National Telecommunications Conference, November 1976 (with H.A. Blank).

"A model for projecting future FAA communications costs," 1977 TIMS/ORSA Joint National Meeting, May 1977 (with S.C. Novikoff, E.M. Boseck, and J. M. Rodgers).

"Queuing disciplines in computer-communications networks," 1978 TIMS/ORSA Joint National Meeting, May 1978.

"A hybrid random access/polling discipline for computer-communications network control," 1978 TIMS/ORSA Joint National Meeting, May 1978.

"A method for statistically estimating the optimum cost of a computer-communications network," 1979 TIMS/ORSA Joint National Meeting, May 1979 (with T. L. Kao).

"Impact of technology trends on control center data communications," presented at 1980 Workshop on Real-Time Monitoring and Control of Electric Power Systems, October 1980.

RESUME

John Frederick Kramer, Jr.
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Alexandria, VA 22302

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Office - (703) 845-2263

EDUCATION

Brown University	9/57-6/61	A.B. Economics
University of Wisconsin (Madison)	1/70-5/71	M.S. Computer Science
University of Wisconsin (Madison)	5/71-5/73	Ph.D. Computer Science

(Ph.D. Major-Computer Science, Ph.D. Minor-Operations Research; Computer Science Primary area-Operating Systems, Secondary area-Artificial Intelligence)

PRESENT EMPLOYMENT

November 1983 to present - Research Staff member, Institute for Defense Analyses, Computer and Software Engineering Division (CSED). Principally responsible for the growing IDA support for the DoD Ada program and technical support of the WWMCCS Information System upgrade and the DoD Software Technology for Adaptable and Reliable Systems (STARS) program. In general, I provide policy analysis and technical planning to the Ada Joint Program Office (AJPO), DUSD (R&AT) and serve as the principal source of technical expertise in the areas of Ada Programming Support Environments (APSE), tools and related standards.

EMPLOYMENT HISTORY

4/83 - 10/83 - Consultant for Institute for Defense Analyses. Provided technical analysis, policy formulations and program planning related to DoD Ada Programming Support Environment (APSE) development and standardization efforts. I was a major contributor to the planning for a new AJPO initiative to develop the technology to evaluate and validate the APSE, and to establish Ada compatible Life Cycle Software methodologies for DoD and Service use. I was one of the principal designers of the proposed DoD MIL-STD Common APSE Interface Set (CAIS) designed to provide a virtual interface on which software tools can run and be moved from one Host Computer system to another. This is necessary if costly DoD tools can be justified based on the cost amortization of use across many systems.

RESUME Dr. J.F. Kramer, Jr.

3/81 - 3/83 - Navy Deputy Director, Ada Joint Program Office (AJPO), Office of the Deputy Under Secretary of Defense for Research and Engineering (Research and Advanced Technology), Washington, D.C. and Ada Program Liaison, Headquarters, Naval Material Command, Washington, D.C. Tactical Embedded Computer Program Office (TECPO).

Ada is the new standard DoD Computer language for mission critical computer applications. I was responsible for all planning, technical, political and management aspects of the internationally visible tri-service AJPO program plan dealing with automated Ada Programming Support Environments (APSEs). I authored that section of the plan, maintained it, and made sure that it was being executed in the Tri-service environment. Within the Navy, I was responsible for the introduction and use of Ada. During this time I was the US representative to various NATO working groups and Experts Groups on Ada. I was the principal author of the technical sections of the NATO WG report dealing with Ada as a potential standard for NATO Command and Control Systems. Based on the report, NATO adopted Ada as the standard for all NATO funded Command and Control Systems starting in 1985.

Other Ada related initiatives started and directed by me during this time were the Kernel Ada Programming Support Environment (KAPSE) interface standardization effort to ensure that the investments in software tools can be amortized over a large number of APSE installations. If successful, the KAPSE effort will probably have a larger impact on DoD's life cycle software costs than the language standardization effort itself. I established and exercised technical management over the following highly technical and not understood Ada support areas : work on Metrics for Ada developments, Software component libraries, Ada runtime systems, Evaluation and Validation of Environments, The development of Ada life-cycle methodologies and a taxonomy of tools. I had to look at problems from many different aspects at the same time and make decisions or recommendations even though there are always conflicting goals to meet at the program manager, Navy, OSD, NATO or company level.

1/80 - 3/83 - System Architect (Deputy SA), Chief of Naval Operations (OP-16)

When the GS-15 System Architect unexpectedly left the government, I was asked to take the job, help select my replacement, and then stay on as his deputy until he learned the job. I was responsible for the formulation and implementation of policy and methodologies for providing ADP information support for all Manpower, Personnel and Training Systems throughout the Navy. In particular, I provided the needed technical and management support for a major computer upgrade in support of OP-01 and all field activities as

well as the Navy's international distributed automated Personnel Support System (PASS).

I had to develop innovative practical solutions to daily problems by applying my academic and practical experience and often spent as much as 1/2 of my time on matrix teams because of my unique ADP technical, planning and management experience. During this period I was the principal author of the MAPTIS Architecture Plan which was the technical management plan for all MP&T ADP systems in the NAVY. I provided the technical direction, standards and methodologies used by more than 550 programmers and analysts and was personally responsible for the technical input to the development of an OP-01 methodology which included budgeting, planning as well as software life cycle.

5/78 - 12/79 - Director, CORE Software System Division, Bureau of Naval Personnel, Washington DC.

I was asked to establish a division with three branches, a total of approximately 60 government system programmers and over 20 contractors. After establishing the division I was asked to select the personnel, including 3 GS-14's and then provide management and technical guidance for over a year. I defined the organizational responsibilities, wrote approximately 60 position descriptions, and then had them classified. Although I was the most inexperienced manager of civilian personnel, my part of the reorganization was the most professionally done and the only organization to obtain approval of all positions at the desired level.

The division was responsible for all operating systems, data base management systems, distributed processing systems and a packet switched network in support of the Bureau of Naval Personnel and its support activities in New Orleans and other locations throughout the U.S. During this period I provided technical direction, management and planning for a successful consolidation of the New Orleans and Washington ADP systems. The consolidation required extensive changes with many unique and highly complex hardware and operating system problems to overcome and the design of a highly complex software interface for the Washington and New Orleans computer centers. I was responsible for initiating and technically directing the Bureau's pioneering in the areas of distributed processing, minicomputer networks and integrated data management usage.

1/75 - 4/78 - System Architect, Future System Project Office (FSPO) Naval Personnel Support Activity and the Bureau of Naval Personnel, Washington DC.

RESUME Dr. J.F. Kramer, Jr.

At various times I was also double hatted as Head, Planning and Control Branch and Head, Computer Systems Design Branch. I personally was selected for the AJPO position to provide Ph.D. level practical technology insertion as well as first hand experience with shipboard personnel support requirements. As System Architect I was responsible for the technical direction, standards and methodologies used by over 100 people. I was responsible for the technical quality of the upgrades, replacements or new capabilities provided for software inventoried at between $25-40 Million.

I was responsible for configuration management and technology upgrade of the Navy's military and civilian manpower and personnel management information systems in which a very traditional batch oriented ADP system was started towards state-of-the art teleprocessing, integrated data base management, security, and other system features required to support the new privacy act requirements. During the period, I had the opportunity to design, formally define and implement a multi-computer, machine independent, packet switched distributed processing network. I did the technical design of all of the network software, and in order to overcome the IBM communications overhead, I personally wrote the operating system software for an Interdata 7/32 minicomputer and the IBM 370 to make the 7/32 look like a set of 8 infinite tape drives to the IBM.

6/61 - 3/83 - ACTIVE DUTY U.S. NAVY

6/81 - 3/83 - Headquarters, Naval Material Command, Washington DC
Navy Deputy Director, Ada Joint Program Office, Office of the Deputy Under Secretary of Defense for Research and Engineering (Research and Advanced Technology).

4/79 - 5/81 - Chief of Naval Operations
System Architect (OP-160), Director Core Software System Division, Head, Support System Branch.

1/78 - 4/79 - Navy Military Personnel Support Activity, Washington
Future System Project Office (FSPO) System Architect, Head. Development Support Branch; Head Computer Systems Design Branch.

8/75 - 1/78 - Naval Personnel Support Activity (DC)
ADP Plans; Head, Developement Management Branch; System Architect, (FSPO)

5/73 - 6/75 - USS Nimitz(CVAN 68) Precommissioning Crew
Shipyard Coordinator, Maintenance and Material Officer, Command Duty Officer, Sea Trial Officer of the Deck, Officer of the Deck Training Officer.

RESUME Dr. J.F. Kramer, Jr.

3/74 - 6/74 - USS Forestal (CVA 59) TAD
Maintenance and Material Officer, Officer of the Deck

1/70 - 3/73 - University of Wisconsin, Madison
Student MS and PH.D. in Computer Science

2/68 - 12/69 - US Naval Postgraduate School, Monterey California
Student Engineering Science and Computer Science. Promoted to LCDR 1 July 1969

2/66 - 1/68 - USS Adroit (MSO 509)
Executive Officer, Navigator, Administrative Officer

1/64 - 1/66 - USS Forrest Sherman (DD 931)
Department Head, Engineering Officer (1200PSI), Anti-submarine Warfare Officer of the Deck, Command Duty Officer, Fire prevention Officer, Safety Officer. Promoted to LT 1 March 1965

7/63 - 12/63 - US Naval Destroyer School, Newport, RI
Surface Warfare Officer School, Department Head Course.

4/63 - 6/63 - USS Fred T. Berry (DD 858)
Assistant Engineering Officer, Officer of the Deck.

7/61 - 3/63 - USS Mount Mckinley (AGC-7)
Officer of the Deck, Navigator, Electronic Warfare Watch Officer, Combat Information Center Watch Officer, Division Officer/Command Duty Officer.

9/57 - 6/61 - Naval Reserve Officer Training Course, Brown University, Providence, RI. Commissioned, Ensign U.S. Navy -- 7 June 1961

PUBLICATIONS

Numerous strategy documents, working papers, position papers and technical discussions. Some of the topics covered dealt with a limited budget and the two existing APSE Environments, a proposed Evaluation and Validation task and a proposed Methodology task to be initiated by the AJPO. Such working documents probably numbered 5 to 10 a month between 1973 and 1983.

"Common APSE Interface Set (CAIS)," Version 1.1, CAIS Working Group, 30 September 1983.

"Parlez-Vous Ada? An Update on DoD's Efforts to Advance Ada as a Standard Computer Language," Fonash, Kramer, Mall, Mathis; Program Manager, Vol. III, No. 4, July-August 1983.

RESUME Dr. J.F. Kramer, Jr.

"Ada Status and Outlook", J.F. Kramer, Jr., AGARD Conference Proceedings No. 330--Software for Avionics, The Netherlands, 6-10 September, 1982

"Ada Program, 1982 Update"; Fonash, Kramer, Mall, Mathis; AJPO internal document.

"Ada Program Plan", Programming Support Environment section. AJPO Staff

"OP-01 Architecture Plan", original version, 1980 and revision 1981, principal author of the Computer Science related technical and management sections.

Thesis: "A General Structure for Uncooperative Processes Distributed over a System Network," University of Wisconsin, May 1973

"A General Network Structure", John F. Kramer and D.R. Fitzwater, Computer Science Conference, Columbus, Ohio, Feb 20-22, 1973

PROFESSIONAL INTERESTS

I am a member of SIGMA XI (the Scientific Research Society of North America), IEEE (the Institute of Electrical and Electronic Engineers), ACM (the Association for Computing Machinery), and AdaTEC, the Washington Chapters of ACM and AdaTEC and IEEE.

My interests lie in the area of life-cycle programming and management support environments, Data Base management systems, Operating Systems, networks involving parallel and distributed processing, and the application of Artificial Intelligence technology to life cycle tools for DoD MMCS systems.

AWARDS

Meritorious Service Medal with Gold Star -- February 1983 -- Navy Deputy Director, AJPO for work in Ada Programming Support Environment development and standardization

Meritorious Service Medal -- October 1977 -- "exceptional leadership, technical knowledge and exacting performance" resulting in the successful implementation of a distributed processing minicomputer network.

Robert E. Larson, Chief Executive Officer and Chairman of the Board

Robert E. Larson received his S.B. degree from M.I.T. in 1960 and his M.S. and Ph.D. degrees from Stanford in 1961 and1964, respectively, all in Electrical Engineering.

His fields of specialization are dynamic programming, applications of control and estimation theory, and distributed data processing. He is the author of State Increment Dynamic Programming (1968), Principles of Dynamic Programming (1977), and Distributed Control (1979). He has also written over 140 technical papers.

Dr. Larson joined Optimization Technology, Inc., as its Chief Executive Officer and Chairman of the Board in May of 1983.

In 1968, Dr. Larson and two colleagues founded Systems Control, Inc., in Palo Alto, California, where he served as Technical Director, Corporate Vice President, and President. He previously worked at IBM, Hughes Aircraft, and SRI International.

Since 1973, Dr. Larson has been a Consulting Professor in the Engineering-Economic Systems Department at Stanford University.

Dr. Larson has received several awards for his work, including the IEEE Group on Automatic Control Best Paper Award in 1965 and the 1968 Donald P. Eckman Award for outstanding achievement in the field of automatic control from the American Automatic Control Council. He was named the Oustanding Yound Electrical Engineer for 1969 by Eta Kappa Nu, and he became a Fellow of IEEE in 1973.

Dr. Larson has been very active in the IEEE. He has served the IEEE Control Systems Society in a number of capacities, including President in 1975 and 1976. He was IEEE Division I Director in 1978 and 1979 and IEEE Vice President for Technical Activities in 1980 and 1981. He served as President of IEEE during 1982. He continues to serve on its Executive Committee and Board of Directors during 1983.

A representative list of Dr. Larson's papers is given below:

1. "Dynamic Programming with Reduced Computational Requirements," IEEE Trans. Auto. Control, Vol. AC-10, No. 2 (April 1965), pp. 135-143.
2. "A Dynamic Programming Approach to Trajectory Estimation" (with J. Peschon), IEEE Trans. Auto. Control, Vol. AC-11, No. 3 (July 1966), pp. 537-540.
3. "A Survey of Dynamic Programming Computational Procedures," IEEE Trans. Auto. Control, Vol. AC-12, No. 6 (December 1967), pp. 767-774.
4. "Application of Dynamic Programming to the Prelaunch Calculation in a Missile Defense System" (with W.G. Keckler), Joint Automatic Control Conf., University of Michigan, Ann Arbor, Michigan (June 1968).
5. "Dynamic Programming Applications to Water Resource System Operation and Planning" (with W.G. Keckler), J. Math. Analysis and Applications, Vol. 24, No. 1 (October 1968), pp. 80-109.

6. "Optimization of Natural-Gas Pipeline Systems via Dynamic Programming" (with P.J. Wong), IEEE Trans. Auto. Control, Vol. AC-13, No. 5 (October 1968), pp. 475-481.
7. "A Dynamic Programming Successive Approximations Technique with Convergence Proofs, Part I: Description of the Method and Applications" (with A.J. Korsak), Automatica, Vol. 6, No. 2 (March 1970), pp. 245-252.
8. "A Dynamic Programming Successive Approximations Technique with Convergence Proofs, Part II: Convergence Proofs" (with A.J. Korsak), Automatica, Vol. 6, No. 2 (March 1970), pp. 253-260.
9. "State Estimation in Power Systems, Part i: Theory and Feasibility" (with W.F. Tinney and J. Peschon), IEEE Trans. Power Apparatus and Systems, Vol. PAS-89, No. 3 (March 1970), pp. 345-352.
10. "State Estimation in Power Systems, Part II: Implementation and Applications" (with W.F. Tinney, L.P. Hajdu, and D.S. Piercy), IEEE Trans. Power Apparatus and Systems, Vol. PAS-89, No. 3 (March 1970), pp. 353-359.
11. "Dynamic Programming for Expansion Planning of Nuclear Power Generation Systems" (with F.J. Rees and J.P. Nichols), Am. Nuclear Society Trans., Vol. 13, No. 1 (June-July 1970), pp. 37-38.
12. "Dynamic Programming for Expansion Planning of the Fuel Reprocessing Industry" (with F.J. Rees and J.P. Nichols), Am. Nuclear Society Trans., Vol. 13, No. 1 (June-July 1970), pp. 38-39.
13. "A Dynamic Estimator for Tracking the State of a Power System" (with Atif S. Debs), IEEE Trans. Power Apparatus and Systems, Vol. PAS-89, No. 7 (September-October 1970), pp. 1670-1677.
14. "Computer-Aided Dispatching and Operations Planning for an Electric Utility with Multiple Types of Generation" (with F.J. Rees), IEEE Trans. Power Apparatus and Systems, Vol. PAS-90, No. 2 (March-April 1971), pp. 891-899.
15. "Dynamic Programming for Stochastic Control of Discrete Systems" (with L. Meier and A.J. Tether), IEEE Trans. Auto. Control, Vol. AC-16, No. 6 (December 1971).
16. "Parallel Processing Algorithms for the Optimal Control of Nonlinear Dynamic Systems" (with E. Tse), IEEE Trans. Computers, Vol. C-22, No. 8 (August 1973), pp. 777-786.
17. "Dynamic Programming and Parallel Computers" (with John Casti, and Mark Richardson), J. Optimization Theory and Applications, Vol. 12, No. 4 (October 1973), pp. 423-438.
18. "Application of Stochastic Control Theory to Resource Allocation Under Uncertainty" (with Y. Bar-Shalom and M.A. Grossberg), IEEE Trans. Auto. Control, Vol. 19, No. 1 (February 1974), pp. 1-7.
19. "Decomposition of Mathematical Programming by Dynamic Programming" (with P.L. McEntire and C.Y. Chong), presented at the Second Lawrence Symposium on Systems and Decision Sciences, University of California, Berkeley, California (October 1978).
20. "A Global Optimality Theorem for Spatial Dynamic Programming" (with P.L. McEntire and C.Y. Chong), presented at the Second Lawrence Symposium on Systems and Decision Sciences, University of California, Berkeley, California (October 1978).
21. "Development of a Unified Approach for System Requirements Engineering" (with .awrence E. Berman, Thomas L. Steding and Gene Hilborm), presented at the IEEE Computer Society's Third International Conference on Programming and Applications (COMPSAC 70), Chicago, Illinois (November 1979).

