2816-88

SRI International

27 October 1988

Qualifications Statement for
Solicitation F04701-88-R-0043

TECHNICAL SUPPORT FOR GLOBAL POSITIONING SYSTEM (GPS) INFORMATION CENTER

Prepared for:

Directorate of Space Navigation Systems Contracts
(SD/PMWG)
P.O. Box 92960
Los Angeles,CA 90009-2960

Attn: Capt. Mark Erkkila

Department of Transportation (DOT/RSPA)
Room 84045
400 7th Street, S.W.
Washington, D.C. 20590

Attn: D. Schull

USDG Headquarters, G-NRN-2
2100 2nd Street, S.W.
Washington, D.C. 20593

Attn: CDR J. Nagle

Submitted by:

Network Information Systems Center
SRI International
Menlo Park, CA 94025

In response to:
Commerce Business Daily Announcement (Issue No. PSA-9685)
28 September 1988

SRI International®
333 Ravenswood Ave. • Menlo Park, CA 94025
(415) 326-6200 • TWX: 910-373-2046 • Telex: 334-486

STATEMENT OF CAPABILITY OF SRI INTERNATIONAL
TO DEVELOP AND OPERATE
A CIVIL GLOBAL POSITIONING SYSTEM INFORMATION CENTER

EXECUTIVE SUMMARY

SRI International is pleased to submit this statement of capability (SOC) to develop and operate the Civil Global Positioning System Information Center (CGIC). SRI has excellent credentials in GPS technology, in the management of information centers, and in providing online and hardcopy user services worldwide. We believe we are uniquely qualified to develop and manage the GCIC on behalf of the Navstar Global Positioning System Joint Program Office (GPS JPO).

TABLE OF CONTENT

1.0 SRI QUALIFICATIONS AND RELEVANT EXPERIENCE

1.1 Overview

SRI International is pleased to submit this statement of capability in response to the Commerce Business Daily notice dated 28 September 1988 seeking qualified sources to develop and operate the Civil Global Positioning System Information Center (CGIC) on behalf of the Navstar Global Positioning System Joint Program Office (GPS JPO).

Lead responsibility for providing technical support for the GCIC will be that of SRI International's Network Information Systems Center (NISC). Management of the NISC team supporting the GCIC will reside in SRI's Computer and Information Systems Division (CISD) which is one of the divisions that makes up the SRI Engineering Research Group (ERG). Technical consulting and expertise on GPS will be provided by the Systems Development Division (SDD), also part of the SRI Engineering Research Group. (See Figures 1-4 for a set of SRI organization charts.) Detailed qualifications for SRI, NISC, and SDD are given below.

1.2 SRI International Qualifications

SRI International (formerly Stanford Research Institute) is an independent, nonprofit California corporation, performing a broad spectrum of problem-oriented research under contract to government, business, and industry. SRI serves clients in all parts of the United States and throughout the world.

Formerly affiliated with Stanford University, SRI was founded in 1946 by a group of West Coast business leaders to provide a center where diversified scientific research could be performed. Headquarters and principal laboratories are in Menlo Park, California, with regional offices in Washington, D.C., New York City, Chicago, Honolulu, Tokyo, and Croydon (England), and marketing offices in Paris, Frankfurt, Milan, Eindhoven, Stockholm, Zurich, Riyadh, and Manila. In addition, field offices are established, as needed, to facilitate on-site technical assistance and engineering support as warranted by individual research programs.

Almost all of the research staff are located at SRI's headquarters in Menlo Park, California. Of SRI International's total staff of about 3,000, nearly two-thirds have professional and technical backgrounds. More than 500 members of the professional staff have Ph.D. degrees or the equivalent, and about 1,000 others have Master's degrees. In addition, when appropriate, highly qualified consultants are employed to supplement the expertise of the SRI staff.

SRI is an applied research organization. All research activities at SRI, except those undertaken to develop internal skills or to perform a public service, are conducted under specific contract with clients. Typically, SRI's research programs are distinguished from those

conducted by universities by being less theoretical and more directly oriented to the immediate problems of a client. At the same time professional competence and innovativeness are maintained at high levels.

Research at SRI is conducted in the following technical areas: engineering systems, electronics and radio sciences, physical and life science, industrial and developmental economics, information science, management systems, urban and social systems, and various combinations of disciplines within these broad fields. SRI operates for the most part under a project team approach. Those individuals with the most appropriate training and experience are brought together under a project leader to carry out the work. The interdisciplinary character of research often requires that individuals from more than one division work together even though responsibility for the project rests within a given division.

SRI's research facilities in the United States include more than one million square feet of office and laboratory space and incorporate the most advanced scientific equipment, including unique instrumentiation developed by the staff. Sophisticated computers are available on-site, and access to supporting research activities is also available through local and long-haul computer networks. SRI's extensive library services and those of the major universities in the area provide excellent research support for staff members and can be used as a resource for this work.

Approximately 1000 research projects are under way at any given time at SRI. About 55% of the research is performed for local, state, and national government agencies, and the remainder for business, foundations, and other private clients. Approximately 20% of the research is conducted for international clients.

In conformance with its basic charter as a nonprofit organization, SRI International does not compete with industry in either small- or large-scale production runs for devices or systems. As a nonprofit, nonmanufacturing organization, SRI International has the unique capability of providing research analyses and system designs unbiased by any proprietary interest in specific areas of technology. Because SRI is not a manufacturing organization and because it maintains privacy of proprietary information, its researchers enjoy a freedom of exchange of information with the members of the commercial and industrial community beyond that existing among competitors. Figures 1-4 shows the structural hierarchy of SRI's Organizations.