22. "Distributed Resource Allocation via Dynamic Programming" (with Paul L. McEntire), International Computer Symposium, Taipei, Taiwan (December 1980).
23. "Real-time Control in Distributed Systems," IEEE Computer Society Real-time Systems Conference, Miami, Florida (December 1981).
24. "Distributed Processing, Software Engineering, and Decentralized Control: The Technologies for a New Generation of Computer Systems," presented at IEEE Conference on Decision and Control, Orlando, Florida (December 1982).

David G. Luenberger, Consultant

David G. Luenberger was born in Los Angeles, California, on September 16, 1937. He received the B.S. degree from the California Institute of Technology, Pasadena, in 1959, and the M.S. and Ph.D. degrees from Stanford University, Palo Alto, California, in 1961 and 1963, respectively, all in Electrical Engineering.

Since 1963, he has been on the faculty of Stanford University, where presently he is Professor and Chairman of Engineering-Economic Systems and Professor (by courtesy) of Electrical Engineering. He is also affiliated with the Department of Operations Research. His activities are centered primarily in the graduate program, where he has taught courses in optimization, dynamic systems, mathematical programming, and economics. His research areas have included observability of linear systems, the application of functional analysis to engineering problems, optimal control, mathematical programming, planning methodology, dynamic systems, and systems economics.

His current research is in the areas of optimization and dynamic systems.

From 1971 to 1972 Prof. Luenberger was Technical Assistant to the Director in the Office of Science and Technology, Executive Office of the President. There he assisted the President's science adviser in the formulation of Federal research policy in the areas of civilian technology and system analysis.

During 1976 he was Visiting Professor of Electrical Engineering at the Massachusetts Institute of Technology.

His past experience includes service as a consultant to Westinghouse, Stanford Research Institute, Systems Control, Inc., Intasa, Inc., the President's Office of Science and Technology, and to Congress's Office of Technology Assessment. He is the author of Optimization by Vector Space Methods (Wiley, 1969), Introduction to Linear and Nonlinear Programming (Addison-Wesley, 1973), and Introduction to Dynamic Systems (Wiley, 1979), and has authored and co-authored over 50 technical papers on various aspects of system analysis.

Prof. Luenberger is a Fellow of the Institute of Electronic and Electrical Engineers, and his other national society affiliations include the Operations Research Society of America, the Econometric Society, the Institute of Management Science, and the American Society for Engineering Education. He is also a member of the Sigma Xi and Tau Beta Pi societies.

BOOKS

Optimization by Vector Space Methods, John Wiley & Sons, Inc., 1969.

Introduction to Linear and Nonlinear Programming, Addison-Wesley, Inc., 1973.

Introduction to Dynamic Systems, John Wiley & Sons, Inc., 1979.

PAPERS

Professor Luenberger has published over 50 papers, of which a few applicable examples are given below.

1. "Observing the State of a Linear System," IEEE Trans. Military Electronics, April 1964, pp. 74-80.
2. "A New Derivation of the Quadratic Loss Control Equation," IEEE Trans. Auto. Control, AC-10, April 1965, pp. 202-203.
3. "A Generalized Maximum Principle," Recent Advances in Optimization Techniques (Lavi, Vogl, eds.), J. Wiley, 1966, pp. 323-339.
4. "Invertible Solutions to the Operator Equation TA-BT = C," Proc. Am. Math. Society, Vol. 16, No. 5, December 1965, pp. 1226-1229.
5. "Observers for Multivariable Systems," IEEE Trans. Auto. Control, AC-11, 2, April 1966, pp. 190-197.
6. "Canonical Forms for Linear Multivariable Systems," IEEE Trans. Auto. Control, AC-12, 3, June 1967, pp. 290-293.
7. "Design of Multivariable Feedback Systems" (with B.D.O. Anderson), Proc. IEEE, Vol. 114, No. 3, March 1967, pp. 395-399.

8. "Solution of Optimal Control Problems by the Method of Conjugate Gradients" (with J. Sinnott), Preprints 1967 Joint Automatic Control Conf., pp. 566-573.
9. "Tracking of Goal Seeking Vehicles," IEEE Trans. Auto. Control, AC-13, February 1968, pp. 74-77.
10. "Convex Programming and Duality in Normed Space," Record of the IEEE Systems Science and Cybernetics Conf., October 1967. Also published in IEEE Trans. Systems Science and Cybernetics, SSC-4, July 1968, pp. 182-188.
11. "Quasi-Convex Programming," SIAM J. Applied Math., Vol. 16, September 1968, pp. 1090-1095.
12. "A Primal-Dual Method for the Computation of Optimal Control," presented at the 2nd International Conference on Computing Methods in Optimization Problems, San Remo, Italy, September 9-13, 1968. Also in Computing Methods in Optimization Problems, Vol. 2 (Zadeh, Neustadt, Balakrishnan, eds.) (Academic Press, 1969), pp. 223-233.
13. "Differential Games with Imperfect State Information" (with I.B. Rhodes), IEEE Trans. Auto. Control, AC-14, February 1969, pp. 29-38.
14. "Reducing the Memory Requirements of Dynamic Programming" (with P. Wong), Operations Research, Vol. 16, No. 6, pp. 1115-1125, 1968.
15. "Stochastic Differential Games with Constrained State Estimators" (with I.B. Rhodes), IEEE Trans. Auto. Control, AC-14, October 1969, pp. 476-481. Also in Preprints 1969 Joint Automatic Control Conf., pp. 539-544.
16. "Control Problems with Kinks," Preprints 1970 Joint Automatic Control Conference, pp. 343-348. Also in IEEE Trans. Auto. Control, AC-15, 5, pp. 570-575, 1970.
17. "The Synthesis of Regulator Logic Using State-Variable Concepts" (with Arthur E. Bryson, Jr.), Proc. IEEE, Vol. 58, No. 11, pp. 1803-1811, November 1970.
18. "Cyclic Dynamic Programming: A Procedure for Problems with Fixed Delay," Operations Research, Vol. 19, No. 4, 1971, pp. 1101-1110.
19. "An Introduction to Observers," IEEE Trans. Auto. Control, Vol. AC-16, No. 6, December 1971, pp. 596-602.
20. "The Reduced System Method for Control Problems with Kinks," (with Mohamed Z. Ghanem), Intl. J. Control, Vol. 19, No. 2, 1974, pp. 243-256.
21. "Efficiently Converging Minimization Methods Based on the Reduced Gradient" (with Daniel Gabay), SIAM J. Control & Optimization, Vol. 14, No. 1, January 1976, pp. 42-61.
22. "Algorithmic Analysis in Constrained Optimization," Nonlinear Programming, SIAM-AMS Proceedings, Vol. 9, 1976, pp. 39-51.
23. "Dynamic Equations in Descriptor Form," IEEE Trans. Auto. Control, AC-22, No. 3, June 1977.
24. "Time-Invariant Descriptor Systems," Automatica, Vol. 14, 1978, pp. 473-480. Also presented at 1977 JACC Conference.
25. "Linear Descriptor Variable Systems," presented at the U.S.-Italy Symposium, and published in Lecture Notes in Economics and Mathematical Systems, No. 162, 1978, pp. 189-200.
26. "Non-Linear Descriptor Systems," J. Economics and Control, Vol. 1, 1979, pp. 219-242.
27. "Analysis of the Asymptotic Behavior of Optimal Control Trajectories: The Implicit Programming Problem" (with Charles Feinstein), SIAM J. Control and Optimization, Vol. 19, No. 5, September 1981.

FRANK J. MAGLIATO

Frank J. Magliato is currently the President of Sigma Associates, a company he founded to consult on the selection and implementation of information technology systems and equipment, and their integration with the siting, design and construction of office facilities.

He previously was Vice President of Planning and Business Development for Satellite Business Systems where he managed the strategic planning process; was responsible for analyses of market structure and competition; and was responsible for the development of new business opportunities. In addition, he managed SBS's participation in the Local Data Distribution Program and had Profit & Loss responsibility for several of SBS's products.

Prior to joining SBS in 1976, Mr. Magliato was with IBM's Federal System Division for seven years where his assignments included Business Area Manager for Intelligence Systems, manager of the Digital Image Processing research and development program, manager of Planning and Technical Staff and manager of Marketing Operations.

Earlier, Mr. Magliato held program management and executive positions with NASA; served with the Atomic Energy Commision and the U.S. Air Force; was an engineer at Chrysler Corporation.

Mr. Magliato has a Bachelor's Degree in Industrial Administration from Union College and studies physics and nuclear engineering in the graduate schools of the Universities of Cincinnati and Alabama.

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DR. JOHN M. MCQUILLAN — President, McQuillan Consulting

Dr. John McQuillan is one of the foremost authorities in computer networks, electronic mail, and office automation, both as an original contributor and as a consultant to industry. He began his career at Bolt Beranek and Newman (BBN) with pioneering work on the ARPANET, the first packet switching network. He went on to found a consulting department conducting important network studies for the international airline and banking communications systems, and for major industrial and financial organizations in the U.S. and Europe. Dr. McQuillan is prominent as an expert on electronic mail from his work as co-founder and President of BBN Information Management Corporation, which produced the first computer-based message system to run on and link a variety of computers (IBM, DEC, and UNIX).

He formed his own consulting firm to apply his considerable talents and experience in planning new computer communications and office automation systems. In his consulting practice, Dr. McQuillan assists vendor and user organizations in several phases of office automation: planning strategies and architectures, selecting high-performance, low-cost systems, and adopting successful implementation tactics, both technological and organizational. Dr. McQuillan continues to apply his expertise in all phases of computer networking as a consultant, educator and adviser.

Dr. McQuillan has authored over 100 papers, reports, and presentations in the field of computer communications and office automation. He serves as a columnist or advisor for several prominent business and techical publications. He is also active in explaining the significance of high-technology developments through in-house courses, seminars, and executive briefings.

Dr. McQuillan received his undergraduate and Ph.D. degrees in Applied Mathematics (Computer Science) from Harvard University.

Richard H. Miller

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Richard H. Miller has recognized expertise in the design, implementation and management of computer based messaging systems, organizational data communication systems, and audio-video teleconferencing systems.

Since the founding of Telematics International in the summer of 1982, Mr. Miller has been involved in the development and adoption of international standards for computer message systems, as well as other telematic services such as Teletex, telex, videotex and facsimile. He currently participates as a member of the US delegation to CCITT regarding the establishment of standards for Message Handling Systems and other high level network protocols. Specializing in computer based message systems and applications of networks, he has worked extensively on the use of satellite development programs associated with telecommunications in the third world and remote locations.

As a principal in TmI, Mr. Miller currently consults to ITT Dialcom on the adoption of standards in Message Handling Systems and technical design of distributed computer based applications. He is the principal investigator for a study to design a data transfer network linking 15 international centers involved in agricultural research.

His practice recently has encompassed the functional specification and implementation planning for an integrated voice and text messaging system, design and planning for a videotex service, and technical design of a portable video display terminal.

As a pioneer of networked computer communications systems, using the ARPA Network while at Stanford University and the Institute for the Future, Mr. Miller participated in the design and implementation of the first computer conferencing systems operating on distributed computer systems by means of packet switching networks. He served as a consultant to NASA in the evaluation of video signals broadcast by satellite to remote ground stations, and was responsible for the evaluation of NASA's audio conferencing systems.

Until 1982, Mr. Miller served as Director of Operations and Director of Research and Development for InfoMedia Corporation, the first commercial computer conferencing company, of which he is a co-founder.

He has degrees from Stanford University in Political Science and in Communications Research. Mr. Miller is an active member of the Institute of Electrical and Electronic Engineers and serves as the Chairman of the North American sub-group of the International Federation of Information Processing on user environment issues in computer based messaging.

September, 1983

Vita

Daniel J. Power

PERSONAL:

University Address:	Home Address:
College of Business and Management University of Maryland College Park, MD 20742	4313 Knox Road Apt. 217 College Park, MD 20740
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Birthdate: February 9, 1950
Birthplace: Waterloo, IA
Marital Status: Single

EDUCATION:

Ph.D. in Business Administration, University of Wisconsin-Madison, December, 1982
- Major: Strategic Management and Decision Making; Organization Theory
- Minor: Information Systems Analysis and Design

Dissertation: Acquiring Small and Medium-sized Companies: A Study of Corporate Decision Behavior

M.B.A. University of Wisconsin-Madison, 1981
- Major: Management

M.A. in Business Administration, University of Iowa, 1977
- Major: Management Information Systems
- Minor: Organizational Behavior and Quantitative Methods

Masters Thesis: Design and Development of DECAID: A CAL Decision Formulation Program

B.S. University of Iowa, 1974
- Major: General Science

PROFESSIONAL AFFILIATIONS:

Academy of Management
American Institute for Decision Sciences
The Institute of Management Science
The Strategic Management Society
Sigma Xi
American Association for Artificial Intelligence
Center for Automation Research, University of Maryland
Center for Innovation Research, University of Maryland
Strategy and Planning Research Group, University of Maryland

Daniel J. Power

TEACHING:

January 1982 - Current — Assistant Professor, The University of Maryland at College Park, courses include Management Planning and Control Systems, Decision Making and Decision Support Systems, and Strategic Management

September 1981 - December 1981 — Lecturer, The University of Wisconsin-Madison, taught Management: Decision, Implementation and Control

Summer, 1980 and 1981 — Lecturer, The University of Wisconsin-Madison, taught Organization and Management Process

Spring/Summer, 1981 — The University of Wisconsin-Extension taught workshops on Organizational Design (with Dr. A. Filley) and Organizational Politics

September 1978 - May 1981 — Teaching Assistant, The University of Wisconsin-Madison, taught discussions for Organizational Behavior and taught Administrative Policy and Strategy

1976-1977 — Teaching Assistant, The University of Iowa, taught Administrative Management

FUNDED RESEARCH:

June, 1979-August, 1979; June, 1978-August, 1978 — Project Assistant to Dr. George P. Huber, The University of Wisconsin-Madison. Project: Review Organizational Decision Making Literature, funded by Army Research Institute for the Behavioral and Social Sciences

January, 1978-June, 1978 — Project Assistant to Dr. Barbara Karmel, The University of Wisconsin-Madison. Project: Survey to evaluate the need for graduate programs in administration for people employed full-time, funded by U.S. Civil Service contract

Summer, 1977-December, 1977 — Research Assistant to Dr. Arthur P. Brief, The University of Iowa. Project: Data analysis for a survey of Iowa nurses, funded by Iowa Board of Nursing

Fall, 1976-Spring, 1977 — Reseach Assistant to Dr. Charles Klasson, The University of Iowa. Activities: Developing and using a Policy Data Base, data analysis, library research

Daniel J. Power

CONSULTING:

- Center for Naval Analyses
- Specialized Carriers and Riggers Association
- Execucom Systems, Inc.,
- Data Specialties, Inc.,
- University of Wisconsin Center System
- University of Wisconsin Department of Police and Security
- Test Development Department of Houghton Mifflin Publishing Co., Inc.
- Mezvinsky for Congress Committee
- Iowa Data Processing, Inc.

PROCEEDINGS PUBLICATIONS AND PAPER PRESENTATIONS:

Brief, A.P., Aldag, R.J., Power, D.J., and Darrow, A.L. Perceived hierarchical communications and subordinate response. Presented at the National Meeting Academy of Management, August 1978.

Klasson, C.R. and Power, D.J. Data-based policy teaching and research. Proceedings of the Academy of Management, August 1977, pp. 118-121.

Paine, F.T. and Power, D.J. An examination of Drucker's five rules for successful acquisition. Presented at the Strategic Management Society Conference, Montreal, October 1982.

Power, D.J. A criteria-based review of 14 generalized heuristic programs. Proceedings of the Midwest Academy of Management, April 1979, pp. 278-285.

Power, D.J. Impact of data management on organizational decision making. Presentation and abstract in Proceedings American Institute for Decision Sciences. November 1980.

Power, D.J. Case study of the design and development of decision support system. Presented at ORSA/TIMS national meeting, Detroit, April 1982.

Power, D.J. Examination of two strategies for reducing appraisal errors. Presented at the forthcoming national meeting American Institute for Decision Sciences, November 1982.

Power, D.J. and Aldag, R.J. Job search and choice: A clarification and elaboration of Soelberg's model. Presentation at National Academy of Management Meeting, August 1981.

Power, D.J. and Huber, G.P. Elicitation of subjective probability: Integration of recent findings. Proceedings of the American Institute for Decision Sciences, October-November 1978, pp. 39-41.

Power, D.J. and Huber, G.P. Guidelines for using key informants and retrospective reports in strategic management research. Presentation and Proceedings of the American Institute for Decision Sciences, November, 1982.

Power, D.J. and Huber, G.P. Decision State versus Process Variables as Predictors of Corporate Acquisition Effectiveness. Presentation at National Academy of Management Meeting, Dallas, August 1983.

Power, D.J. and Rose, G.L. Improving decision-making behavior using the Hewlett-Packard 2000/Access System. Proceedings of the American Institute for Decision Sciences, November, 1976, pp. 47-49.

Power, D.J. and Rose, G.L. An evaluation of Decaid, a decision formulation computer aided learning program. Proceedings of the American Institute for Decision Sciences, October, 1977, pp. 118-119.

Power, D.J., Rose, G.L. and Valliere, W.P. BASIC DECAID. Presented at the National Meeting Academy of Management, August, 1978.

Power, D.J. and Zwerling, H.L. Designing management decision-aid programs. Presentation and Proceedings American Institute for Decision Sciences, November, 1980.

Daniel J. Power

JOURNAL PUBLICATIONS:

Brief, A.P., Aldag, R.J., Darrow, A.L., and Power, D.J. Examination of responses of registered nurses to manifest needs questionnaire. Psychological Reports, 1980, 46, 1233-1234.

Paine, F.T. and Power, D.J. Merger Strategy: An Examination of Drucker's Five Rules for Successful Acquisitions. Strategic Management Journal, in press

Power, D.J. Acquisition Decision Making. Mergers and Acquisitions. August 1983.

Power, D.J. The impact of information management on the organization: Two Scenarios. MIS Quarterly, September. 1983.

CURRENT WORKING PAPERS:

Huber, G.P. and Power, D.J. the occurrence of information search in organizations.

Power, D.J. and Aldag, R.J. Soelberg's job search and choice model: a review evaluation and critique (under review).

Power, D.J. Case study of the design and development of a decision support system.

Power, D.J. Design specifications for DECISION AID.

Power, D.J. Examination of two strategies for reducing appraisal errors.

Power, D.J. User's manual for DECISION AID (version 5).

WORK IN PROGRESS:

Power, D.J. and Aldag, R.J. Reprogramming and evaluating DECISION AID.

OTHER PROFESSIONAL ACTIVITIES:

Chairperson and Participant in Workshop on "Using microcomputers in managment decision making education" at the National Meeting of the Academy of Management, MED Division, New York, August 1982.

Daniel J. Power

Participant in Workshop on "Computer-Aided Organizational Problem Solving," R.J. Aldag, Chairperson, at the National Meeting of the American Institute for Decision Sciences, November 1979.

Participant in the First Annual Doctoral Consortium sponsored by the Business Policy and Planning Division of the National Academy of Management, Atlanta, August 1979.

Participant in the Third Annual Doctoral Consortium sponsored by the Organizational Behavior and Theory divisions of the National Academy of Management, San Francisco, August 1978.

Participant in the First Annual Junior Faculty Workshop sponsored by the Organization Management and Theory division of the National Academy of Management, Dallas, August 1983.

Discussant for session, "Critical Issues in Investigation of Task Characteristics," R.J. Aldag, Chairperson, at the Midwest Meeting of the Academy of Management, March 1978.

1981 Kohler Fellow and Resident Knapp Graduate Center.

Reviewer for McMillan Publishing Company, special reveiwer for *Management Science* (1982), and reviewer for Policy and Decision Theory Tracks, National AIDS meeting (1981, 1982).

LEWIS D. PRIVEN

Biographical Information

Lewis D. Priven is Vice President of Engineering for Satellite Business Systems (SBS). He joined SBS in December 1978 after 18 years with IBM. Prior to assuming his current responsibilities, Mr. Priven was instrumental in establishing the Information Resource Management area within SBS.

At IBM, Mr. Priven was involved in developing the TSS, SVS, VTAM and JES programming products. His last assignment was as Manager of the IBM Gaithersburg Programming Center. He also worked at the Social Security Administration from 1974 to 1975 as part of the President's Executive Interchange Program.

Mr. Priven received a Bachelor's degree in Electrical Engineering From Tufts University and a Master's degree in Management from Rensselaer Polytechnical Institute. He and his wife Judy have two children and live in Cabin John, Maryland

RESUME

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EDUCATION

University of New Hampshire	1/71 -- 6/73	B.A. Zoology
Northeastern University	9/73 -- 12/74	ABT Biology
University of Massachusetts	1/75 -- 1/77	M.S. Computer and Information Science
University of Massachusetts	1/77 -- 2/81	Ph.D. Computer and Information Science (Dissertation Defense in May, 1980)

PRESENT EMPLOYMENT

Director, Computer and Software Engineering Division, Institute for Defense Analyses. I am the founding Director for this Division where I manage technical staff and a multimillion dollar budget. The Division provides technical support to the Ada, VHSIC, STARS and WIS Modernization Programs among others.

EMPLOYMENT HISTORY

11/82 -- 11/83
From November 1982 until November 1983, I served as a Computer Scientist in the Science and Technology Division of the Institute for Defense Analyses. I provided lead technical expertise on several projects: assessments of the U S. national computing technology research program; feasibility analyses and planning for the modernization of the WWMCCS C3I system using Ada; and continuing support of the Ada Program in the areas of compiler and software tool validation, development of support environment specifications, education and technology insertion.

4/81 -- 11/82
Technical Staff Member, MITRE Corporation. From November 1981 through November 1982, I provided technical support to the Ada Joint Program Office, a component of the Office of the Undersecretary of Defense for Research and Engineering (Research and Advanced Technology). The bulk of this support was in the technical analysis and formulation of policies concerning the validation of Ada language processors and other Ada software. I served as a primary source of expertise in defining the research issues and solutions to technical problems associated with the standardization and validation Ada programming support environments. In addition, I provided consultation and advice to the AJPO in the development of policies and plans for the education and training component of the Ada Program. Because of the close relationship of the Ada Program to the Software Technology Initiative, I provided similar support to the development of this initiative.

Since beginning my employment in April, 1981 until I assumed the support role to the AJPO, I had responsibility for all aspects of the systems analysis and design of the environmental/weather support system for the Automated Enroute Air Traffic Control System. This project, undertaken for the FAA, is the proposed replacement air traffic control system for the late 1980's. My contributions to this project included the design of data acquisition and analysis strategies, database management and retrieval, as well as numerous other functions necessary for automated real time air traffic control.

7/80 -- 4/81
Computer Scientist, GS-13-1550, on the Staff of the Director, Environmental Data and Information Service, National Oceanic and Atmospheric Administration, Department of Commerce. My responsibilities included project management, systems analysis and design, and acting as technical advisor to the Director. I was project leader in the design and implementation of the EDIS Management Information System. I served as the systems scientist in support of the design of the LANDSAT data archival system. I was the project leader on a computer performance evaluation of the National Climatic Center, a repository for all atmospheric information and data ever collected in the U.S.

7/79 -- 6/80
Systems Scientist, Marine Environmental Assessment Division, Environmental Data and Information Service. My responsibilities included technical oversight of contracts with the private sector. This was a research-oriented position in which I designed, analyzed, implemented and validated complex systems models. I assumed this position on a consultative basis through an Inter-Governmental Personnel Act Agreement with the State of Maine.

9/78 -- 6/80 (On leave 7/79 -- 6/80)
Assistant Professor of Computer Science, Department of Mathematics, University of Maine. Usual duties including teaching, curriculum development, supervision of Masters Theses, and research. Appointed to the Graduate Faculty in November, 1978.

9/76 -- 1/78
User Systems Consultant, Research Computing Center, University of Massachusetts. Graduate Student support.

PROJECTS AND RELATED EXPERIENCE

Member, Ada Experts Group, as established by ISO/TC 97/SC 5.

Member, Programming Languages Subcommittee, American National Standards Institute Committee X3 -- Information Processing Systems. This committee serves as the Technical Advisory Group to SPARC for all international activities. It is also responsible for formulating the United States position on appropriate technical and policy issues concerning the programming languages standardization program. This subcommittee also provides long range planning for the standardization of programming languages to the parent X3 committee.

International Representative for Programming Languages Subcommittee to ISO/SC5/WG 18 Validation Working Group.

Vice-Chairperson, Washington Chapter of AdaTEC. The local chapter of the national AdaTEC, Special Interest Group for Programming Languages of the Association for Computing Machinery (also co-founder).

International Representative to the International Organization for Standardization for the ANSI APL Standards Project X3J10.

TEACHING POSITIONS

7/82 -- present
Adjunct Assistant Professor of Computer Science, Virginia Polytechnic and State University (Northern Virginia Graduate Campus) -- teach a two quarter sequence on software engineering.

7/80 -- 9/81
Adjunct Professor of Computer Science, Department of Mathematics, Gallaudet College.

9/80 -- 1/82
Adjunct Professor of Computer Science, Department of Mathematics, Howard University.

9/80 -- 9/81
Professorial Lecturer, Department of Mathematics and Statistics, The American University.

6/81 -- present
Adjunct Assistant Professor of Computer Science, Virginia Institute of Marine Science and The College of William and Mary.

9/78 -- 6/79
Assistant Professor of Computer Science, Department of Mathematics, University of Maine.

1/78 -- 8/78
Teaching Associate, Department of Computer and Information Science, University of Massachusetts. Taught courses in Data Structures and Programming Languages.

PUBLICATIONS

"What is Ada," invited article for BYTE magazine under preparation.

(with W. Carlson and S. Glaseman) "An Assessment of U.S. and Foreign Funding for Information Processing Technology R&D," IDA Memo Report prepared for Dr. E. Martin of DUSDR&E (R&AT), 9 August 1983.

(with John B. Goodenough) "Designing and Testing Interfaces for Portable Software: Ada TEXT-IO as an Example," published in Proceedings of SERC Workshop on Ada* Software Toole Interfaces, 13-15 July 1983.

(with D. Kafura, T. Lindquist, J.A.N. Lee) "Validation and Ada Programming Support Environments" Technical Report, Department of Computer Science, Virginia Polytechnic and State University (submitted to the AJPO as a result of research begun in the summer of 1982).

"Validation Issues" Ada Letters Issue No. 4, September - October.

"Ada Validation Organization: Policies and Procedures" MITRE Technical Report MTR W30-82106, June 1982, 35 pages.

"Implementation Plan for the Ada Validation Organization," MITRE Technical Report MTR W30-8200131, September 1982, 27 pages.

"Strategies for Real Time Data Extraction from Winds Aloft Databases," MITRE Working Paper, January 1982.

"The Effects of RMS Wind Induced Positional Error on EnRoute Aircraft," MITRE Working Paper, August 1981.

"Modeling Theory: A Perspective of Approach," Proceedings of a Workshop on Government Oil Spill Modeling Activities, November 1979.

"A Model of a Renewable Resource Ecosystem Under Exploitation," Ph.D. Dissertation, University of Massachusetts, February 1981.

(with W. Kilmer) "Depletion Models for Ecosystems with Continuously Delayed Resource Renewals," Mathematical Biosciences, 47, 35-54 (1979).

(with W. Kilmer and I. Lieblich) "Two Time-Delayed Oscillatory Brain Models for Psychologists," contribution to System Neuroscience I: J. Metzler ed., Academic Press 1977.

(with W. Kilmer) "A Renewable Resource Depletion Model for Grazing Populations," Mathematical Biosciences, 36, 25-29 (1977).

RECENT PRESENTATIONS

"The Need for Redefinition of Procurement Structure with Newer Software Technology," The First Washington Ada Symposium, March 25-27, 1984. Also chairing a group on "Compiler Management Issues."

"A Briefing on the STARS Program," Economics and Technology of Software Engineering Conference, in Firenze, Italy, on November 7-11, 1983.

On the panel of the telecast of The World of Ada on WETA in Washington, D.C., October 25, 1983.

"Validation Policies," AdaTEC meeting in Dallas, October 1983.

"Ada Compiler Validation: Status and Direction," The U.S. Professional Development Institute National Conference on Using Ada: A New Era in Adaptable, Reliable Software, June 27-29, 1983.

"Preparing for the Software Revolution," invited presentation to the National Association of Record Managers in Washington, D.C., on November 17, 1982.

"The Ada Program and the Future of Software Engineering," invited seminar at the Data Processing Managers Association Seminar in Reston, VA, on November 5, 1982.

"Validation of APSE's," National AdaTEC Meeting, October 1982.

"The Ada Validation Organization," National AdaTEC Meeting, July 1982.

"Validating Ada Compilers: A Progress report," National AdaTEC Meeting, April 1982.

PROFESSIONAL INTERESTS

My primary interest and currency is in the classical areas of computer science and software engineering, such as quality software development tools and methodology, and productivity enhancement through intelligent programming environments. I prefer working in an applied research and development environment where there are opportunities for multi-disciplinary interaction. I enjoy problem solving.

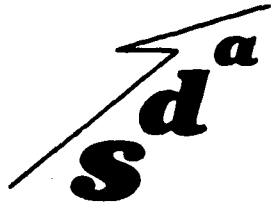
My secondary area of interest is the general theory of mathematical modeling and computer simulation in complex systems. This includes problems in model design and specification, parameter identification and estimation, as well as validation and verification.

Security Clearance maintained.

software design & analysis

1670 bear mountain drive, boulder, colorado 80303

Bill Riddle is an independent consultant specializing in research, education and evaluation projects in the area of software engineering environments. Previously, he directed software design and engineering work at Cray Laboratories, the research and development subsidiary of Cray Research. Prior to that, he was a professor of computer science at the Universities of Michigan and Colorado. His work has emphasized the description and analysis of software designs and the delivery of description and analysis techniques to practitioners through software engineering environments. He is a former ACM National Lecturer and is currently chair of the ACM SIGSOFT organization.



WILLIAM E. RIDDLE

CONSULTANT
software design & analysis, inc.
1670 Bear Mountain Drive
Boulder, Colorado 80303
303 499-4782

INTEREST AREAS:

Software Engineering Environments
Software Modelling
Analysis of Software Designs
Programming and Design of Concurrent Systems

EDUCATION:

Doctor of Philosophy (Computer Science),
Stanford University, Stanford, California, March 1972

Master of Science (Computer Science),
Cornell University, Ithaca, New York, September 1966

Bachelor of Engineering Physics,
Cornell University, Ithaca, New York, January 1966

EXPERIENCE:

Adjunct Associate Professor of Computer Science, Universities of Massachusetts and Colorado, December 1982 - present. Intermittent participation in research projects.

Consultant, software design & analysis, May 1982 - present. Consulting work focuses on software engineering environments with special emphasis on tools supporting pre-implementation activities. Contracts have included: analyzing current state of affairs, developing plans for implementing a software engineering program, developing R&D program, professional education and training.

Manager, Software Design and Engineering, Cray Laboratories, From July 1980 - May 1982. Set up and managed a group to develop a Kernel operating system for multi-processor, high-performance computers. Actively participated in operating system design and in the development of a supporting engineering environment.

Associate Professor, Computer Science, University of Colorado, From September 1977 - July 1980. Taught courses in all areas of software development. Led research projects concerning environments supporting development of concurrent systems.

Assistant Professor, Computer and Communication Sciences, From March 1972 - August 1977. Developed and taught curriculum in software and software development. Designed and implemented undergraduate degree program. Led department's redesign of Ph.D. program.

TECHNICAL REPORTS (last four years):

(Co-authored with G. Bristow, C. Drey, and B. Edwards) Anomaly Detection in Concurrent Programs. RSSM/85 and CU-CS-147-79, Department of Computer Science, University of Colorado at Boulder, February 1979.