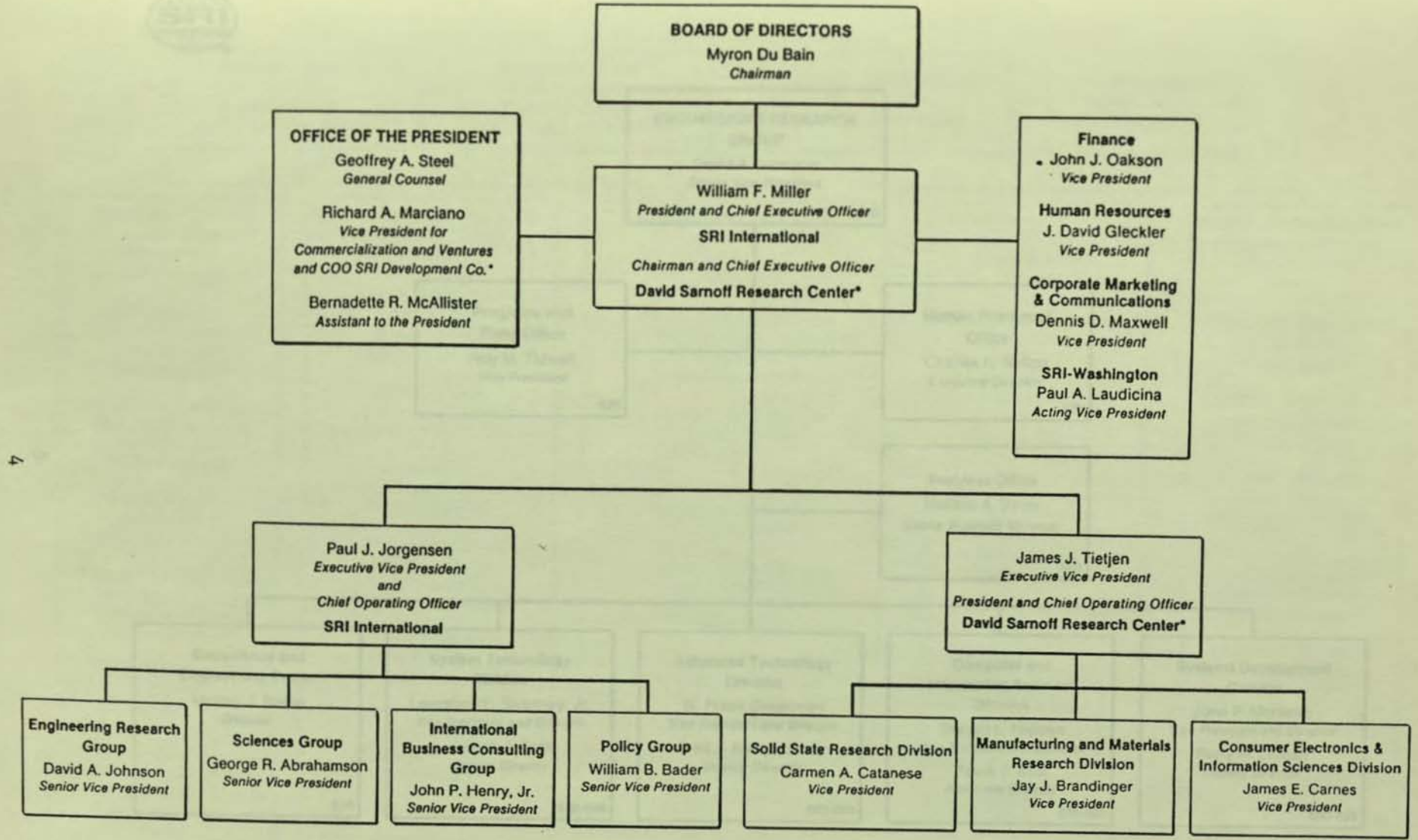


FIGURE 1: SRI International Organization

*A wholly owned subsidiary of SRI.