(Co-authored with G. Bristow, C. Drey, and B. Edwards) Design of a System for Anomaly Detection in HAL/S Programs. RSSM/87 and CU-CS-151-79, Department of Computer Science, University of Colorado at Boulder, March 1979.

Procedural Approaches to Software Design Modelling. RSSM/86 and CU-CS-150-79, Department of Computer Science, University of Colorado at Boulder, April 1979.

(Co-authored with J. Wileden) Design Modelling Languages for Distributed Operating Systems. RSSM/88, Department of Computer Science, University of Colorado at Boulder, May 1979.

(Co-authored with J. Wileden) DREAM - A Support System for Designers of Distributed Computing Systems. RSSM/89, Computer and Information Science Department, University of Massachusetts, Amherst, May 1979.

Software Tools - Are We on the Right Track? (Panel Discussion Outline). RSSM/91, Department of Computer Science, University of Colorado at Boulder, September 1979.

(Co-authored with R. Fairley) Review of the Pingree Park Software Development Tools Workshop. RSSM/92, Department of Computer Science, University of Colorado at Boulder, September 1979.

An Assessment of DREAM. RSSM/100, Department of Computer Science, University of Colorado at Boulder, February 1980.

Capabilities for the Abstract Description of Multi-activity Software Systems. RSSM/102, Department of Computer Science, University of Colorado at Boulder, June 1980.

Software Development Tools: A Bibliography. RSSM/103, Department of Computer Science, University of Colorado at Boulder, June 1980.

Software Development Environments: A Bibliography. RSSM/104, Department of Computer Science, University of Colorado at Boulder, June 1980.

(Co-authored with R. Fenchel, J. Rader, M. Penedo, and S. Saib) Software Development Environments. SDAM/2, Software Design and Engineering Group, Cray Laboratories, Boulder, Colorado, October 1981.

Software Development Environment Work in the Software Design and Engineering Group. SDAM/3 and SDE Memo 1.1, Software Design and Engineering Group, Cray Laboratories, Boulder, Colorado, October 1981.

Software Design Tools. SDAM/4, Software Design and Analysis Co., Boulder, Colorado, November 1981.

Software Development Environments. SDAM/5 and SDE Memo 3, Software Design and Engineering Group, Cray Laboratories, Boulder, Colorado, February 1982.

Report on a Visit to the Institute of Computing Technology, Beijing, People's Republic of China. SDAM/6, software design & analysis, inc., Boulder, Colorado, January 1983.

CONFERENCE PAPERS (last four years):

W. Riddle, J. Sayler, A. Segal, A. Stavely and J. Wileden. Abstract Monitor Types. Proc. of Specification of Reliable Software Conf., Boston, April 1979.

W. Riddle. An Event-based Design Metnodology Supported by DREAM. Proc. IFIP TC8 Working Conf. on Formal Models and Practical Tools for Information System Design, Oxford, England, April 1979.

G. Bristow, C. Drey, B. Edwards and W. Riddle. Anomaly Detection in Concurrent Programs. Proc. 4th International Conf. on Software Engineering, Munich, September 1979.

W. Riddle and R. Fairley. Review of the Pingree Park Software Development Tools Workshop. Proc. AIAA 2nd Computers in Aerospace Conference, Los Angeles, October 1979.

W. Riddle, J. Sayler, A. Segal, A. Stavely and J. Wileden. Hierarchical Description of Software System Organization. Proc. 13th Hawaii International Conference on Systems Sciences, Honolulu, Hawaii, January 1980

W. Riddle. Software Development Environments (Panel Outline). Proc. Compsac 80 Conference, Chicago, Illinois, October 1980.

INVITED PAPERS (last four years):

W. Riddle. Software Development Environments: Present and Future. Proc. International Computer Technology Conf., San Francisco, California, August 1980.

JOURNAL PAPERS (last four years):

W. Riddle. An Approach to Software System Behavior Specification. J. Computer Languages, 4, 1 (1979), pp. 29-47.

W. Riddle. An Approach to Software System Modelling and Analysis. J. Computer Languages, 4, 1 (1979), pp. 49-66.

W. Riddle and J. Sayler. Modelling and Simulation in the Design of Complex Software Systems. In B. Zeigler (ed.), Methodology in Systems Modelling and Simulation, North-Holland Pub. Co., 1979, pp. 359-386.

W. Riddle. An Event-based Design Methodology Supported by DREAM. In Schneider (ed.), Formal Models and Practical Tools for Information System Design, North-Holland Pub. Co., 1979, pp. 93-108.

W. Riddle. Procedural Approaches to Software Design Modelling. In Riddle and Fairley (eds.), Software Development Tools, Springer Verlag, 1980.

W. Riddle. An Assessment of DREAM. In Hunke (ed.), Software Engineering Environments, North-Holland Pub. Co., 1981, pp. 191-221.

H.-L. Hausen, M. Mullerburg, and W. Riddle. Software Engineering Environments: A Bibliography. In Hunke (ed.), Software Engineering Environments, North-Holland Pub. Co., 1981, pp. 191-221.

Guest Editor's Overview: Tool and Methodology Evaluation. J. Systems and Software, 2, 2 (December 1981).

W. E. Riddle, J. H. Sayler, A. R. Segal, A. M. Stavely and J. C. Wileden. Abstract Process Types to appear: Journal of Systems and Software.

J. C. Wileden, W. E. Riddle, J. H. Sayler, A. R. Segal and A. M. Stavely. Behavior Description for Software Systems to appear: Journal of Systems and Software.

W. E. Riddle, R. Fenchel, J. Rader, M. Penedo and S. Saib. Software Development Environments to appear: Computer.

BOOKS:

W. Riddle and R. Fairley (eds.), Software Development Tools, Springer Verlag, 1980.

PROFESSIONAL ACTIVITIES:

ACM SIGSOFT: Vice-Chair (1979-1981), Chair (1981-present).
Associate Editor: Journal of Systems and Software, ACM Trans. on Programming Languages and Systems.
Chairman or Program Committee Member for several workshops and conferences.

DANIEL R. RIES

EDUCATION:

Ph.D.- Computer Science, 1979, University of California, Berkeley

M.A.- Mathematics (foundations of mathematics), 1971, University of Maryland

B.S.- Mathematics, 1969, University of Maryland

PROFESSIONAL POSITIONS

1981 - Present: Director, Distributed Databases Section/Project Manager/Senior Computer Scientist, Computer Corporation of America, Cambridge Massachusetts

1974 - 1980: Section Leader/Computer Scientist/Systems Programmer, Lawrence Livermore National Laboratory (LLNL) , Livermore, California

1979 - 1980: Lecturer in Computer Science, University of California, Davis, California. (Concurrent with Position at LLNL).

1979 - 1980: Computer Consultant, Britton-Lee, Inc., Berkeley, California. (Concurrent with Position at LLNL).

1979: Computer Consultant, Organization of Economic Cooperation and Development, Paris, France. (On leave of absence from LLNL).

1971 - 1974: Assistant Director/Assistant Professor, Computer Education Center, Mansfield State College, Mansfield, Pennsylvania

1969 - 1971: Faculty Research Assistant, Computer Science Center, University of Maryland College Park, Maryland.

PROFESSIONAL EXPERIENCE

SUMMARY: Dr. Ries is an experienced manager and internationally known senior researcher in database management.

He has engaged in a wide range of professional activities, including research, teaching, commercial and academic consultation, and project management. He publishes frequently and participates regularly in professional activities including journals, conferences and study groups.

Management Experience: At CCA, as Director of the Distributed Databases Section, Dr. Ries supervises three projects of about 15 - 18 researchers and systems programmers. In addition, he is Project Manager for an ARPA project to demonstrate distributed database management and advanced user interface technology in command and control.

At LLNL, as Section Leader, Dr. Ries supervised a staff of 3 to 5 computer scientists and systems programmers in database applications and development sections. The database applications provided database Administrator functions for scientific and engineering databases. The development section developed and supported generalized database management systems

At Mansfield State College, as Assistant Director of the Computer Center, he supervised 1 to 2 full time employees and 10 student assistants. He was responsible for increasing the instructional and research applications of a college computer for that college and for primary and secondary schools in a 50-mile radius of the college.

DBMS_RESEARCH_AND_DEVELOPMENT: At CCA, Dr. Ries participated in the design of the Local Database Manager (LDM) and the Distributed Database Manager (DDM) for the ADAPLEX project. The LDM is a state-of-the-art, efficient, single computer database management system to support a specially designed database access language that has been embedded in Ada. The DDM is a distributed system of LDM nodes.

Dr. Ries lead the design of DACOS, a DAtabase Centered Office System, which provides integrated and easy to use interfaces to databases and other office systems.

Dr. Ries worked on a National Bureau of Standards project to develop a standard architecture for database system standards.

While a graduate student at Berkeley, he researched and implemented concurrency control mechanisms for Ingres, a well-known relational DBMS.

At LLNL, his work included the development of a scientific, portable relational database management system, Database Administrator responsibility for the National Uranium Resources Exploration database, and system

programming.

CONSULTATIONS: Dr. Ries was a Computer Consultant on the design and implementation of the Britton-Lee back-end relational database machine. He has acted as a Computer Consultant on the organization and use of a Cogasyl DBTG database management system for acquiring and distributing scientific data on nuclear energy. He was employed by the Computer Science Center of the University of Maryland to aid other faculty and graduate students on the use of computers, test and evaluate various mathematical and statistical packages for the UNIVAC 1108, and provide mathematical design consultation on the use of those packages.

PROFESSIONAL ACTIVITIES: Dr. Ries was co-chairman of the Database Architectural Framework Task Group of the ANSI Database Study Group, and he participated on the ANSI Relational Task Group. He served as a member of a specialist study group on scientific database management systems, sponsored by the OECD, DOE, and NBS. He participated in a national committee for data exchange.

Dr. Ries has been a member of the Association of Computing Machinery (ACM) and a variety of its special interest groups since 1971. He is currently an Associate Editor for the IEEE Bulletin on Database Engineering. He has also served as a reviewer for ACM Transactions on Database Systems, IEEE Transactions on Software Engineering, and numerous conferences. He also served on the program committee for a number of conferences.

ACADEMIA: Dr. Ries was lecturer at the University of California, Davis, and he guided graduate students in independent computer science research projects. While a graduate student, he served as a teaching assistant for Database Management courses. He also taught computer science courses at Mansfield State College. Dr. Ries is also an author and co-author on over 25 technical journal and conference articles.

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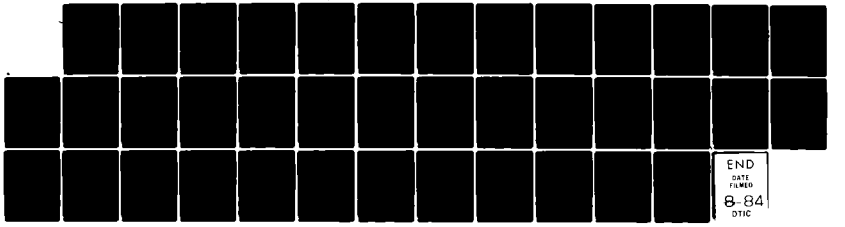

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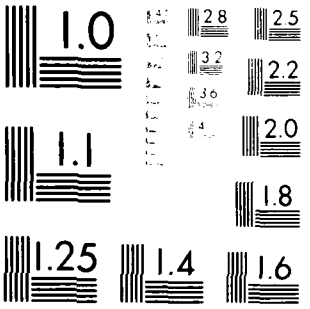

MICROCOPY RESOLUTION TEST CHART

PUBLICATIONS

(With Hector Garcia-Molina, Barbara T. Blaustein, R. Mark Chilenskas, and Charles W. Kaufman.) "Maintaining Replicated Databases Even in the Presence of Network Partitions" To appear in the Proceedings of the IEEE 1983 EASCON Conference, Sept. 19-21, Washington, D.C.

(With N. Goodman, D. Skeen, A. Chan, U. Dayal, and S. Fox) "A Recovery Algorithm for a Distributed Database Systems," ACM PODS Conference Proceedings (1983).

(with Dayal, U., A. Chan, S. Fox, and D. Ries) "Query Optimization in the Distributed Database Manager (DDM)," Technical Report, Computer Corporation of America, 1983 (in preparation).

(With J. Barnett, C. Kaufman, M. Chilenskas, B. Blaustein, W.K. Lin) "DACOS -- A Database Centered Office System," CCA Technical Report, (May 1983).

(With A. Chan, U. Dayal, S. A. Fox, K. Lin and L. Yedwab) "Decompilation and Optimization of ADAPLEX: A Procedural Database Language," Technical Report CCA-82-04, Computer Corporation of America (November 1982).

(With W.K. Lin, B. Blaustein, and R.M.Chilenskas) "Office Procedures as a Distributed Database Application," Proc 1983 ACM SIGMOD, San Jose, (May 1983).

(With A. Chan, U. Dayal, S. Fox, N. Goodman, and D. Skeen) "Overview of an Ada Compatible Distributed Data Manager," Proc 1983 ACM SIGMOD, San Jose, (May 1983).

(With A. Chan, S. Fox, W.K. Lin and A. Nori) "The Implementation of an Integrated Concurrency Control and Recovery Schema," Proc. 1982 ACM SIGMOD, Orlando, (June 1982).

(With A. Chan, S. Danberg, S. Fox, W.K. Lin, and A. Nori) "Storage and Access Structures to Support a Semantic Data Model," Technical Report CCA-82-02, Computer Corporation of America, (March 1982). This was also given as a paper at Proc 1982 VLDB, Mexico City, September 1982.

(With A. Chan, S. Fox, and W.K. Lin) "The Implementation of an Integrated Concurrency Control and Recovery Scheme," Technical Report CCA-82-01, Computer Corporation of America, (March 1982).

(With G.S. Smith). "Nested Transactions in Distributed Systems." IEEE Transactions on Software Engineering (May 1982, to appear). A version of this paper was also presented at Symposium on Reliability in Distributed Software and Database Systems (Pittsburgh: July 1981).

(With W. Thompson). "A Sort-Merge Join for Multiprocessor Database Machines." UCRL - 85674 Revision 1 (Livermore, California: December 1981).

(With A. Chan, S. Fox, and W.K. Lin). "The Design of An Ada Compatible Local Database Manager." Technical Report CCA-81-09, Computer Corporation of America (November 1981).

(With S.E. Jones, L. Lyles, and A. Dittli). "FRAMIS Reference Manual." UCID-30176 (Livermore, California: Lawrence Livermore National Laboratory, September 1981).

"A Non-unique Key B-Tree Implementation." UCID (Livermore, California: Lawrence Livermore National Laboratory, January 1981).

"Feature Analysis of Relation Concepts and Systems for the IDM." UCID-18844, (Livermore, California: Lawrence Livermore National Laboratory, October 1980). System,"

"Feature Analysis of Relational Concepts and Systems for the NOMAD and NOMAD2." UCID-188843 (Livermore, California: Lawrence Livermore National Laboratory, October 1980).

(With G.S. Smith). "The Deadlock Problem in a Distributed Environment." UCRL-84896 (Livermore, California: Lawrence Livermore National Laboratory, August 1980).

"The Effects of Concurrency Control on the Performance of a Distributed Data Management System." 4th Berkeley Conference on Distributed Data Management and Computer Networks (San Francisco: August 1979).

(With Michael Stonebraker). "Locking Granularity Revisited." ACM Transactions on Database Systems, 4, 2 (June 1979).

"The Effects of Concurrency Control on Database Management System Performance." Ph.D. Dissertation UCB/ERL M79/20 (April 1979).

(With R. Epstein). "Evaluation of Distribution Criteria for Distributed Data Base Systems." UCB/ERL M78/12 (May 1978).

(With S. Jones). "A Relational Data Base Management System for Scientific Data." 6th International CODATA Conference (Santa Favia, Sicily, Italy: May 1978).

(With E.W. Birss, S.E. Jones, and J.E. Yeh). "Scientific Database management at Lawrence Livermore Laboratory, Needs and a Prototype System." Generalized Data Management Systems and Scientific Information, a report of a specialist study by the OECD, U.S. DoE, and U.S. NBS (October 1977).

(With Michael Stonebraker). "Effects of Locking Granularity in a Database Management System." ACM Transactions on Database Systems, 2, 3 (3 September 1977).

"Analyzing User Requirements for Data Management Systems." Department of Energy AESOP Conference (Seattle: May 1977).

John W. Sapp
Senior Systems Engineer

Mr. Sapp joined Software Architecture and Engineering, Inc. in December, 1980, after having spent seventeen years with IBM's Federal Systems Division. His experience has included the design, implementation, test and management of complex real time systems, as well as the application of software engineering techniques such as structured programming, systematic design, and chief programmer teams.

Some of the contributions Mr. Sapp has made to major systems include:

- NASA's Master Data Processor image processing system: Designed and managed the development of the control program.