September 1988

ORGANIZATION CHARTS — 10
OFFICE OF THE PRESIDENT — 10

4

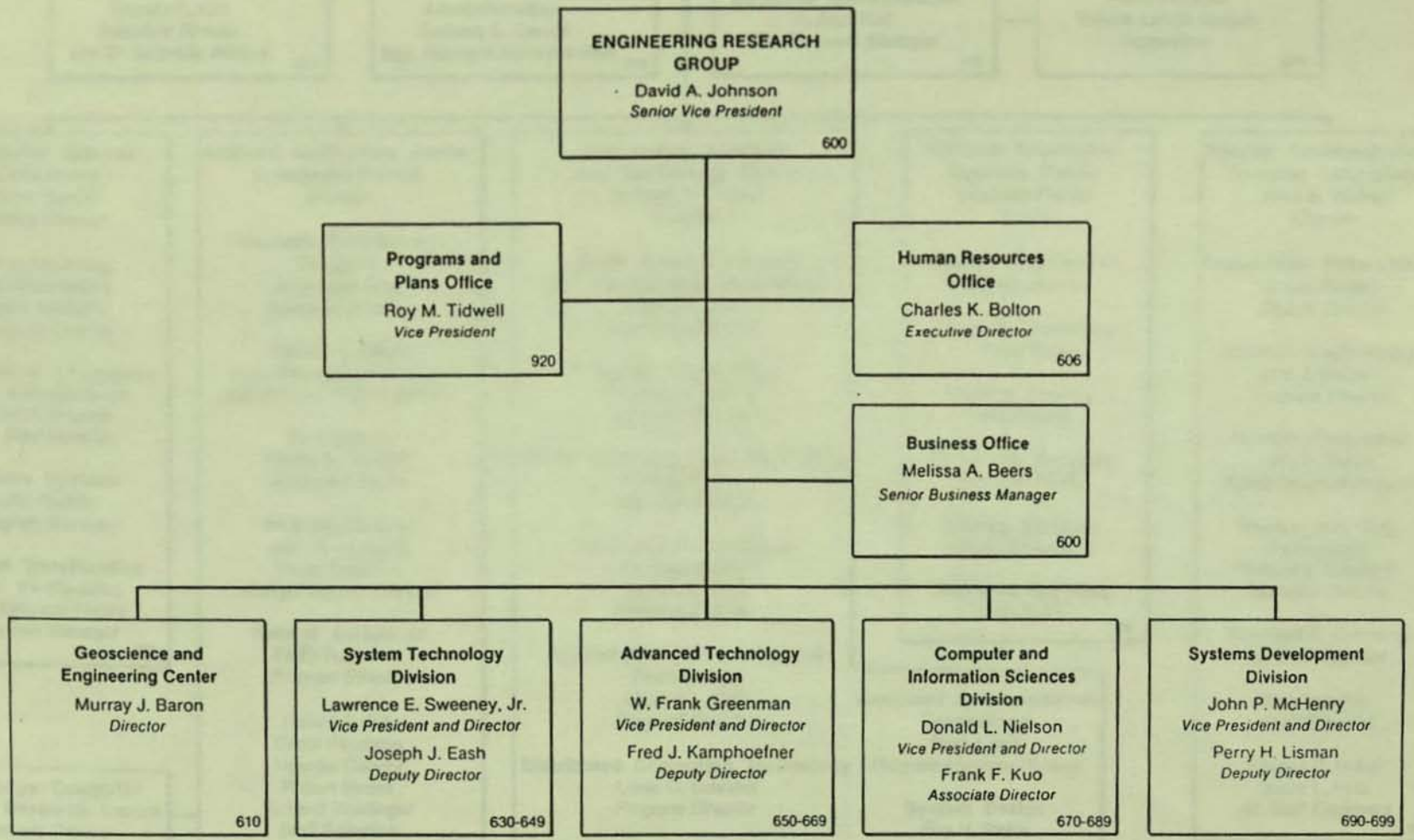


FIGURE 2: Engineering Research Group

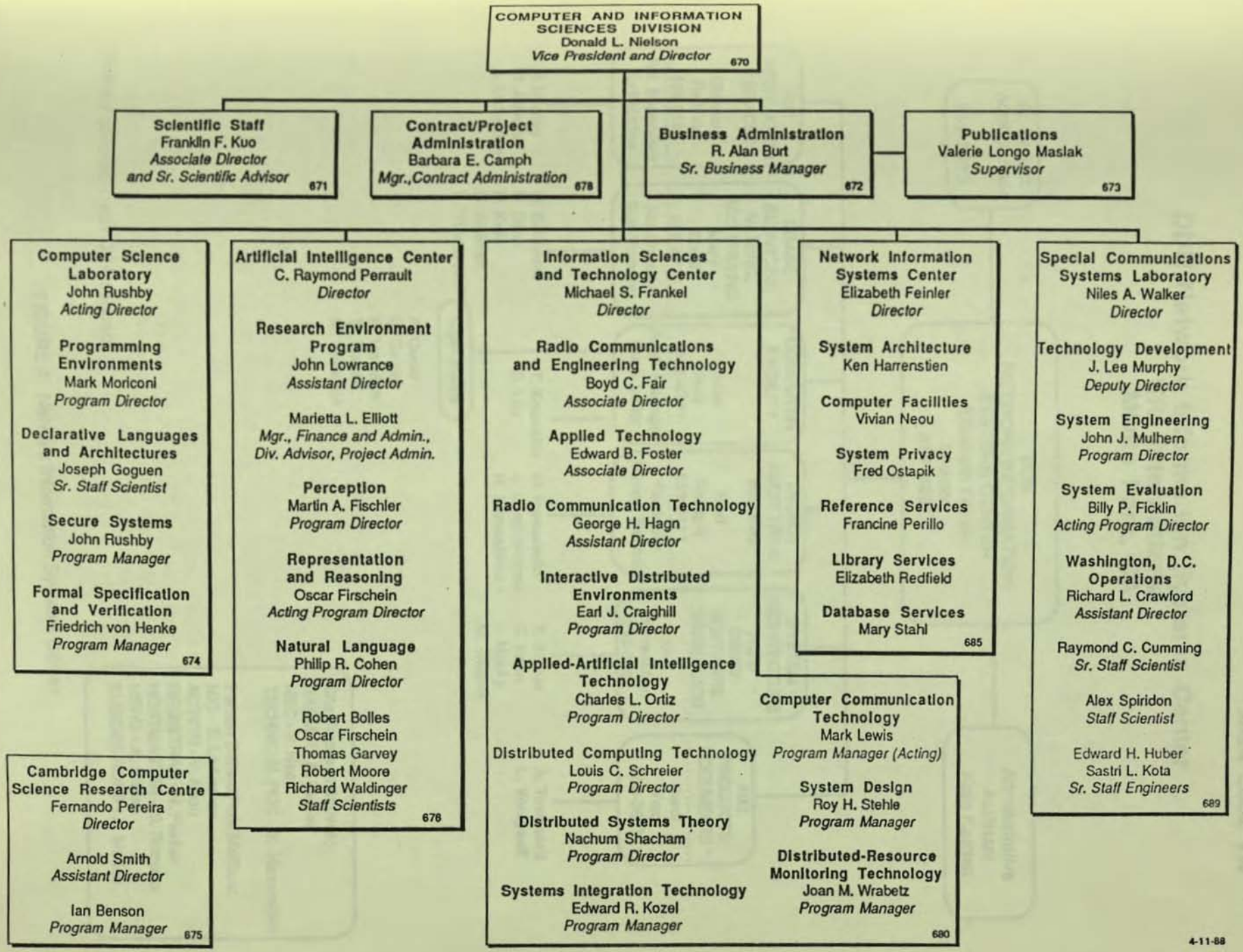
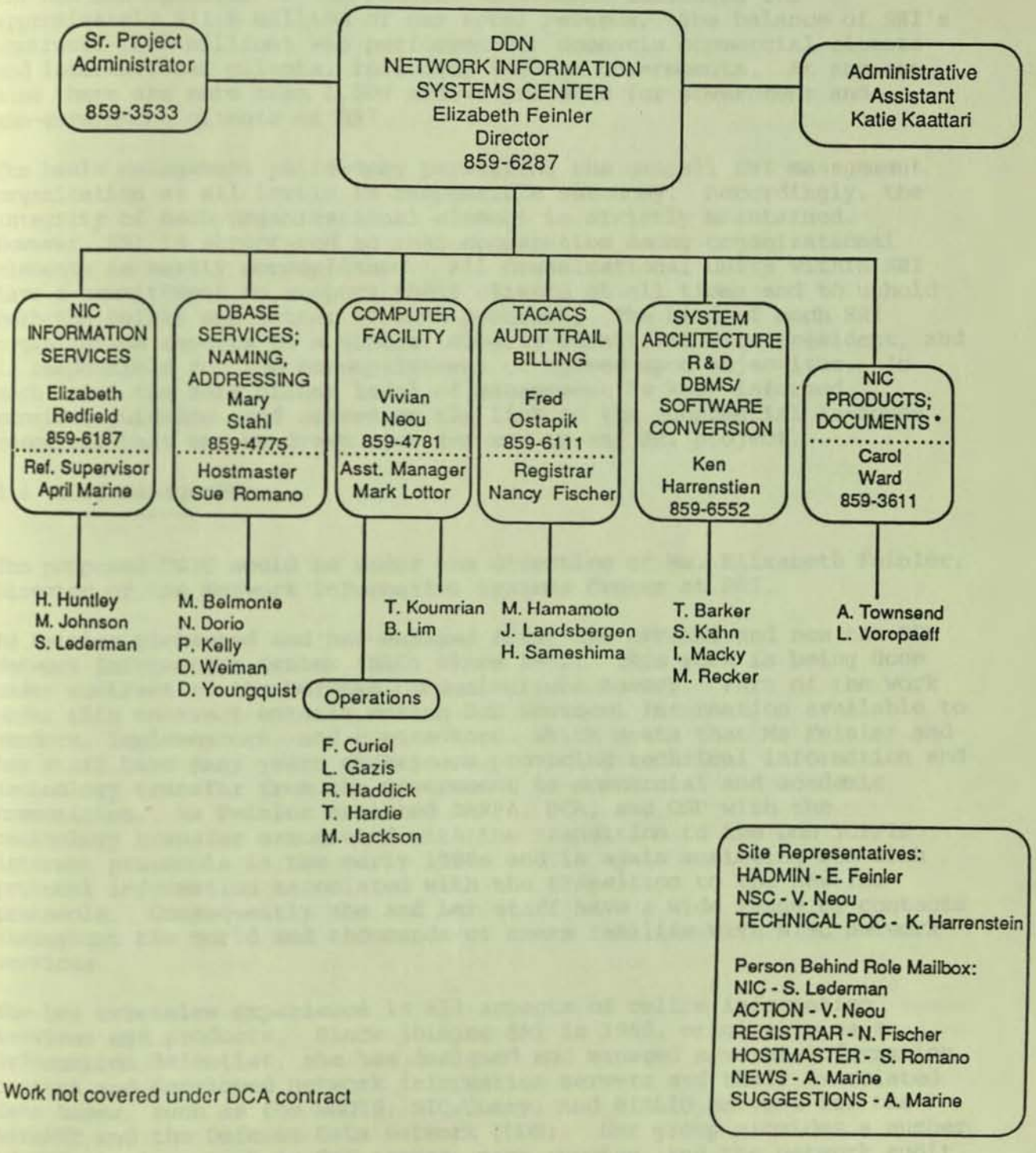


FIGURE 3: Computer and Information Sciences Division

DDN Network Information Systems Center
SRI International
Menlo Park, CA



* Work not covered under DCA contract

FIGURE 4: Network Information Systems Center

1.3 SRI Program Management

SRI International is experienced in the technical conduct and contractual management of advanced technology and engineering contracts for the government. In the year ending December 1987, SRI had contractual revenues totaling $213 million. Of this amount approximately $94.4 million was performed under contract to various agencies within the Department of Defense (DoD). Government contracts for non-DoD agencies of the Federal Government accounted for approximately $31.6 million of our total revenue. The balance of SRI's contracts ($87 million) was performed for domestic commercial clients and international clients, including foreign Governments. At any one time there are more than 1,500 active projects for government and non-government clients at SRI.