- Newspaper system automation: Chief architect and designer of a data base management system designed to support interactive text entry and editing, page layout, and page makeup.

- New York Stock Exchange Market Data System: Designed and managed the development of the control program and data base management functions.

- Operating System/360 Multiprocessor development: Participated in the analysis and design of the modifications required to OS/360-MVT to support the S/360 Model 65 Multiprocessor. Managed the system integration and test effort.

During the period from 1978 to 1980, Mr. Sapp applied the systematic programming and advanced design techniques that are taught in the IBM-FSD software engineering education program to the architecture and design of complex data processing systems for DOD. In addition to designing the software support for the physical security subsystem in IBM's candidate MX C^3 system, he was also responsible for the architecture of the control and display subsystem for the Global Positioning System (GPS) Control Segment.

Since joining the company, Mr. Sapp has been project manager for Software A&E's software engineering support for the Navy Command and Control System and for the Software Cost Reduction program at the Naval Research Laboratory. The latter project has involved the application of state of the art software specification and design techniques to the development of modules for an avionics computer. Mr. Sapp has also participated in software engineering audits and reviews for government agencies and industry.

Mr. Sapp received his B.S. degree from the U.S. Naval Academy in 1959.

NAME	
STEPHEN H. SHELLEY	

EDUCATION

DEGREE/MAJOR(S)	SCHOOL	DATE
M.S., Computer Science	University of Colorado	1977
B.S., Computer Science	Virginia Polytechnic Institute & State University	1975

EMPLOYMENT HISTORY

NAME OF EMPLOYER	PERIOD OF EMPLOYMENT	DUTY
Intermetrics, Inc.	2/79 - Present	Staff Engineer
IBM	5/77 - 1/79	Assoc. Programmer
Community College of Denver	2/78 - 5/78	Instructor, CS
Hewlett-Packard	5/76 - 5/77	Application Programmer
University of Colorado	9/75 - 5/76	Teaching Assist., CS
Virginia Polytechnic Institute & State University	1/74 - 6/75	Systems Analyst

PROFESSIONAL EXPERIENCE

RELEVANT AREA(S) ORGANIZATION DATES	DESCRIPTION
Real-time Graphics Avionics Intermetrics, Inc. Program Manager 4/82 - 4/83	Designed and developed the Command Flight Path Display (CFPD) prototype software to be used in actual flight test. The CFPD format presents a 3-D perspective image of the world outside the cockpit and the commanded flight path.

PROFESSIONAL (CON'T)	
RELEVANT AREA(S) ORGANIZATION DATES	DESCRIPTION
Interactive Graphics Avionics Display Intermetrics, Inc. Staff Engineer 11/81 - 4/82	Consulted on the design of an EFIS/EICAS avionics display system and on the requirements and design of a Symbology Design and Evaluation Station to support the operational system. The Symbology Design and Evaluation Station will support interactive graphics editing functions utilizing a VAX and Megatek 7250.
Real-time Graphics Microcode Design/ Development Intermetrics, Inc. Project Manager 1/82	Provided computer graphics consulting and Adage 4145 graphics display microcode design and development for Adage. The developed microcode extended the standard 4145 functions to include high performance random placement of symbols.
Integration Test Design System Analysis Intermetrics, Inc. Staff Engineer 1/82	Provided system and software engineering analysis for the design of a dynamic, integrated test facility for the incremental testing of a large, distributed advanced combat system for submarines.
Real-time Graphics Microcode Design/ Development Intermetrics, Inc. Project Manager 10/81 - 12/81	Designed and developed a microcode product (Perpective Transformation Extension™) which adds a perspective tranformation and clipping capability to the Adage 4145 graphics display.
Compiler Design DBMS Design/Development Intermetrics, Inc. Staff Engineer 2/81 - 9/81	Co-designed the system architecture of the Graphics Real-time Application Display Support (GRADS) compiler for the Navy's Advanced Integrated Display System (AIDS). The GRADS language is a high level hierarchical language for the generation of 2-D and 3-D dynamics, real-time display formats. Designed and developed the DBMS utility for the GRADS compiler.
Avionics Display & Control Concept Design Intermetrics, Inc. Staff Engineer 1/81	Provided principal engineering support for an Orbiter Display & Control proposal effort; responsible for the technical approach section of the resultant proposal.

PROFESSIONAL (CON'T)	
RELEVANT AREA(S) ORGANIZATION DATES	DESCRIPTION
Real-time Graphics Microcode Design/ Development Intermetrics, Inc. Staff Engineer 1/80 - 1/81	Designed and developed two emulators of a Standard AIDS Display Processor, one for hardcopy and analysis functions and the other for real-time display. The real-time version was implemented using an Adage 4145 microprogrammable graphics display. The display is used in a prototype Advanced Integrated Display System (AIDS) configuration for the airborne display of tactical platform health and navigation information on USN aircraft.
System Analysis Intermetrics, Inc. Staff Engineer 9/79 - 12/79	Analyzed real-time flight performance management software to identify product improvement techniques for maintainability, through-put efficiency, and adaptability.
Interactive Graphics Requirements/Analysis Intermetrics, Inc. Staff Engineer 6/79 - 9/79	Defined the interactive graphics requirements of the Global Positioning System User Equipment Performance Evaluator (GPSE) of the Air Force Avionics Laboratory. System applications include scenario preparation, simulation monitoring, data reduction, and data presentation.
Interactive Graphics System Analysis Intermetrics, Inc. Staff Engineer 2/79 - 6/79	Surveyed and analyzed state-of-the-art computer graphics technology to develop recommendations for hardware and software satisfying the functional requirements of situation and status display workstations. Study was for the Mission Effectiveness Assessment Program (MEAP) of the Naval Underwater Systems Center.
Interactive Graphics & DBMS Design/ Development IBM Assoc. Programmer 7/77 - 1/79	Developed the functional specification, user interface, and system design for a proprietary Series/1 minicomputer-based automated drafting system. Design goals included low cost and user-friendly with short training time. Also designed and developed the database management system and the interactive graphics system support software.
Systems Analysis IBM Assoc. Programmer 5/77 - 6/77	Studied the feasibility of enhancements to the OPMINI/5100 APL microcode loader online debug software tool.

PROFESSIONAL (CON'T)	
RELEVANT AREA(S) ORGANIZATION DATES	DESCRIPTION
Computer Education Comm. College of Denver Instructor 2/78 - 5/78	Prepared and taught classes in FORTRAN programming and general software engineering methods.
Computer Applications Design/Development Hewlett-Packard Application Programmer 5/76 - 5/77	Designed and implemented software systems for general engineering on the HP 9815 and clinical laboratory analysis on the HP 9831 desktop computer.
Computer Education University of Colorado Teaching Assistant 9/75 - 5/76	Instructed computer science courses for engineering and liberal arts students.
Software Development & Maintenance VPI & SU Systems Analyst 1/74 - 6/75	Developed and maintained software for aerospace engineering applications/simulations on an IBM 370.

PUBLICATIONS

Landon, S., Avery, J., and Shelley, S., "Symbology Evaluation Station System and Software Requirements", Intermetrics, Inc., IR-MA-067, Cambridge, MA, February 1982.

Shelley, S.H., "Perspective Transformation Extension™ Reference Manual", Intermetrics, Inc., IR-MA-060, Cambridge, MA, December 1981.

Shelley, S.H., Michener, J., "Standard Aids Display Interface," Intermetrics, Inc., IR-258-3, Cambridge, MA, April 1981

Roy, K., Triplett, J. and Shelley, S., "PMS Software Architecture Phase I: Analysis Final Report", Intermetrics, Inc., IR-465, Cambridge, MA, January 1980.

Shelley, S.H., "Graphics Requirements of the Global Positioning System User Equipment Performance Evaluation (GPSE)", Intermetrics, Inc., IR-406, Cambridge, MA, September 1979.

Shelley, S.H., "Situation and Status Display Configurations for the Mission Effectiveness Assessment Program," Intermetrics, Inc., IR-389, Cambridge, MA, May 1979.

Shelley, S.H., et.al., "Development of a Preliminary Design Concept for a Multifunction Display and Control System for the Orbiter Crew Station. Volume I: Technical Proposal", Intermetrics, Inc., P-7177, Cambridge, MA, 13 March 1981.

STEFAN SHRIER
624-A South Pitt Street
Alexandria, Virginia 22314

Columbia University
B.S. (1964) Engineering Mathematics
M.S. (1966) Engineering Mathematics and Operations Research

Brown University
Ph.D. (1977) Applied Mathematics

Since 1980, Dr. Shrier has been a Member of the Research Staff at the System Planning Corporation where he conducts and supports defense-related studies within the Computer Laboratory. Recently, he directed radar signature analyses that applied advanced spectral theory to millimeter wave signals. In addition, he managed the initiation and installation of the microprocessor-based software engineering center within the Laboratory.

He has conducted and supported studies and analyses in reconnaissance, surveillance, and target acquisition systems. For the U.S. Army ERADCOM, he examined various radar system uses to assess target analysis capabilities and the integration of other information sources with those of a developmental, division-level surveillance system. He also planned and implemented a computer simulation of this system to assist mission effectiveness analysis. During a military training exercise (REFORGER 80), he collected tactical field data for subsequent analysis and correlation to radar signatures. In addition, he planned and subsequently directed an imagery display project. The project required the design and implementation of an interactive color display for radar data, military situations, and topographic maps. After completion, the display system was used to analyze radar data collected by an airborne platform.

Dr. Shrier also developed several models used for defense system analyses. As principal investigator in a force allocation study for the Defense Nuclear Agency, he implemented a computer decision model to support strategic system analyses. In support of the U.S. Army AVRADCOM, he developed a queuing model to evaluate Remotely-Piloted Vehicle launch and recovery operational concepts. For a strategic study, he developed a preferential-defense analysis model as a constrained matrix game and derived an equivalent linear programming statement to render the problem readily solvable by standard computational means. For use in System Planning's test instrumentation radars, he analyzed and developed several function approximations for microcomputer implementation.

Concurrently, Dr. Shrier is an Associate Professorial Lecturer in Statistics at the George Washington University. In this adjunct faculty post he teaches computer and information systems courses including compiler construction, software design and development, and theory of formal languages and automata. He is also a founder and chairman of the Special Interest Group University Personal Computing (SIGUPC).

From 1979 to 1980, while at SofTech, Inc. in Springfield, Virginia. Dr. Shrier served as Director of Latin American Operations (effective October, 1979). He was responsible for developing software technology transfer programs in the commercial sector. Previously, he prepared and taught a microprocessor software engineering course and also was Deputy Contract Manager for an ocean surveillance system study.

From 1977 to 1979, as Senior Engineer at Booz, Allen & Hamilton, Inc., in Bethesda, Maryland, Dr. Shrier directed a communications system architecture study for the Defense Communications Agency. He also provided technical support to several defense projects that included: analyzing signal processing computer requirements for anti-jam communications and developing evaluation criteria for alternative database system designs. In addition, Dr. Shrier contributed to various other communications-related projects. He built a regression model of twenty years of data traffic to project traffic load in a world-wide data network. For a major communications company, he conducted a technology forecast and requirements study based on projected (mid-80s) market requirements.

During the periods 1966 to 1972 and 1975 to 1977, Dr. Shrier was at Brown University in Providence, Rhode Island. From 1976 to 1977, as a senior professional at the Computer Center, Dr. Shrier managed the 55-person consulting service and taught programming.

As a Research Assistant in Applied Mathematics from 1975 to 1976, he conducted his dissertation research in pattern theory. He developed algorithms for grammatical inference and applied them to demonstrate a model of language acquisition. These algorithms were also used as a model of word classification by neural networks. Previously, as the Brown University Teaching Fellow in Applied Mathematics, Dr. Shrier developed and taught computer calculus courses. In addition, his work with computer-driven graphics displays resulted in a "Computers and Art" course.

For several years, Dr. Shrier translated papers from Russian and Polish in probability, statistics, and differential equations for the American Mathematical Society Translations Project. As a National Defense Education Act Fellow in Applied Mathematics, he taught and conducted research in numerical analysis.

During 1972 to 1975, while at Wellesley College in Wellesley, Massachusetts, Dr. Shrier chaired the Computer Science Program -- which he established. He taught introductory courses in computer science as well as special-topic seminars (e.g., cryptography and list processing). He also initiated a computer literacy plan for the academic community. As Director of Academic Computer Services (1973-1975), he directed budget and policy planning for all curriculum and instruction computing activities. Concurrently, Dr. Shrier was Secretary to the Board of Trustees, New England Regional Computing Program, Inc.

MARKO M. G. SLUSARCZUK

Age: 31
Marital Status: Married
Willing to Relocate

1215 Crystal Plaza South
2111 Jefferson Davis Hwy.
Arlington, VA 22202
(703) 521-7176

EDUCATION

Boston College Law School, J.D. May, 1982
Honors: cum laude
Activities: Articles and Citations Editor - B.C. Environmental Affairs Law Review
ABA Physical Sciences Committee
MIT Educational Council

Massachusetts Institute of Technology, Ph.D. September, 1979
Area: Materials Science - Electronic Materials
Minor: Management of Innovation, Research and Development
Honors: IBM Fellowship
Allied Chemical Fellowship
Sigma Xi

Massachusetts Institute of Technology, S.B. May, 1974
Major: Electrical Engineering
Activities: Editor, departmental newsletter
Chairman, departmental student-faculty committee
Chairman, committee awarding faculty for excellence in teaching

PROFESSIONAL LEGAL EXPERIENCE

Associate - **McKenna Conner and Cuneo**
Washington, D.C., 1982 - present
Administrative Law and Government Contracts practice. Recent assignments include: research and write sections of the post-hearing brief in an appeal to the ASBCA, followed by complete responsibility for the reply brief; draft and file appeal to the U.S. Claims Court, handle on-going matters pertaining to the appeal; participate in preparatory stages of litigation addressing technical aspects of defective government-furnished specifications.

Law Clerk - **Hemenway and Barnes**
Boston, MA, Academic Year 1981-1982
Researched and wrote memoranda in general litigation, employment, criminal and environmental law areas.

Consultant - **Self Employed**
Wellesley, MA, 1982
Prepared an analysis and report for a law firm on a contractor's claim based on the learning curve theory. Researched engineer's salaries for a labor law firm.

Summer Associate - **McKenna, Conner and Cuneo**
Washington, D.C., Summer 1981
Researched and prepared memoranda on environmental and government contract issues. Audited opposition claim for accounting discrepancies.

Legal Intern - **Goodwin, Procter and Hoar**
Boston, MA 1981
Researched environmental matters, in particular toxic substances. Distilled scientific information to facilitate the application of legal principles.

Project Participant - **Massachusetts Institute of Technology**
Cambridge, MA, 1979-1981
Participated in a project, sponsored by the National Science Foundation, on the "Use of Scientific Evidence in Courts."

SCIENTIFIC/TECHNICAL EXPERIENCE

Project Officer - **United States Army**
Fort Meade, MD, 1982-1983
Carried out classified projects with Headquarters, Intelligence Security Command.

Research Assistant - **Massachusetts Institute of Technology**
Cambridge, MA, 1975-1978
Performed theoretical and experimental research into surface phenomena of semiconductor materials. The objective of the research was to resolve problems encountered during the fabrication of computer "chips" which, when resolved, would permit a tenfold increase in computer speed and the production of highly efficient solar cells. Presented research results at the 1978 Symposium of the American Vacuum Society.

Research Assistant - **IBM T.J. Watson Research Center**
Yorktown Heights, N.Y., Summers 1973, 1974
Performed theoretical and experimental research on materials for magnetic bubble domain computer memories, and on the properties of magnetic fluids. Work was featured in an IBM press release and resulted in a paper presented at the 1974 International Magnetics Conference.

Designer - **Artificial Intelligence Laboratory**
Cambridge, MA, Academic Years 1970-1973
Worked as a circuit designer and draftsman for project LOGO, which explored the use of computers and robots to teach school children.

PROFESSIONAL ACTIVITIES

District of Columbia Bar Association
American Bar Association - Public Contracts Law Section
Section on Science and Technology
Massachusetts Institute of Technology Educational Council
Institute of Electrical and Electronic Engineers
George Washington University - Assist teaching Law for Engineers

EXPERTISE

Metallurgy, Ceramics, Solid State Physics and Chemistry, Solid State Devices and Applications, Electrical Engineering, Computer Technology, Computer Programming, Energy Related Problems, Economic Analysis, Cost Analysis, Accounting, Management of Innovation.

PATENTS

3,072,595 "Ferrofluid Display Device."

SECURITY CLEARANCE

TOP SECRET. Indoctrinated for and granted access to Sensitive Compartmented Information (SCI) in November 1982.