The basic management philosophy permeating the overall SRI management organization at all levels is responsible autonomy. Accordingly, the integrity of each organizational element is strictly maintained. However, SRI is structured so that cooperation among organizational elements is easily accomplished. All organizational units within SRI have a committment to support their clients at all times and to uphold both the spirit and letter of each contract. The head of each SRI organization reports to a single, clearly-identified vice president, and is responsible for the accomplishment of agreed-upon objectives. In each case, the next higher level of management is kept informed, provides guidance, and serves as the link to the substantial in-house resources that may be drawn upon for use in any SRI project.

1.4 GCIC Management

The proposed CGIC would be under the direction of Ms. Elizabeth Feinler, Director of the Network Information Systems Center at SRI.

Ms Feinler pioneered and has managed first the ARPANET and now the DDN Network Information Center (NIC) since 1972. This work is being done under contract to the Defense Communications Agency. Part of the work under this contract entails making DoD protocol information available to vendors, implementors, and contractors, which means that Ms Feinler and her staff have many years experience providing technical information and technology transfer from the government to commercial and academic communities. Ms Feinler assisted DARPA, DCA, and OSD with the technology transfer associated with the transition to the DoD TCP/IP internet protocols in the early 1980s and is again assisting DCA with protocol information associated with the transition to the new ISO protocols. Consequently she and her staff have a wide range of contacts throughout the world and thousands of users familiar with NISC network services.

She has extensive experience in all aspects of online information services and products. Since joining SRI in 1960, originally as an Information Scientist, she has designed and managed several information centers and developed network information servers and their associated data bases, such as the WHOIS, NIC/Query, and BIBLIO servers for the ARPANET and the Defense Data Network (DDN). Her group provides a number of DDN services such as TAC access, name service, and the network audit trail and billing system. In 1985 Ms. Feinler was appointed Director of

the Network Information Systems Center at SRI. She has also served as Editor-in-chief for several well-known reference documents such as the DoD Protocol Handbook. Before coming to SRI she was an Editor for Chemical Abstracts and a carbohydrate research chemist. She was appointed Delegate at Large to the White House Conference on Libraries and Information Centers; is a member of ACM, ASIS, IEEE, and the Internet Engineering Task Force; past chair of IFIP W.G. 6.5A on user requirements for electronic mail; and current chair of the Internics W.G.

Ms. Feinler has many years of technical and managerial competence in managing information services for both government and commericial clients, and is well qualified to manage the GCIC.

2.0 THE SYSTEM DEVELOPMENT DIVISION

The SRI International Systems Development Division (SDD) has been engaged in activities to improve the capabilities of avionics systems and military test and training ranges since 1967. Accelerated advances in weapons technology and rapid evolution of high-performance combat aircraft place continuing and heavy demands on tactical commanders and aircrews and on the military engineering support for all phases of system development from requirements determination through design and engineering development to test, evaluation, and field modification.

The SDD staff keeps abreast of state-of-the-art and emerging technologies, such as the Global Positioning System, advanced avionics architectures, and electronic warfare simulators, to develop cost-effective technically sound approaches to realizing maximum operational and training benefits. Often, because of the size and complexity of range instrumentation systems and the required human interaction necessary in operational environments, work takes SDD staff on site to system installations where they are able to collect vital information for requirements analysis, observe day-to-day operations, and assist in test and evaluation programs. Continual association with activities in the field has created an awareness within the group of the essential aspects of system functions and user needs that could otherwise be overlooked.

The professional staff of SDD is composed principally of senior systems engineers and analysts who are expert in the development of hardware and software for complex operational systems. Disciplines represented include electrical, mechanical, aeronautical, and civil engineering, physics, mathematics, geology, psychology, and economics. Project teams formed within SDD to carry out individual research projects make a point of working closely with clients throughout the project. This close interaction fosters a mutuality of purpose between the client and the team, which in turn smooths the way toward workable and cost-effective strategies with which to meet client objectives.

Systems engineering specialities developed and applied by SDD in various avionics system and range improvement efforts include:

a. Requirements definition--Identification of operational avionics and test and training requirements. Derivation of implied technical system/instrumentation requirements.

b. Planning--Development of system concepts and facility plans to meet immediate and far-term requirements.

c. Feasibility studies--Determination of technical practicability and capability of proposed system/instrumentation concepts.

d. Economic analyses--Projecting the cost of ownership of candidate system approaches over their expected life-cycles.

e. Design--Practical mechanization of new range system/instrumentations and facility concepts and interfaces.

f. Development--Technical guidance in the creation, evolution, and production of new systems.

i. Troubleshooting--Assistance during installations and checkout of new systems.

j. Test--Planning and implementation of test procedures.

k. Evaluation--Measurement and appraisal of system performance.

l. Consulting--Development of methods to achieve better use of existing capabilities.

2.1 SDD Expertise in GPS Technology

Two separate events in the development of the Global Positioning System (GPS)--the deployment of the Block II GPS satellite constellation and the development of smaller, less-expensive GPS receivers--have increased users' recognition of potential GPS applications in navigation, vehicle tracking, and surveying. The user community now sees GPS as a vast improvement and, potentially, a solution to the classic problem of extremely precise positioning, velocity measurement, and timing on a global, geometrically unconstrained basis.

A team of scientists and systems engineers within the SRI Systems Development Division (SDD) provides a wide variety of systems engineering development activities to both government and commercial clients interested in using GPS technology for specific and general applications. Representative GPS applications expertise within SDD includes:

a. Requirements Definitions--Definition of GPS applications requirements.

b. Tradeoff Studies--Assessment of the feasibility and comparative effectiveness of using GPS instead of alternative solutions.

c. System Integrations--Integrations of GPS solutions into user systems in cost-effective, technically efficient, low-risk ways.

d. Performance Analysis--Analysis of GPS performance in specific applications and in comparison with other alternatives.

e. Cost Analysis--Investment and life-cycle cost analysis of various system alternatives.

f. Implementation Planning--Planning for development and integration to minimize time and cost and to maximize capabilities during transition.

g. Ground Transmitter Siting--Augmentation of early GPS satellite constellation buildup (Blocks I and II) by optimum placement of pseudo-satellite ground transmitters.

h. Avionics Integration--Integration of GPS into vehicle avionics (inertial, etc.) to provide a robust navigation function under stressing conditions.