MARKO MYKOLA GREGORY SLUSARCZUK

PUBLICATIONS

1. G. S. Almasi, Y. S. Lin, E. Munro, and M. Slusarczuk, **Analytical Model for Bubble Propagation,** AIP Conference Proceedings no. 24, pp. 635-637, 1974.

2. G. S. Almasi, E. A. Geiss, R. J. Hendel, G. E. Keefe, Y. S. Lin and M. Slusarczuk, **Bubble Domain Propagation Mechanism in Ion-implanted Structures,** AIP Conference Proceedings no. 24, pp. 630-632, 1974.

3. M. M. G. Slusarczuk, **Ferrofluid Droplets in a Non-Magnetic Host Fluid,** Bachelor's Thesis, May 1974 (available M.I.T. Library).

4. L. T. Romankiw, M. Slusarczuk, D. A. Thompson, **Liquid Magnetic Bubbles,** IEEE Transactions on Magnetics, vol. MAG-11, no. 1, pp. 25-28, January 1975.

5. L. T. Romankiw, M. Slusarczuk, D. A. Thompson, **Ferrofluid Display Switch Selector,** IBM Technical Disclosure Bulletin, vol. 17, no. 11, pp. 3468-3469, April 1975.

6. L. T. Romankiw, M. Slusarczuk, D. A. Thompson, **Frictionless Surface for Ferrofluid Propagation,** IBM Technical Disclosure Bulletin, vol. 17, no. 11, p. 3470, April 1975.

7. L. T. Romankiw, M. Slusarczuk, D. A. Thompson, **Ferrofluid Reservoirs Storage in a Ferrofluid Display,** IBM Technical Disclosure Bulletin, vol. 17, no. 11, pp. 3471-3472, April 1975.

8. L. T. Romankiw, M. Slusarczuk, D. A. Thompson, **Immiscible Liquid Magnetic and Non-magnetic (Ferrofluid) Bubble Display with Magnetic Bubble Propagation and Recirculator,** IBM Technical Disclosure Bulletin, vol. 17, no. 11, pp. 3474-3477, April 1975.

9. A. Morawski, M. M. G. Slusarczuk, J. Lagowski and H. C. Gatos, **Surface Photovoltage Due to Photo-Thermo-Ionization of Surface States: GaAs,** Surface Science, vol. 69, no. 1, pp. 53-61, December 1977.

10. J. Lagowski, W. Walukiewicz, M. M. G. Slusarczuk and H. C. Gatos, **Derivative Surface Photovoltage Spectroscopy: A New Approach to the Study of Absorption in Semiconductors: GaAs,** Journal of Applied Physics, vol. 50, no. 7, pp. 5059-5061, July 1979.

11. M. M. G. Slusarczuk, **Electronic and Optical Properties of Gallium Arsenide Surfaces and Interfaces,** Doctoral Thesis, September 1979 (available M.I.T. Library).

12. M. M. G. Slusarczuk, **The Environmental Implications of an Emerging Technology: Photovoltaic Solar Cells — A Case Study,** Boston College Environmental Affairs Law Review, vol. 9, no. 4, 899-937, 1981.

RESUME

Roger Smeaton
Naval Ocean Systems Center, Code 8322
San Diego, CA 92152

Education

M.S., Computer Science
University of California at Irvine
graduated 1982

B.S., Computer Science
University of Calgary (Canada)
graduated 1975

Work Experience

1982 - present
computer scientist
Naval Ocean Systems Center

1975 - 1979
programmer & programmer/analyst
various commercial applications

Professional Memberships

Association for Computing Machinery

Institute of Electrical and Electronic Engineers

WENDELL G. SYKES

Mr. Sykes has specialized in operations research and systems analysis for the Department of Defense for the past 20 years.

His present interests include:

- Development of new systems and technology for over-the-horizon targeting.
- Time-critical processing of area surveillance data.
- Management and development of large distributed data base systems.
- Research and development in the field of area surveillance.

For nearly 20 years, Mr. Sykes was intimately involved in all phases of a major large-area military surveillance system. The system collects data from sensors distributed geographically over a large area and interconnected with a variety of telemetering links. The data from this primary source are processed with a variety of automated and semi-automated procedures in a two-level hierarchy of data processing centers. At the higher center, data and intelligence from other sources are coordinated to produce a final output.

Mr. Sykes has participated in research, development, and operational evaluation of this system in various stages of its development since 1961. For two and one-half years, first as a consultant and then as a Public Law Appointee (on leave of absence from Arthur D. Little), Mr. Sykes was Technical Director of the major procurement agency of the U.S. Navy responsible for continued development and procurement of the then most advanced version of this system. In that position, Mr. Sykes managed a staff of 65 officers and civilians and was responsible for the technical aspects of the program, with a yearly budget of over $150 million. He has also been involved in development, test and evaluation of a number of alternative and competing technical developments intended to complement, augment, or replace parts of that system.

For another U.S. Government client, Mr. Sykes participated in the development of an experimental program for testing applications of what was then the Government's largest digital computer and an associated national network of smaller computers, input-output access points and peripheral equipment.

Several years ago, the National Aeronautics and Space Administration (NASA) was considering the development of a Federal Government-wide information system to support decision-making by the Executive and Legislative branches. Mr. Sykes assisted NASA in examination of the technical, economic and political issues associated with such a system.

Mr. Sykes recently assisted the Federal Aviation Agency in the development of an agency response to extensive technical criticism of the proposed En-Route Air Traffic Control System Computer Replacement Program by a Congressional Subcommittee.

WENDELL G. SYKES (Continued)

Mr. Sykes is currently assisting the Defense Advanced Research Projects Agency in the planning, technical management, and experimental verification of a system to support over-the-horizon targeting of advanced, long-range Naval missiles. This system applies advanced computer science and artificial intelligence technology to the development of a targeting product from defense-wide aerospace sensors.

Mr. Sykes has served as a consultant for a number of Defense Department agencies in the area of computer networks and advanced signal processing. He has also been responsible for the planning and direction of several large test programs, both on sea and on land.

MARTIN C. TROCKI -- Software Engineer, Washington Division

EDUCATIONAL BACKGROUND:

Pursing M.S. in Computer Science, University of Maryland
B.S. in Electrical Engineering, The George Washington University, 1976

EMPLOYMENT HISTORY SUMMARY:

Intermetrics, Inc.	Software Engineer, Washington Division
The Johns Hopkins University	Systems Analyst/Programmer
International Business Services	Systems Programmer
Science Applications, Inc.	Senior Programmer

PROFESSIONAL EXPERIENCES:

Intermetrics, Inc. --

I participated in a project to design and implement an assembler. Ancillary work included writing a user's manual.

I worked on a team that determined the requirements for a telecommunication project concerning the reading of electric power cosumption meters via telephone lines. The system needed a flexible user interface and database manager to schedule and monitor the reading process.

The Johns Hopkins University, School of Medicine, Department of Biomedical Engineering --

Under contract to IBM I wrote an hierarchical database manager for the Series/1 minicomputer. The database manager is more flexible than those available commerically and it can be transported to other computers.

I assisted in developing a requirements and program generating language designed to increase programmer productivity and provide consistent user interfaces and documentation. My specific responsibilities were investigating database design and writing a prototype program generator, as well as testing and critiquing the completed system.

I have designed and implemented clinical information systems to handle patient-problem, administrative and research data. Users of these applications range from the Department of Social Work to researchers in bacteriology.

International Business Services --

Working for a subcontractor to IBM, I wrote a real-time program to test the efficiency of a submarine sonar system.

Science Applications Inc. --

Projects included designing user interface programs in the Congressionally mandated Five Year Defense Plan financial resources system, and serving as a group leader in charge of maintenance and documentation of a subsystem in the Army personnel tracking system.

For the U.S. Army European headquarters, in West Germany, I participated in a system upgrade and conversion from the Burroughs 3500 to the IBM 360/65. My responsibilities included development of testing procedures and documentation standards in addition to program conversion.

TECHNICAL EXPERIENCE SUMMARY:

MACHINES	OPERATING SYSTEMS	LANGUAGES
VAX 11	VMS	PASCAL, FORTRAN
IBM 360/370/303*	OS/VS, MVS	PL/I, FORTRAN, COBOL, JCL
IBM Series/1	RPS, CPS, EDX	EDL, FORTRAN
PDP 11/70	DSM, ISM	MUMPS
AN/UYK-7	CMS-2/ULTRA-32	CMS-2/ULTRA-32

EDISON T.S. TSE
Director, Decision Systems Laboratory
Associate Professor
DEPARTMENT OF ENGINEERING-ECONOMIC SYSTEMS
Stanford University
Stanford, California 94305
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ASSOCIATE PROFESSOR
ENGINEERING-ECONOMIC SYSTEMS DEPARTMENT
STANFORD UNIVERSITY

Professor Tse received the B.S. and M.S. degrees simultaneously in 1967 and the Ph.D. degree in 1970, all in Electrical Engineering from the Massachusetts Institute of Technology.

Professor Tse's fields of specialization includes control and optimization theory, decision-making under uncertainty, modeling and policy assessment, the optimal utilization of information in decision making and hierarchical systems theory.

From 1969 to 1975 he was with Systems Control, Inc., where he was a Senior Research Engineer. At Systems Control he contributed to the formulation and development of hierarchical systems techniques for command, control, and communication systems. He also developed new techniques for optimal stochastic resource allocation for radar energy, computer time and interceptors in an ABM system, filtering techniques for target tracking and a new efficient estimation algorithm for nonlinear state estimation problems in electric power systems. He introduced and studied the notion of parameter identifiability in the system identification problem. He has made significant contributions to the area of adaptive control by introducing and developing the concept of acitvely adaptive control.

Since January 1975, he has been with the Department of Engineering-Economic Systems at Stanford University where he is now an Associate Professor and the Director of Decision Systems Laboratory within the department.

At Stanford, he has developed a methodology on the use of models as a consensus seeking device among different persons, who represent different usage groups and may have different bias information, in a decision process under uncertainties. The approach is a unique combination of decision analysis, system modeling, group behavior and optimization theory. He has applied this methodology in the development of decision systems for resource management decision, which is now installed and used by the Southeasst Fisheries Center at Miami in providing assessment that assists in the decision making in the Gulf of Mexico shrimp plans; and textile industry investment decision for the World Bank for the use in assessing synthetic fiber investments in some developing countries.

He is a principal consultant with Advance Information and Decision Systems where he participates in the development of decision systems in military applications. He has consulted in projects related to C^3, Systems Evaluation, Distributed Sensor Network and Multi-target Tracking.

His recent research interest is in the integration of quantitative and qualitative methodologies in solving complex distributed decision problems. Specifically, the integration of Artificial Intelligence, Cognitive Psychology and Mathematical System Theory in complex problem solving. Professor Tse has published over 140 technical articles in his research activities.

Dr. Tse received the 1973 Donald P. Eckman Award for outstanding achievement in the field of automatic control from the American Automatic Control Council. He served as Chairman of the IEEE S-CS Technical Committee on Stochastic Control and as Associate Editor of this TRANSACTIONS from 1975 to 1976. He was Chairman of the 15th Symposium on Adaptive Processes. He was Co-Chairman of the NBER Conference on Economics and Stochastic control for the years 1975, 1976 and 1977. He is a co-founder and an editor of the Journal of Economic Dynamics and Control.

Professor Tse is a member of Eta Kappa Nu, Tau Beta Pi, Sigma Xi, AAAS, IEEE, ORSA and TIMS.

KARL J. WEIDNER

Mr. Weidner has over 13 years experience in the field of data processing. He has provided technical and administrative management to numerous projects dealing with state-of-the-art advances in information technology. He has also managed the technical activities of systems analysts, computer programmers, simulation and modeling specialists, and human factors, documentation, and training specialists. Mr. Weidner's hardware experience is with the IBM 360/25, 30, 40, 50 and 65 and HIS 6000, 6050, 6060, and 6080. His software experience is with COBOL, FORTRAN, RPG, GCOS, NIPS, FFS, IDS, TPS, and ISP.

At INCO, INC., Mr. Weidner is a member of the C^3I Division and is assigned to the Modular Architecture for the Exchange of Intelligence (MAXI) project.

Previously, Mr. Weidner was employed at the System Development Corporation as the project manager for the Command and Control Technical Center (CCTC) Worldwide Military Command and Control System (WWMCCS) ADP Security contract. In his capacity as project manager, Mr. Weidner was directly responsible for the daily contract management and budget monitoring functions as well as directing the technical activities of project team members performing on the contract. The primary area of project performance concerned the architecture validation and extensive testing of the security controls implemented in a minicomputer oriented Network Front End (NFE) proposed for incorporation into the WWMCCS Intercomputer Network (WIN). Specific task areas included the analysis and design of sophisticated ADP testing concepts for security vulnerabilities, the design and development of a formal test methodology to include automated test tool development, actual conduct of numerous security tests in a network environment under simulated operational conditions at varying levels of system stress and formal reporting of test results as they pertained to specific security requirements. Additionally, Mr. Weidner was responsible for the development of the WWMCCS ADP System Security Officer (WASSO) Security Audit Handbook. This document was published by CCTC as the WWMCCS community standard reference manual concerning interpretation of the security audit trail produced by standard WWMCCS hardware/software configurations.

Mr. Weidner was also the project manager for the WIS ADP security project with the WIS Joint Program Management Office (JPMO). Mr. Weidner was directly responsible for the daily contract management and budgeting activities. He also was the senior technical manager managing the project team which conducted the security requirements analysis and security architecture derivation tasks. Specific tasks included coordination of the worldwide data collection task, definition of the security requirements, and definition of the proposed security architecture for the local area network which formed the foundation of the WIS implementation.

Earlier, Mr. Weidner was assigned as the principal investigator on the Naval Research Laboratory (NRL) Security Analysis and Risk Assessment efforts. Mr. Weidner was directly responsible for conducting a high-level security analysis of the Integrated Radio Room (IRR), the external communications center for TRIDENT submarines. This task included definition and analysis of security requirements, definition of generic security weaknesses and associated potential countermeasures, and identification of specific features of the automated communications suite which should be subjected to a stringent and formal risk assessment. Mr. Weidner was also the senior member of a risk assessment team performing a comprehensive security analysis and formal risk assessment for a highly specialized Naval facility. His primary area of concentration was on intercomputer networks and formal protocol and validation features of several sophisticated communication systems.

Mr. Weidner has served as project head for the Nuclear Contingency Planning System, Part of the General WAS Subsystem developed to support the Joint Chiefs of Staff and the National Command Authority. In the capacity of project head, he supervised a senior-level staff of analysts, programmers, human factors and training specialists directly supporting the Strategic Operations Division of the Command and Control Technical Center in such areas as system requirements analysis and definition, data base design, cruise missile interface design, application software design and implementation, and development of the total system documentation necessary to support a fully operational nuclear planning system Mr. Weidner provided direct guidance for design and implementation of several interactive graphics systems, particularly in the areas of nuclear weapon selection and optimization modeling, aircraft route simulation, target optimization and selection methodologies. Mr. Weidner traveled extensively to all nuclear capable theater CINCs to ensure complete system integrity during software installations and to provide hands-on training and management overview briefings at the responsible commands.

At Planning Research Corporation, Mr. Weidner was the senior task manager of the project for the development of worldwide standard functional software for a large-scale, interactive, real-time automatic message processing system for the Department of the Navy. The Navy WWMCCS Software Standardization (NWSS) system provided for automatic processing of military message traffic between Chief of Naval Operations, Washington, D.C., Commander in Chief, Atlantic Fleet (CINCLANT), Commander in Chief, Pacific Fleet (CINCPAC), and Commander in Chief, U.S. Naval Forces, Europe (CINCUSNAVEUR). He traveled extensively to Europe and Hawaii to ensure total system compatibility of NWSS standard software between WWMCCS sites. Mr. Weidner participated in all phases of system development from initial specifications analysis through design, implementation, production of system documentation, and user training. Mr. Weidner was responsible for conducting advanced feasibility studies, cost/effectiveness tradeoffs, and oral and visual senior management presentations. The system was designed to accept both rigidly formatted and free form message text from various sources, including remote

intelligent terminals, CRT, and electronic AUTODIN/NAVCOMM inputs. Extensive testing was done with both the Prototype WWMCCS Intercomputer Network (PWIN) as well as the WWDMS data management system. The system was responsible for message validation, storage in central WWMCCS IDS data base, and automatic routine of message text to other worldwide WWMCCS sites included in the NWSS network. The system featured COBOL-IDS under TPS and GCOS on a Honeywell 6080 in a multiprocessing, multiprogramming, real-time, interactive, on-line environment. Access to the system was on a priority/security restricted basis.