Since 1978 SRI has been involved in identifying applications where GPS is most effective, both technically and economically. SRI applications work has been complemented by its extensive participation in a Tri-Service GPS Range Applications program since 1982.

3.0 NISC QUALIFICATIONS AND RELEVANT EXPERIENCE

The Network Information Systems Center (NISC) at SRI provides network information systems and services such as naming and directory services, audit trail and billing systems, user agents, distributed systems, information servers, and online and "hotline" user assistance to government and commercial clients. The group provides both services and research required to distribute information in a networking environment.

3.1 NISC Expertise in Managing Information Centers

The Network Information Systems Center (NISC) at SRI is currently under contract to the Defense Communications Agency (DCA) to manage the ARPANET/Defense Data Network Network Information Center (DDN NIC), a repository of network services and information for operational military users, software developers, and scientific researchers.

SRI was a pioneer in building both the ARPANET and the DDN NIC. The SRI Augmentation Research Center (SRI-ARC) host computer was added to the network in 1970 as the second computer on the ARPANET. This host

provided the first online NIC which was designed and built by SRI using the NLS/AUGMENT system.

The NLS/AUGMENT system was one of the early proponents of a "framework" or "bootstrap" system and was the forerunner of most workstation systems being offered today. It boasted the first "mouse" tracker (for which SRI owns the original patents); a common command language and command-language interpreter; an embedded programming language called L-10 and associated program libraries; mixed text and graphics; multiple windows and multistations; debuggers and cross debuggers; a process-commands macro package; a structured file system; a central bibliographic journal system with automatic cross-reference links analogous to today's "hypertext"; "yellow" and "white page" network servers; and a sophisticated text editor and text formatter.

The NLS/AUGMENT system was designed to support knowledge workers; Air Force personnel at Gunter Air Force Station and Rome Air Development Center, Army personnel at DARCOM, and Navy personnel at NOSC (among others) helped design its features along with participation and support from DARPA and NSF. Consequently, SRI has had many years experience in collaborative research with the government and its contractors.

The NLS/AUGMENT system progressed from a research project at SRI to a commercial offering at Tymshare/McDonnnell Douglas, and at that time the Augmentation Research Center merged with the Telecommunications Sciences Center and eventually resulted in the formation of the NISC. During this evolution, SRI continued to play a major role in providing information to users of the ARPANET and later the DDN.

SRI, together with Stanford University, designed and implemented the first versions of the Transition Control Protocol (TCP) and the Internet Protocol (IP). SRI personnel also contributed to the specification and implementation of the mail and file transfer protocols, the packet radio protocols, and the remote procedure call protocol used by the Department of Defense (DoD). In 1983, when the DDN was created by splitting the ARPANET into an operational segment (MILNET) and a research segment (ARPANET), NISC expanded its effort on behalf of DCA and DARPA by taking on the registration of TAC users, the development of an audit trail and billing system for the DDN, and the administration of name services for the entire internet community.

Our heavy involvement with protocols and protocol implementation, coupled with our continuing information center activities led us to play a major role in assisting DCA with its transition to the current DoD TCP/IP-based protocol suite. The NISC provided documents, online files, reference implementations, information on vendor offerings, network newsletters and management bulletins, online bulletin boards, and online technical notes in the form of Requests for Comments (RFCs) to military subscribers, researchers, contractors, vendors, and users. Today NISC is again assisting the DoD with its transition to the International Standards Organization (ISO) protocol suite.

In addition, NISC publishes a number of documents, such as the "DoD Protocol Handbook", the "DDN New User Guide", and the "Protocol Implementations and Vendors Guide". The NISC offers the entire set of RFCs as either online files or a hardcopy subscription. NISC is the coordinator for the network Host Administrators, distributes the DDN Newsletter and DDN Management Bulletin on behalf of DCA, and maintains a number of network bulletin boards and online distribution lists, such as the TCP-IP interest group and the Namedroppers interest group. It also provides online and telephone "hotline" user assistance, answering hundreds of calls and messages per month.

NISC provides a number of online information servers to users of the DDN. The most popular of these are the WHOIS and NAMSER servers, which provide directory services to DDN users. The data bases for these servers contain thousands of entries, and the WHOIS server alone is accessed more than 75,000 times a month by network users. The SERVICE server allows users to request and receive files and WHOIS responses via electronic mail. NIC/QUERY provides a network "yellow pages" and an index to NIC services. The PROTOCOL LOCATOR points users to protocol information, and the BIBLIO server allows users to search the NISC bibliographic database and deliver the resulting search to their local workspace via electronic mail. The BIBLIO server, along with its underlying data record and data dictionary, was designed to be compatible with DIALOG (a commercial database vendor) data template so that subsets of NISC data could be made available to users via DIALOG, if desired. The TACNEWS server lets users read the DDN Newsletters and Management Bulletins online and obtain information on how to use a terminal access controller (TAC). It also allows users to find the TAC closest to their telephone dialing area.

All of the NISC network services are designed for naive or episodic users. We have attempted to design these services as an extension to the knowledge worker's personal workspace and have made them easily accessible and simple to use. Although all of the NIC servers have extensive HELP systems, most users can easily use the servers without extensive help or printed documents. Use patterns can be observed and analyzed and the servers adapted to user needs. NISC has also developed software tools, such as PC SAM, to assist PC users with access to electronic mail and network information.

In building the many information services that we now provide to DDN and internet users, we have developed an impressive array of government-owned software, which would be available to develop a GCIC. Recently, we have undertaken the conversion of NISC information-handling tools to portable C code and are incorporating a commercial relational database management system (DBMS) in addition to the hierarchical one now in use. We have developed an extensive library of C programs and routines with which we can build new information tools quickly. Our approach to software development has been modular and generic. It is our goal to develop software modules that can be easily replicated or modified and expanded or extended as the need arises, and that can be adapted to provide information on hardware ranging from small workstations to large mainframes.

NISC staff are leading a working group, Internics, to define the role of information centers in an internet environment. Members of NISC are also represented on the DoD Internet Engineering Task Force (IETF), the ANSI C programming language standards committee, and the NBS/OSI directory services working group.

NISC maintains an information repository which makes information available to researchers, contractors, vendors, and subscribers at once. SRI can provide either online or hardcopy versions of documents to the military, research, and commercial communities. Hardcopy documents are printed at SRI expense and are sold to requestors for nominal costs to cover reproduction, postage, and handling. We work closely with DTIC and NTIS, and have recently discussed the possibility of distributing working group documents on behalf of the National Bureau of Standards. Our goal is to distribute necessary and key documents as widely as possible by a variety of means at cost.

SRI's involvement in the development of the ARPANET and the DDN and our many years of experience designing network systems and information services for network developers and users has resulted in capabilities and know-how uniquely suited to the goals of GCIC.

4.0 NISC RELATED CONTRACTS

DEFENSE DATA NETWORK NETWORK INFORMATION CENTER (DDN NIC) CONTRACT

Client

Defense Communications Agency
Code B622
Washington, DC 20305-2000

Description

Begun in 1970 this project has expanded to 8 separate tasks several of which are of particular interest to the work being proposed here. The tasks are: core network information services; information and database protocols and architechture; network access control and user registration; design and implementation of the DDN/ARPANET audit trail and billing system; naming and directory service for the DoD internet; operation of a government computer facility.

The Network Information Center provides a range of services to DDN and ARPANET users which are summarized in the table below. Most of the software and data base design required to provide such services has been developed on government contracts and is optimized for use on the DDN. The work could easily be adapted to provide similar services for DOT.

Network Services	Information Services	Publications/Products
DDN Audit Trail System	WHOIS (net directory)	DoD Protocol Hdbk
DDN Billing System	Protocol Locator	DDN New User Guide
TAC User Registration	BIBLIO server	Protocol Implementations
DDN Name Service	NIC/Query	and Vendors Guide
DDN Domain Naming System	TACNEWS server	PC SAM Mail Program
DDN Protocol Repository	SERVICES	DOTS PC Data Entry
800 Reference "Hotline"	NAMSER	RFCs and IDEAs
Online Feedback Service	BBoards	DDN Mgt Bulletins
C Compiler/C Library		DDN Newsletters
NIC DBMS		

Contract Dollars and Period of Performance

AGENCY/CONTRACT #	DATES	FUNDING
DCA DCA200-87-C-0020	1 Feb 87-31 Jan 88	YEAR 1 $ 3,772,115
	1 Feb 88-31 Jan 89	YEAR 2 $ 4,121,252

Below are the dollar amounts for previous NIC contracts back 5 years.

DCA DCA200-84-C-0024	15 Jun 84-31 Jan 87	$ 8,128,495
DCA DCA200-83-C-0025	1 Jun 83-31 Dec 85	$ 3,122,367

All deliverables were met and all projects were delivered without overruns.

5.0 SDD RELATED CONTRACTS

Following are profiles of GPS applications projects that demonstrate the experience SRI has developed in recent years.

5.1 Engineering Support to Tri-Service GPS Range Applications Joint Program Office (RAJPO)

Under contract to the GPS RAJPO at Eglin AFB, FL, since 1984, SRI has provided systems engineering and special analyses in defining and developing a family of small (300-400 cubic inch) GPS receivers specifically tailored to providing a source of time-space position information (TSPI) for surface, air, and space vehicles in DoD test and training range applications. This work includes design reviews of GPS receivers, analysis of special technical issues, software IV&V, and acceptance test planning.

5.2 GPS Field Measurement Program

SRI conducted a number of hardware field tests to address critical issues affecting the development of specifications for the GPS receiver family for range applications. These tests addressed differential GPS accuracy (as a function of separation between reference receiver and user receiver), GPS receiver behavior (both in near and far proximity to ground satellite transmitters), the effects of vehicle-induced multipath signals, and the acquisition, integration, and testing of a GPS receiver installed in an airborne instrumentation pod with inertial systems.

5.3 GPS Integrations Planning for the Utah Test and Training Range (UTTR)

This work established the future requirements for tracking multiple test participants investigated UTTR's existing resources, and provided range system integration planning using RAJPO-developed GPS elements to design an improved GPS-based tracking and test control system for UTTR.

5.4 GPS as a Tracking System Alternative to Radars for the SDI Exoatmospheric Reentry Vehicle Intercept System (ERIS) Test at USAKA

Accuracy and coverage requirements for target and interceptor tracking and handover during the ERIS Functional Technology Validation test placed excessive demands on conventional radar-based tracking approaches. SRI analyzed the performance tradeoffs, risks, and costs associated with using a GPS-based tracking approach. The ERIS Program Office selected the GPS approach, and SRI continues to provide GPS systems analyses and test planning support to the ERIS program. The Air Force's space-based interceptor technology program also is planning to use the GPS tracking assets at the U.S. Army Kwajalein AToll (USAKA).

5.5 GPS as a Tracking System to Support Space Testing

SRI has performed several studies that indicate GPS technology potentially could be used to provide TSPI for test articles in a variety of future on-orbit tests under various space programs. Analyses have shown that adequate GPS satellite visibility can be obtained at orbital altitudes up to 1000 miles above the earth.

5.6 GPS Computer Analysis Tools

SRI's extensive experience in systems engineering for GPS applications has led to development of numerous computer tools required for analysis. These tools permit rapid evaluation of GDOP predictions (geometric dilution-of-precesion) with different satellite and ground transmitter

(pseudo-satellite) configurations and with different GPS receiver shadowing by terrain and vehicle structures. As a service to the GPS user community, SRI has made available in the past, at no charge, personal computer software for these GPS applications analyses. Several hundred government and commercial organizations have requested SRI's GPS software.

5.7 GPS Avionics Integration

The capability of GPS to provide a long-term, drift-free navigation aid is of great interest to air vehicle guidance programs requiring a robust navigation capability. SRI has analyzed applications in which multiple sensors are integrated with GPS to provide reliable navigation under hostile conditions.

6.0 FACILITIES AND SECURITY

6.1 Electronic Publishing Capabilities

NISC staff are experienced in using a variety of desk-top publishing programs and text-formatting systems for turning online files into hardcopy publications. The center has four laser printers of its own and can call on the extensive report production and printing services of SRI as well as extensive printing facilities in the area.

SRI has a staff of professional technical writer/editors, augmented by illustrators, report typists, and proofreaders. A complete photographic department is fully equipped for general, scientific, and process photography in black and white or color. This organization is also fully staffed and equipped for the preparation of presentations and visual materials. Complete in-house printing facilities ranging from copy center through high-quality offset presses are also available.

6.2 Information Resources

Both NISC and SDD have library collections associated with their respective activities germane to the specific research they carry out.

In addition research at SRI is supported by extensive and comprehensive technical library facilities. A library services staff of 32, ten of whom hold professional degrees in either library science or a subject discipline, serve the institute staff. The library's collection reflects SRI research interests and consists of approximately 58,000 books, 6,000 pamphlets, 130,000 government publications, 2,000 bound periodical volumes, 18,000 company annual reports, 3,000 periodical subscriptions, 28,000 technical reports (from sources outside SRI), 43,000 internally-generated research reports, and various special files

and material on microfilm. Access to published material is provided by subscribing to 80 major abstracting and indexing services.

Manual and computerized literature searching can be provided and tailored to meet project or client needs. For computerized searching, nineteen systems are used, including DIALOG, ORBIT, BRS, DROLS, STN International, QUESTEL, MEDLARS, Pergamon's Infoline, and Dow Jones. These systems provide access to over 700 databases, including major interntional indexes such as: Chemical Abstracts, Psychological Abstracts, Engineering Index, Government Reports Announcements, Scientific and Technical Aerospace Reports, World Patents Index, Index Medicus, Dissertations Abstracts, Biological Abstracts, Derwent Patents, and the New York Times Index.