Mr. Weidner served as a senior task manager in a project to provide advanced technical support to Headquarters U.S. European Command (HQ USEUCOM) in the application area of combatant command and control. He directed the analysis, design and implementation of the initial WWMCCS Integrated Data Store (IDS) data bases to be installed at HQ USEUCOM. He was solely responsible for definition, analysis, design, testing, and integration of a major new Petroleum, Oil, Lubricant (POL) logistics system including data base design, generation, revision, and maintenance. Work was performed on the WWMCCS Honeywell 6050 computer featuring IDS, a COBOL enhancement designed to upgrade data handling in mass storage, random-access environment.

Mr. Weidner designed and developed comprehensive integrated logistics data bases and supportive reporting software for Headquarters U.S. European Command. As task leader, he was responsible for development of large-scale integrated data bases utilized to provide logistical (war material) support to U.S. Forces in Europe and the Near East. Logistical support programs featured the NIPS Formatted File System (FFS) on IBM 360/65 OS in an MVT environment.

Mr. Weidner performed program design, coding, testing, and final systems integration in a redesign effort for the NASA Financial Status of Programs System. Work was performed in COBOL to execute on an IBM 360/40 OS immediate access environment. The project was designed to provide NASA budget managers with an ad hoc query capability as to the current and proposed financial status of any of NASA's current projects.

Employed by the Washington Suburban Sanitary Commission, Mr. Weidner participated in a project to develop the conceptual design, analysis, and implementation plan for a Total Management Information System (TMIS) with emphasis on personnel data bases. He was responsible for the design of data collection techniques; information collation, storage, and retrieval; and report generation. He provided customer liaison to ensure system compatibility with customer requirements and evaluated the capability of existing ADP hardware to provide required support for future developments. TMIS utilized CRT devices operating under a security system to prevent unauthorized accessing of the data base. Programs were written in COBOL under IBM 360/50 MVT.

Mr. Weidner served as a programmer/analyst responsible for developing a tuition accounting and automatic grading system. Work involved design and maintenance of multiple data files and comprehensive report generation to management personnel. Programs were written in COBOL F for the IBM 360/25 and 360/30.

Mr. Weidner has an A.A. in Business Administration from the University of Maryland.

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June, 1983

PERSONAL:

Born June 24, 1936 in Varese, Italy. German citizen, permanent resident of the United States since November, 1958.

Married to Voy Yat Jew, July 30, 1966. Two children.

EDUCATION:

1954-1957 TMS Technicum, Rotterdam, Holland
B.S., cum laude, in Aeronautical Engineering

1957-1958 THS Delft, Delft, Holland
Graduate work in Aeronautics
Assistantship in the Laboratory for Electronic Music

1960-1964 University of California at Berkeley
Course work in heuristic programming, compiler design, recursive programming, and lambda calculus

1973-1976 University of California, San Francisco
Ph.D. in Medical Information Science
Thesis: "A Methodology for the Design of Medical Database Systems"

PROFESSIONAL EXPERIENCE:

1983-present Associate Professor (Research) Medicine and Computer Science and, by courtesy Electrical Engineering, Stanford University.

1976-1983 Assistant Professor, Computer Science Department and, by courtesy, Electrical Engineering, Stanford University.

Research interests: System Design (databases, distributed systems) and applications in medicine, planning, and business.

Principal Investigator (current):
Knowledge Based Management Systems (ARPA/DOD),
RX, Knowledge Extraction from Medical Databases (NCHSR/DHHS).
Follow-up on Automated Ambulatory Med. Rec. Systems(NCHSR/DHHS),
Theory and Computation for Natural Language Processing for Jerrold Kaplan (NSF-DIST)

1982-present Vice President, Time Oriented Databases Inc., Palo Alto.

1974-1975 Project Manager, University of California, San Francisco Office of Medical Information Systems, for the project, "Evaluation of Automated Ambulatory Medical Records Systems" (NCHSR/DHHS).

1971-1973 Staff Consultant, Stanford University Hospital, Dept. of Immunology, and Dept. of Community Medicine and Family Practice, Stanford Medical School.

1970	Manager of System Design, MASCOR - Multi-Access Systems Corporation, Sunnyvale, CA.
1969-1970	Director of Program and Terminal Development, INDEX Division of Reeves Telecom Corporation, New York and Belmont, CA.
1965-1976	Lecturer, Computer Science Department, Stanford University.
1965-1970	Director of ACME (Advanced Computer for Medical Research) and Associate Director of Real-time Facility, Computation Center, Stanford University.
1961-present	Private Consultant to industry, subjects: Data Acquisition and Organization, Database Design Methods, and Evaluation.
1961-1965	Head of Programming, University of California Computer Center, Berkeley, CA.
1958-1961	Programmer and Senior Programmer, IBM Service Bureau Corp., New York and San Jose, CA.
1958	Technical Assistant, SHAPE Air Defense Technical Center, The Hague, Holland

TEACHING APPOINTMENTS:

1966-present	Lecturer (1966-1975), Assistant Professor (1976-present) Computer Science Department, Stanford University. Courses taught: Introduction to Algorithmic Processes, Computer Organization and Information Structures, Introduction to Computer Science, Non-numerical Methods, Database Systems, Introduction to Computer Architecture, Operating Systems, Systems Programming, Parallel Processing, Systems Research Seminar, Language Features and Their Implementation. Current responsibility: File and Database Systems, Database Research Seminar.
July, 1975	Visiting Lecturer, Institute of Information Technology, Tokyo, Japan. Course on "Database Performance Prediction".
Spring, 1974	Visiting Lecturer, University of California, Berkeley, Department of Electrical Engineering and Computer Science. Taught "Database Organization".
Autumn, 1973	Lecturer, University of California, San Francisco, Medical Information Science Program. Taught "Database Organization".
Winter, 1972	ACM, Professional Course on "Database Schemas".
1964-1965	Visiting Professor for USAID, Indian Institute Technology, Kanpur, India. Courses taught: Introduction to Programming, Numerical Analysis and Computation, and Systems Programming.
1963	University of California Computer Center, Berkeley. Courses taught: MAP Programming and Introduction to FORTRAN (TV tape).
1959-1961	IBM Service Bureau Corporation, New York. Course taught: FORTRAN Programming.

HONORS:

Who's Who in America, since 1968
National Library of Medicine Fellowship, 1974-1976
Member, Health Care Technology Study Section, HRA-DHSS, 1980-1984.
Chairman of the Board, Pacific Software, Berkeley, 1981-present.
Associate Editor, TODS (ACM Transactions on Database Systems), 1982-present.
Distinguished Lecturer, IEEE Computer Society, 1981-1982.
Program Chairman, IEEE Computer Society 2nd Symp. on Reliability in Distributed Software and Database Systems, 1982.
Member, Editorial Board, IEEE Computer Magazine, 1982-present.
Member, Committee on Data Management and Computation, Space Sciences Board, National Research Council, 1982-1985.
Associate Member, Data for Development International Association, Marseille, France, 1982-present,
Vice Chairman, Executive Committee of the IEEE-CS Technical Committee on Database Engineering, 1983.

CONSULTANTSHIPS (current)

1971-present	National Center for Health Services Research, DHHS-HRA-NCHSR, Hyattsville, MD. (Hospital and Disease Information Systems.)
1975-present	Division of Immunology, Stanford School of Medicine. (ARAMIS: American Rheumatism Association Medical Information System.)
1976-present	United Nations Development Programme. (Computer systems and databases for economic planning in India and the People's Republic of China.)
1977-present	National Cancer Institute, NIH, Washington D.C. (Cancer studies proposal review and Chairman, Committee for the Evaluation of Proposals for the Statistical Analysis and Quality Control Center for the Centralized Cancer Patient Data System.)
1978-present	University of Southern California, Center for Health Services Research. (Hospital Computer Systems Studies.)
1979-1982	National Academy of Science, Washington, D.C. (Panel on the Conduct of Basic Research in Computer Science.)
1982-present	(Commitee on Data Management and Computation, Space Sciences)
1979-present	National Library of Medicine, DHHS-NIH-NLM, Bethesda, MD. (Review of Proposals in their Information Science Program.)
1979-present	WIVAC, Palo Alto, CA. (Databases for Design Automation.)
1980-present	SRI-International, Croydon, England. (Database Systems for European Banks, Research Policy Evaluation for the Bundesministerium fur Forschung und Technologie, FRG.)
1981-present	Review Board, US Navy Computer Command and Control Systems, 6.2 programs (Advanced development), NavCom, Washington DC.
1982-present	Visicorp, San Jose CA, (Database architecture for Personal Computer Systems).

PROFESSIONAL SOCIETIES:

Association for Computing Machinery (ACM)
American Association for the Advancement of Science (AAAS)
American Association for Medical Systems and Informatics (AAMSI)
American Institute for Aeronautics and Astronautics (AIAA)
Association for Computational Linguistics (ACL)
Computer Society, Institute of Electrical and Electronics Engineers (IEEE)
The Institute of Management Sciences (TIMS)
Combustion Institute

PUBLICATIONS:

BOOKS:

Wiederhold, Gio: Database Design: (in the Computer Science Series) McGraw-Hill Book Company, New York, NY, May 1977, 678 pp. Second edition, Jan. 1983, 768 pp.

Wiederhold, Gio: Databases for Health Care; D.A.B. Lindberg (Ed.), Springer Verlag, 1981

Wiederhold, Gio: Datenbanken Analyse-Design-Erfahrungen; (translation of Chapters 1-6 of Database Design) Reihe Datenverarbeitung, R. Oldenbourg Verlag, FRG, 1980, 454 pp.

JOURNAL ARTICLES and BOOK CHAPTERS:

Wiederhold, Gio: "Modeling Databases"; to be published in Information Systems, 1983.

Kuhn, Ingeborg, Gio Wiederhold, Jonathan E. Rodnick, Diane M. Ramsey-Klee, Sanford Benett, and Donald D. Beck: "Automated Ambulatory Medical Record Systems in the U.S.", to be published by Springer-Verlag, 1983, in Information Systems for Patient Care, B. Blum (ed.), Section III, Chapter 14.

Wiederhold, Gio: "Databases and File-System Organization"; in The McGraw-Hill Computer Handbook, McGraw-Hill Book Company, New York, Harry Helms (ed.), 1983, pp. 19-1--19-99.

Wiederhold, Gio: "Scientific Computing: A Scientific Group of Mixed Background Attempts to Cope with a Broad Spectrum of Problems": abstracted in Roles of Industry and the University in Computer Research and Development, National Academy Press, Washington, D.C. 1982, pp. 60-66.

Whang, Kyu-Young, Gio Wiederhold, and Daniel Sagalowicz: "Estimating Block Accesses in Database Organizations: A Closed Noniterative Formula"; accepted for publication in Communications of the ACM, 1983.

Ceri, Stefano, S. B. Navathe, and Gio Wiederhold: "Distribution Design of Logical Database Schemas"; to be published in Transactions on Software Engineering, 1983.

Minoura, Toshimi and Gio Wiederhold: "Resilient Extended True-Copy Token Scheme for a Distributed Database System"; IEEE Transactions on Software Engineering, Vol. SE-8, No. 3, May 1982, pp. 173-188.

JOURNAL ARTICLES AND BOOK CHAPTERS (continued)

Garcia-Molina, Hector and Gio Wiederhold: "Read-Only Transactions in a Distributed Database"; Stanford University, Department of Computer Science, Report No. STAN-CS-80-797, April 1980; ACM Transactions on Database Systems, Vol. 7, No.2, June 1982, pp. 209-234.

Wiederhold, Gio, Anne Beetem, and Garret Short: "A Database Approach to Communication in VLSI Design"; IEEE Transactions on Design Automation, Vol. CAD-1, No. 2, April 1982, pp. 57-63.

Wiederhold, Gio: "Database Technology in Healthcare"; Journal of Medical Systems, Plenum, Vol.5, No.3, Sept. 1981, pp. 175-196.

Wiederhold, Gio: "New Technologies"; The Computer in the Doctor's Office, O. Rienhoff/M.E. Abrams (Eds.), North-Holland Publishing Company, IFIP, 1980, pp. 263-264.

Wiederhold, Gio and Ramez El-Masri: "The Structural Model for Database Design"; Entity-Relationships Approach to Systems Analysis and Design, (Chen, Ed.), North-Holland, 1980, pp. 237-257.

Wiederhold, Gio: "Hospital Information Systems" and "Medical Applications"; Encyclopedia of Computer Science, A. Ralston (editor), Van Norstrand Reinhold Co., NY, 2nd Ed., 1982, pp.686-688 and pp.934-940.

Wiederhold, Gio: "Databases for Economic Planning in India"; Management Sciences and the Development of Asean Economies, S. Torok (editor), Times Books International, Singapore, 1979.

Flexer, J. Robert and Gio Wiederhold: "A Building Block Approach for Digital Graphics"; Computer Graphics Quarterly, Vol.13, No.2, Aug. 1979, pp. 238-245.

Wiederhold, Gio and Ingeborg Kuhn: "Effective Services of Automated Ambulatory Medical Record Systems"; International Journal on Policy Analysis and Information Systems, Vol.1, No.2, January 1978.

Wiederhold, Gio: "Applications of Computers in Medicine"; Encyclopedia of Computer Science, A. Ralston (editor), Petrocelli Charter 1976, pp. 611-612 and 873-879.
Second edition; van Norstrand-Reinhold 1982, pp.686-688, 934-940.

Weyl, Stephen, James F. Fries, Gio Wiederhold, and Frank Germano: "A Modular Self-describing Clinical Database System"; Computers in Biomedical Research, June 1975, Vol. 8, pp. 279-293.

Dong, Eugene and Gio Wiederhold: "The Use of a General Purpose Time-Shared Computer in Physiology Research"; in Research Animals in Medicine, L. Harmison (editor), DHEW, National Heart and Lung Institute, 1973.

Wiederhold, Gio: "Das ACME System an der Stanford School of Medicine und seine praktische Verwendung" (in German); Krankenhaus Informations-systeme, G. Wagner (editor), Schattauer Verlag, Stuttgart, Germany, 1972, pp.139-147.

Girardi, Serge, Regina Frey, and Gio Wiederhold: "A Filing System for Medical Research"; International Journal of Biomedical Computing, 1971 2(1), pp. 1-26.

JOURNAL ARTICLES AND BOOK CHAPTERS (continued)

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Crouse, Linda and Gio Wiederhold: "An Advanced Computer System for Real-Time Medical Applications"; Computers in Biomedical Research, December 1969, 2(6), pp. 582-598.

Tsao, C.C. and Gio Wiederhold: "A Computer Program for the Evaluation of Rocket Fuels"; in Kinetics, Equilibrium and Performance of High-Temperature Systems, G.S. Bahn (editor), Gordon and Breach Publisher, New York, 1963, pp. 261-269.

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Wiederhold, Gio: "Modeling Databases"; in Information Sciences 29, Elsevier Science Publishing, 1983.

Wiederhold, Gio: "A Method for the Design of Multi-Objective Databases"; Proceedings of the Annual Meeting of the American Society of Mechanical Engineers, June 1982, pp. 161-165.

Whang, Kyu-Young, Gio Wiederhold, and Daniel Sagalowicz: "Separability as a Tool for the Design of Network Databases"; Proceedings of the 8th VLDB Conference, Mexico City, Mexico, Sept. 1982, pp. 98-107.

Keller, Arthur M. and Gio Wiederhold: "Updates to Relational Databases through Views Involving Joins"; 2nd International Conference on Databases: Improving Usability and Responsiveness, Jerusalem, Israel, Academic Press, June 1982, pp. 363-384.

Whang, Kyu-Young, Gio Wiederhold, and Daniel Sagalowicz: "Separability - An Approach to Physical Database Design"; Proceedings of the Seventh International Conference on Very Large Data Bases, ACM, Sep. 1981, pp. 320-332.

Keller, Arthur M. and Gio Wiederhold: "Validation of Updates Against the Structural Database Model"; Symposium on Reliability in Distributed Software and Database Systems, July 1981, Pittsburgh, PA., pp.195-199.

Minoura, Toshimi and Gio Wiederhold: "Resilient Extended True-Copy Token Scheme for a Distributed Database System"; Symposium on Reliability in Distributed Software and Database Systems, July 1981, Pittsburgh, PA., pp.1-12.

Allchin, James E., Arthur M. Keller, and Gio Wiederhold: "FLASH: A Language-Independent, Portable File Access System"; Proceedings of the ACM SIGMOD Conference, Santa Monica, May 1980, pp. 151-156.

Kuhn, Ingeborg and Gio Wiederhold: "Advances in Automated Ambulatory Medical Record Systems"; Proceedings of the Fifth Annual Symposium on Computer Applications in Medical Care", IEEE, Nov 1981, pp. 80-85.

El-Masri, Ramez and Gio Wiederhold: "Properties of Relationships and their Representation"; Proceedings of the National Computer Conference, AFIPS Press, May 1980, pp. 319-326.

PUBLICATIONS IN REFEREED PROCEEDINGS (continued)

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El-Masri, Ramez and Gio Wiederhold: "Data Model Integration Using the Structural Model"; Proceedings 1979 ACM SIGMOD Conference, pp.191-202.