To supplement the library's information resources, SRI has access through the Cooperative Information Network (CIN) to the combined collections of more than 300 libraries in the four neighboring counties of San Mateo, Santa Clara, Santa Cruz, and Monterey. The network includes the libraries of Stanford University, San Jose State University, the University of Santa Clara, the University of California at Santa Cruz and several community colleges. Over 10,000,000 volumes in these local libraries are available to SRI as a CIN member. In addition, through the reciprocal borrowing arrangement of interlibrary loan, the SRI library can acquire publications from libraries and information centers throughout the world.

6.3 Computational Facilities

NISC runs a computer facility on behalf of the Defense Communications Agency consisting of a variety of hardware, including a DEC-2065, SUN workstations and fileservers, and numerous personal computers tied together via local-area networks and triple-homed on the ARPANET, MILNET and NSFnet. NISC also owns a VAX-780 and a number of SUN 350 and 360 workstations tied to SUN fileservers via an ethernet LAN. It's equipment can be reached via Tymnet through gateways and via electronic mail from throughout the whole internet comprised of government, military, commercial and academic networks.

Major SRI computing systems include two DECSYSTEM 10/70 mainframes running TOPS20, seven DEC-compatible computers running TENEX, three DEC VAX-11 computers running VMS and one VAX- 11/780 running UNIX, five DEC PSP-22 computers, a Pyramid running UNIX and one running RSX-11, and a Prime 400 computer running PRIMOS IV. SRI's computer facility is accessible via TYMNET or via the ARPANET or MILNET or NSFNET for DoD or government-related projects and therefore accessible by government and commercial users alike.

SRI Menlo Park has a secure computing facility consisting of two VAX-11/780 computers. This facility, housed in a fully RFI-shielded room, meets NSA "TEMPEST" Specification No. 65-6.

A DEC PDP 11/45 computer system is available in the SRI- Washington,

D.C. office. This computer system is secured within an approved "closed area" and is authorized for automatic data processing at the TOP SECRET level by the DIS-Capital region.

6.4 Security

SRI International at Menlo Park holds a Top Secret facility clearance, which may be verified through the cognizant military security agency, Director, Industrial Security Defense Investigation Service, Presidio of San Francisco, California 94129. Telephone (415) 561-3435. Staff assignments will be in accordance with the level of security assigned to the work.

APPENDIX A

REPRESENTATIVE BIOGRAPHIES

TRUDY L. BARKER
Software Engineer
Network Information Systems Center
Computer Science and Technology Division

SPECIALIZED PROFESSIONAL COMPETENCE

Software design, development, test and analysis in distributed environments; System analysis including the survey and recommendation of specific commercially available software products, database products

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (since 1982)

User-level form oriented application software in distributed network environment

Database server capable of internetwork communication

Natural Language interface to intelligent planning system

Critique software system to facilitate interaction among users, developers and clients in Strategic C3 Testbed

Design of architecture for distributed graphic system.

Design of various relational databases for Strategic Air Command, Network Information Center and CENTCOM

OTHER PROFESSIONAL EXPERIENCE

System Analyst, Teledyne Brown Engineering: verification and validation of the Ada Language System and other military software systems; Monitored financial and technical performance of contractors on behalf of the Army.

Student Position, IBM: Variety of positions in computer facility operations while attending University.

ACADEMIC BACKGROUND

B.A. (1980), Computer Science, University of Minnesota, Duluth

Graduate Computer Science studies at Stanford (nonmatriculated)

PUBLICATIONS

Authored various technical papers on specific software architectures, user interfaces, and software specifications including:

A User-Level Introduction To The Critique System, SRI Special Technical Report 2, December 1985.

An Investigation Of The SAC C3 Experiment System Performance, SRI Special Technical Report 3, August 1986.

User Observations Gathered by the Critique System During the Strategic C3 Experiment, SRI Special Report, October 1986.

Detailed Observations Gathered by the Critique System During the Strategic C3 Experiment, SRI Special Report 2, March 1987.

Contributor to numerous technical reports and proposals

EARL G. BLACKWELL

Program Director
Systems Development Division

SPECIALIZED PROFESSIONAL COMPETENCE

Structuring and conduct of broadly-scoped studies for DoD national and major range instrumentation asset definition/development and long-term planning; requirements definition/analysis; high-technology instrumentation concept formulation and assessment; technical and economic tradeoffs of alternatives; resource development planning and asset transition strategy. Specialization in precision metric tracking, phased-array telemetry, air-air weapon scoring systems, ballistic missile test support, and GPS applications to range instrumentation

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (since 1970)

Analysis/validation of air-to-air missile endgame scoring requirements; concept definition/evaluation for specific aircraft, drone, and missile interfaces

GPS applications to DoD T&E ranges, including GPS field test planning/execution; evaluation of metric tracking of aircraft, drones, and missiles

Analysis of mobile/transportable multifunction instrumentation alternatives for TRIDENT test support

Technical support to Navy for advanced airborne phased-array telemetry system development program (EATS)

Strategic Systems Test Support Study; future user requirements and option definition/evaluation, cruise missile and space testing support

Analysis of range surveillance and tracking techniques and capabilities

Identification of future space/SDI test support requirements, and space-based instrumentation concept formulation (i.e., space-based range)

GPS applications and range integration analyses

Technical support to Tri-Service GPS range equipment development

OTHER PROFESSIONAL EXPERIENCE

Program manager, Aerojet-General Corp.: development and testing of microwave radiometric systems, nuclear power systems, satellite power systems, and expandable space structures

Principal engineer, Hoffman Electronics Corp.: commercial and military electronic and electromechanical systems design/development

Research engineer, Douglas Aircraft Co.: electronic design, applied optics, aircraft instrumentation, and photoelastic stress analysis

ACADEMIC BACKGROUND

B.S. in Engineering Physics (1957), University of Tennessee; graduate work in Astrophysics, Nuclear Physics, and Mathematics (1959), USC and UCLA

PUBLICATIONS

Strategic Systems Test Support Study, tri-service report, 1980; Far-Term Mobile Instrumentation Study, 1978; Airborne Alternatives for RV Impact Scoring, 1979; GPS/SMILS Concept Definition, 1980; other SRI reports

PROFESSIONAL ASSOCIATIONS AND HONORS

Member of Tri-Service GPS Transitional Advisory Group; Sigma Pi Sigma

ELIZABETH J. FEINLER
Center Director
Network Information Systems Center
Computer and Information Sciences Division

EXPERIENCE

Management Experience:

Director, Network Information Systems Center, since 1986 Program Manager, DDN Network Information Center Project, 1984-86 Manager, Literature Research Dept., 1961-1972 Project Leader on several SRI information projects.

More than 25 years technical management experience at SRI.

Technical Experience:

At SRI: Information system analysis; network information protocols; online reference services; name and directory services; information servers and online information retreival systems; data base management; distributed systems; electronic mail products; automated document production; user assistance; user agents for technical information handling; Editor-in-chief, NIC publications; design and administration of several technical information centers; preparation of handbooks, user manuals, data compilations; bibliographic citation standards, thesauri, indices, authority lists; market surveys, chemical literature and patent searching.