Ghosh, Sakti P., Alfonso F. Cardenas, Ignacio Mijares, and Gio Wiederhold: "Some Very Large Databases in Developing Countries"; Proceedings of the 5th International Conference on Very Large Databases, Rio de Janiero, October 1979, pp. 173-182.

Blum, Robert and Gio Wiederhold: "Inferring Knowledge from Clinical Data Banks Utilizing Techniques from Artificial Intelligence"; Proceedings of the Second Annual Symposium on Computer Applications in Medical Care, IEEE, Washington, D.C., November 1978, pp. 303-307.

Rodnick, Jonathan and Gio Wiederhold: "A Review of Ambulatory Medical Record Systems in the United States: Charting Services That Are of Benefit to the Physician"; MEDINFO-77 Proceedings, D.B. Shires and H. Wulfs (editors), IFIP, North Holland Publishing Company, 1977, pp. 957-961.

Wiederhold, Gio, James F. Fries, and Stephen Weyl: "Structured Organization of Clinical Databases"; Proceedings of the National Computer Conference, 1975, AFIPS Vol 44, pp. 479-485.

Wiederhold, Gio: "The Need and a Method to Obliterate Control Languages"; Proceedings of the SIGPLAN-SIGOPS meeting on Programming Languages and Operating Systems, SIGPLAN Notices, 8(9), September 1973, pp. 140-141.

Wiederhold, Gio and John Ehrman: "An Inferred Syntax and Semantics of PL/S"; Proceedings of the ACM Conference on System Implementation Languages, SIGPLAN Notices, 6(9), October 1971, pp. 111-121.

Breitbard, Gary Y. and Gio Wiederhold "PL/ACME: An Incremental Compiler for a Subset of PL/1"; Proceedings of the 1968 IFIPS Conference, Edinburgh, North Holland, 1969, pp. 358-363.

Sanders, William J., Gio Wiederhold, et al: "An Advanced Computer System for Medical Research"; Proceedings of the AFIPS Conference, Vol. 31, Washington, D.C., Thompson Books, 1967, pp. 497-508.

OTHER PUBLICATIONS:

Wiederhold,Gio: "Networking of Data Information", National Cancer Institute Workshop on the Role of Computers in Cancer Clinical Trials, National Institutes of Health, June 1983, pp.113-119.

Sacca, Domenico and Gio Wiederhold: "Database Partitioning in a Cluster of Processors"; accepted by the VLDB 9 Conference, May 1983.

Olumi,Mohammad, Gio Wiederhold, Carl Hauser, Peter Lucas, and James Mehl: "Software Project Databases"; Proc. ACM-SIGMOD June 1983.

Navathe,Shamkant, Stefano Ceri, Gio Wiederhold, and Jinglie Dou: "Vertical Partitioning for Physical and Distribution Design of Databases"; to be published as a Stanford CS report, Dec. 1982.

Kuhn,Ingeborg M., Gio Wiederhold, Jonathan E. Rodnick, Diane M. Ramsey-Klee, Sanford Benett, Donald D. Beck: "Automated Ambulatory Medical Record Systems in the U.S."; Stanford CS Report STAN-CS-82-928, August 1982.

Beetem, Anne, Jack Milton, and Gio Wiederhold: "Performance of Database Management Systems in VLSI Design"; Database Engineering, Vol.5, No.2, June 1982, pp. 15-20.

Gio Wiederhold: "Databases for Ambulatory Care"; Proceedings of the Annual Conference of the American Medical Informatics Association, May 1982, pp. 79-85.

Shaw, David E., Salvatore J. Stolfo, Hussein Ibrahim, Gio Wiederhold, and Jim Andrews: "The NON-VON Database Machine, A Brief Overview"; IEEE Database Engineering Bulletin, Vol.4, No. 2, Dec. 1981, pp. 41-52.

Ceri,Stefano, Shamkant Navathe, and Gio Wiederhold: " Optimal Design of Distributed Databases"; Stanford CS Report STAN-CS-81-994, Dec. 1981.

Whang, Kyu-Young, Gio Wiederhold, and Daniel Sagalowicz: "Two Techniques for Physical Database Design"; Stanford CS report CSL TR-222, Nov. 1981.

Blum, Robert L. and Gio C.M. Wiederhold: "Studying Hypotheses on a Time-Oriented Clincial Database: An Overview of the RX Project"; Proc. of the 6th Symposium on Computer Applications in Medical Care, Oct. 30-Nov. 2, 1981, Washington, D.C., IEEE 82 CH1805-1, pp. 725-735.

El-Masri, Ramez and Gio Wiederhold: "Formal Specifications of GORDAS: A High-Level Query Language for Graph Databases"; Proceedings of the Second International Conference on the Entity-Relationship Approach to System Analysis and Design, Washington; D.C., Oct. 12-14, 1981.

Wiederhold, Gio, S. Jerrold Kaplan, and Daniel Sagalowicz: "Research in Knowledge Base Management Systems"; ACM SIGMOD Record, Vol. 11, No. 3, April 1981, pp. 26-54.

Wiederhold, Gio: "Binding in Information Processing"; Stanford University, Computer Science Dept. Report, STAN-CS-81-851, May 1981.

OTHER PUBLICATIONS (continued):

Minoura, Toshimi and Gio Wiederhold: "Resilient Extended True-Copy Token Scheme for Distributed Database Systems"; Stanford University, Computer Systems Laboratory, EE and CSL, TR.197, 1981.

Wiederhold, Gio: "Scientific Computing and Its Effect on Industrial Development"; working paper for the National Research Council's Panel on the Conduct of Basic Research in Computer Science, July 1980.

Wiederhold, Gio: "The Evolution of the B-tree"; working paper for the National Research Council's Panel on the Conduct of Basic Research in Computer Science, April 1980.

Garcia-Molina, Hector and Gio Wiederhold: "Read-Only Transactions in a Distributed Database"; Stanford University, Department of Computer Science, Report No. STAN-CS-80-797, April 1980.

Wiederhold, Gio and Ramez El-Masri: "A Structural Model for Database Systems"; Stanford CSD Report 79-722, February 1979.

Keller, Arthur and Gio Wiederhold: "S-1 Intermediate Loader Format and S-1 Linker"; CSL Technical Note 147, Stanford University, Jan.1979.

Chow, Fred, Peter Nye, and Gio Wiederhold: "UFORT, A Fortran to U-Code Translator"; CSL Technical Report No. 168, Stanford University, February 1980.

Wiederhold, Gio and Ramez El-Masri: "Errata for Database Design"; Database Engineering, 2(3), September 1978, pp. 8-12.

Wiederhold, Gio: "The Data Model of MUMPS Globals"; Proceedings of the 1978 MUMPS User's Group Meeting, P. Zimmerman (editor), MUG, Bedford, Mass., December 1978, pp. 159-183.

Castaneda, Fernando, F. Chow, P. Nye, D. Sleator, and G. Wiederhold: "PCFORT, A FORTRAN to P-Code Translator"; CSL Technical Report 160; Stanford University, January 1979.

Wiederhold, Gio: "Introducing Semantic Information into a Database Schema"; Proceedings of the CIPS Session '78, Canadian Information Processing Society, September 1978, pp. 338-391.

Wiederhold, Gio: "Management of Semantic Information for Databases"; Third USA-Japan Computer Conference Proceedings, San Francisco, September 1978, pp. 192-197.

Garcia-Molina, Hector and Gio Wiederhold: "Application of the Contract Net Protocol to Distributed Databases"; Report HPP-77-21, Stanford University, April, 1977.

Wiederhold, Gio: "Alternatives in Database Design"; Proceedings of the Third Illinois Conference on Medical Information Systems, University of Illinois, 1977, pp. 78-87.

Wiederhold, Gio: "The Use of Operational Feedback Loops to Attain Data Correctness"; (Abstract) Workshop on Database Error Detection, Naval Research Laboratory, Washington, D.C., January 17-18, 1978.

OTHER PUBLICATIONS (continued):

Wiederhold, Gio, Earl Sacerdoti, Daniel Sagalowicz, Ramez El-Masri, and Gordon Novak: "A Preliminary Sketch to Define Research Opportunities Relevant to ARPA's Plans for Knowledge Processing in Databases"; (Planning paper for ARPA IPToffice), September 1977.

Wiederhold, Gio: "Methods for the Design of Medical Database Systems"; Technical Report No. 24, Laboratory of Medical Information Science, University of California, San Francisco, September 1976.

Ramsey-Klee, Diane M., Vivian Richmond, and Gio Wiederhold: "Feasibility of Design Parameters for a Computer-Based Attitudinal Research Information System"; Navy Personnel Research and Development Center, San Diego, Technical Report No. 76-9, August 1975.

Fries, James, Alison Harlow, and Gio Wiederhold: " Experience-Based Computer Consultation"; 1975 International Conference on Cybernetics and Society, September 23-25, 1975, San Francisco.

Wiederhold, Gio and Emanuel Mesel: "Automated Ambulatory Medical Record Systems"; Proceedings of the 1975 MUMPS User's Group Meeting, J. Zimmerman (editor), Biomedical Computer Lab, St. Louis, November 1975.

Henley, Ronald H., Gio Wiederhold, Jack Dervin, Michael Jenkins, Ingeborg Kuhn, Emanuel Mesel, Diane Ramsey-Klee, and Jonathan Rodnick: "An Analysis of Automated Ambulatory Medical Record Systems"; Technical Report No. 13, Vols. 1 & 2, Laboratory of Medical Information Science, University of California Medical Center, San Francisco, June 1975, NTIS PB 254 234.

Wiederhold, Gio: "A Proposal for the Structuring of the Data Base Problem"; working paper for the IFIP-TC2 meeting, Corsica, France, 1974.

Crouse, Linda and Gio Wiederhold: "Interactive Use of a Timesharing System for Medical Laboratory Support"; Proceedings of the San Diego Biomedical Symposium on Computing On-Line, San Diego, April 1970.

Wiederhold, Gio: "Medical Uses of Computing" (in Japanese); IBM Review (Japan), No. 27, February 1970, pp.55-66.

Wiederhold, Gio: "An Advanced Computer for Medical Research"; Proceedings of the IBM Japan Computer Science Symposium: Research and Computer Systems, IBM, Japan, November 1969, pp. B1-B15.

Wiederhold, Gio: "Setting-up a General Purpose Data Acquisition System"; Proceedings of the IBM Scientific Computer Symposium on Computers in Chemistry, White Plains, New York, IBM Data Processing Division, August 1969, pp. 244-264.

Wiederhold, Gio and Lee Hundley: "A Time-Shared Data Acquisition System"; IEEE Digest, June 1969, pp. 190-196.

Wiederhold, Gio: "A Summary of the ACME System"; Proceedings of the ONR Computer and Psychobiology Conference, Monterey, California, Office of Naval Research, May, 1966.

Potter, Robert L. and Gio Wiederhold: "Computation of the Equilibrium Composition of Multi-Component Chemical Systems"; American Cyanamid Company, Stamford, CO., 1962.

Paul A. Willis P.E.
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Falls Church, VA 22042
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PROFESSIONAL SUMMARY

Proven specialist in executive, system, and project management. Extensive management of software development, design of computer systems, design of computers, computer architecture development, biomedical engineering, and graduate education. Analytic capabilities in computer simulations, C^3, ECM, ECCM, mathematics, statistics, chemical physics, computation theory and practice, algorithm development, design of data bases. Extensive marketing experience.

PROFESSIONAL EXPERIENCE

Intellimac, Inc. 1983 - Present

Director, Software Engineering - Leading corporate expansion efforts in Ada language Software Engineering areas including the planning, management, design and implementation of Ada Programming Support Environment tools.

EG&G Washington Analytical Services Center, Inc. 1980 - 1983

Engineer VI, Engineering Department - Leading corporate expansion efforts in computer software and computer engineering areas, including the planning, management, design, and implementation of software specification and production projects. Managed the design and implementation of a corporation personnel skills data base on the IBM 4341 and a NavSea Radar Program Managers data base on the DEC PDP-11/34. Contributed to the Army Military Computer Family project in the areas of input/output design, computer architecture, built-in security requirements and methods, built-in test requirements and methods, and impact of distributed processiing. Contributed to the NSWC Dahlgren distributed processing and data bus project, and the SUBACS distributed processing, data bus, and radar projects. Contributed to the SPS-67 automation module computer acceptance by NavMat 08Y, and the NSWC EMCON program. Did complete hardware design of SPS-67 MTI filter.

United States Air Force 1976 - 1979

Systems Management Office, Tactical System Division Headquarters USAF Studies and Analysis - Recalled to active duty to design and manage the development, documentation, testing, implementation, and exercising of the TAC-RECONNER simulation of air reconnaissance in the European Theater. TAC-RECONNER is a major module of TAC-EVALUATOR, the only joint air-ground combat simulation model currently in use by both USAF (TAC) and USA (TRADOC). Exercised the model to produce results for the Sabre Star Golf Study of Reconnaissance Effectiveness. Contributed to studies of JTIDS, C^3, Air Base closings, the use of passive chaff, lasers, and the electron beams as weapons, to the rational management of software development, to jamming effectiveness for a

variety of existing and proposed military equipments, to AF/SA manuals on Software Standards and Simulation Model Design, and to planning the external assistance program.

Polytechnic Associates Incorporated 1969 - 1976

Vice President - Managed, planned, designed, and implemented systems and applications software for Insurance, Educational, Industrial, and Scientific firms. Designed and implemented mini- and micro-computer systems for inventory, industrial security, Loran D, mailing list maintenance, biomedical engineering, and pattern recognition. Performed studies of ECM effectiveness, Loran D performance, C^3 topologies, and computer based controller and peripheral designs. Designed and built digital signal processing and intrusion detection systems software and hardware.

Teledyne Industries 1973 - 1976

Technical Director - Managed a staff of 21 professionals in expanding the VELA underground nuclear monitoring real-time computer network. This included adding seismic arrays internationally, adding satellite and national computer network communication links, interfacing to remote computer systems and a remote mass storage facility, designing, documenting and installing improved signal processing and efficient, reliable, documented software, and supplying quality management to the project.

Scope Electronics 1972 - 1973

Manager of F15 DMR Analysis Department and Manager of REMBASS Marketing - Managed analyses of the DMR algorithm, developed the correct algorithm for recovering aliased data, and led the development of F15 DMR test plans. Directed a successful REMBASS ground intrusion sensor system proposal effort.

Defense Communications Planning Group 1967 - 1969

Director of Engineering Analysis - Led the design of the original sensor drop plan of Project Igloo White (which was implemented), simulated expected results, and participated in testing of deployed system at Eglin AFB.

Mitre Corporation 1965 - 1967

Corporate Research Committee - Led the design of the National Military Command System (NMCS) computer facilities which were implemented. This NMCS had two sites each with 3 IBM 360/65 and over 20 IBM 2314 disk system per CPU. Advisor to President on biomedical engineering problems.

University of Alabama 1964 - 1965

Professor of Engineering and Biomedical Engineering - Computer Project Director of Cardiovascular Division, principal investigator on NIH

program grant. Directed 22 physicians and scientists in performing computer based and computer-aided cardiovascular research. Selected and implemented a department computer complex.

MIT 1960 - 1965

Research EE, Project Engr, Lecturer - R&D Director of interdisciplinary laboratory performing real-time closed loop computer based biological, instrumentation, and neurological research. Directed and performed research. Initiated, lead successful proposal efforts. Selected and implemented a GE 225 computer complex.

Yale University School of Medicine 1958 - 1960

Research Associate - Organized laboratory above. Performed research in human engineering, motor coordination, invertebrate neurophysiology. Lead two successful proposal efforts. Implemented an RW 300 computer complex.

EDUCATION

Southern Methodist University	B.S., Physical Education (1952)
Polytechnic Institute of Brooklyn	B.E.E., M.E.E., Electrical Engineering (1958, 1962)
George Washington University	Sc.D, Electrical Engineering and Computer Systems (1972, ABD)
Industrial College of the Armed Forces	(1969)
Air War College	(1977)

PROFESSIONAL AFFILIATIONS

American Management Association
American Society for Engineering Management
American Chemical Society
American Mathematical Society
American Physical Society
Association for Computing Machinery
American Society of Mechanical Engineers
Institute of Electrical and Electronics Engineers
Optical Society of America
USAFR, Association of Old Crows, Air Force Association, Association for Unpiloted Vehicles, ROA

OTHER DATA

Excellent health
Current SECRET clearance
Eta Kappa Nu, Tau Beta Pi, Sigma Xi, Scabbard and Blade
Ada, PASCAL, FORTRAN, BASIC, C, FORTH, LISP
Familiar with MIL-STDS and SPECS and DoD Acquisition and Procurement procedures
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Over 150 published professional journal papers and reports.

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