Previous Experience: Assistant Editor, Chemical Abstracts Service. Carbohydrate chemist, Shuman Chemical Corporation.

EDUCATION

B.S., chemistry (with honors), 1954, West Liberty State College; completed course work for Ph.D. in Biochemistry, 1956, Purdue Univ.

HONORS AND PROFESSIONAL ASSOCIATIONS

Member ASIS, IEEE, ACM, Internet Engineering Task Force, Protocols Standards and Testing Panel; Chairperson, Internics Working Group; former Chairperson, IFIP WG 6.5 User Environment for Electronic Mail; Delegate-at-large, White House Conference on Libraries and Information Services.

PUBLICATIONS

Editor of the DoD Protocol Handbook; the ARPANET Resource Handbook; the DDN Directory, and a Handbook for the Preservation of Biological Materials for NASA Spacelabs.

Author of "The Evolution of the ARPANET," Invited paper in Proc. SESESCU, Sao Paulo, Brazil, 1984; "The Identification Data Base in a Networking Environment," NTC '77 Conference Record, IEEE, Dec. 1977; "The Electronic Yellow Pages," Invited paper presented at ASIS, San Francisco, 1976; "NIC/Query, A Novice User Interface Program," Proc. Berkeley Workshop on Distributed Data Management and Computer Networks, Univ. of Calif., May 1976 (coauthored with D. Maynard); also author of numerous technical reports.

QUALIFYING EXPERIENCE (Past 5 years)

DDN Network Information Center (3150), DCA200-87-C-0020, February 1987 to January 1989, Mr. Tyrone Smallwood, COR, (703) 285-5238.

DDN Network Information Center (7326), DCA200-84-C-0024, June 1984 to January 1987, Mr. John Walker, COR, (703) 285-5250.

DDN Network Information Center and Protocol Repository (5910), DCA200-83-C-0025, June 1983 to December 1985, Mr. John Walker, COR, (703) 285-5250.

KENNETH L. HARRENSTIEN
Senior Computer Scientist
Network Information Systems Center
Computer Science and Technology Division

SPECIALIZED PROFESSIONAL COMPETENCE

C language (portability, implementation, standardization); database management systems; computer message systems; network protocols; terminal software support; text processing; electronic document production, deaf telecommunications.

REPRESENTATIVE RESEARCH AT SRI (since 1976)

DDN-NIC (Network Information Center) - Software architect for all aspects of NIC services, including DBMS, network servers, data retrieval and processing.

KCC C - Provided a full implementation of C for TOPS-20. Involved with C language standardization.

MIT TCP/IP - Designed and implemented TCP, UDP, IP for the MIT ITS PDP-10 systems.

DEAFNET project - Research in computer telecommunications for the deaf, including configuration, installation, maintenance of on-site & off-site systems, creation of Unix-based message system and simplified user interfaces.

UNIX systems programming - kernel overlays; device drivers for disks, terminals, network interfaces; file system mods.

ELLE - Created a widely portable UNIX-based display text editor.

NLS (AUGMENT/L10) systems programming - data handling and document formatting programs for Network Information Center (NIC), design/implementation of ARPANET identification system database and programs.

PREVIOUS PROFESSIONAL EXPERIENCE

Systems programming at MIT A.I. Laboratory; design and implementation of COMSAT message system, user data base, real-time graphics, network servers

ACADEMIC BACKGROUND

B.S. Computer Science (1976), Massachusetts Institute of Technology.

DENNIS L. HOLEMAN

Senior Research Engineer
Systems Development Division

SPECIALIZED PROFESSIONAL COMPETENCE

Integrated navigation systems design; applications of the Global Positioning System (GPS); integration of GPS and inertial system data; tracking and control systems for drones and other unmanned vehicles; advanced test, evaluation, and training systems involving tracking/navigation systems, closed-loop simulations, and display systems; advanced multiprocessor integrated avionics systems; specification and standards development; interface documentation; procurement support; test planning

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (since 1978)

- Design of an integrated navigation suite for an advanced aircraft involving GPS data, inertial data, digital map/radar altimeter data, air data, electro-optical system data, and other data
- Specification of miniaturized Global Positioning System (GPS) equipment for use in instrumented test and training range applications
- Investigation of application of the Global Positioning System to control and navigation of drones and autonomous vehicles
- Development of specification for the Missile End-Game Scoring System
- Development of top-level system descriptions for the Mobile Sea Range
- Development of test procedures for the operational test of the Yuma TACTS
- Development of specifications for additional functional capabilities for the TACTS/ACMI systems including no-drop bomb scoring, mining training, anti-radiation missile training, and electronic warfare training
- Support in the definition and procurement of a number of other advanced test, evaluation, and training systems

OTHER PROFESSIONAL EXPERIENCE

- Senior Engineer, IMS Associates, Inc. (IMSAI): design and production of modular microcomputer systems; concept development of Hypercube massively-parallel computer architectures
- Project Manager, Ocean Research and Engineering Center, Westinghouse Electric Corporation: design and development of undersea intelligence systems, including remotely piloted and autonomous vehicles, advanced sensors, manipulators, and navigation systems

ACADEMIC BACKGROUND

B.S.E. (1968), Harvey Mudd College; M.E.M.E. (1970), University of California at Berkeley

PROFESSIONAL ASSOCIATIONS AND HONORS

American Association for Artificial Intelligence; Institute of Electrical and Electronic Engineers (Computer Society); American Institute of Aeronautics and Astronautics; Association for Unmanned Vehicle Systems; American Association for the Advancement of Science; Society for General Systems Research; Registered Professional Engineer (California)

GERALD V. LUCHA

Staff Scientist
Systems Development Division

SPECIALIZED PROFESSIONAL COMPETENCE

Test and training range systems engineering, GPS Range Applications data management and analysis, software engineering, systems test and evaluation

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (Since 1970)

- Project leader, several GPS Range Applications Joint Program Office support projects and GPS integration planning for Pacific Missile Test Center and Pacific Missile Range Facility
- Project leader, Mobile Sea Range instrumentation system development and evaluation
- Project leader, Navy/DARPA Acoustic Research Center Advanced Systems Engineering Support Contract
- Project leader, engineering support for ACMI range development
- Task leader, Tyndall AFB Range System Engineering Study
- Project leader, Naval Weapons Center TSPI Systems Study
- SRI task leader, HAMOTS Upgrade System (HUS) procurement for Hill-Wendover-Dugway Range Complex
- Project leader, test design, coordination, monitoring, data analysis, and reporting for the RMS/SCORE Accuracy Test, Yuma Proving Grounds, Arizona
- Task leader, data reduction for a study of the relationship between motor vehicle accidents and the geometric and traffic features of highway intersections
- Project leader, analysis of aircraft accidents involving fire for NASA, Ames Research Center
- Expanded and improved the SRI Firefight Model; prepared user's manual; analyzed programs for a comparative evaluation of small arms weapons
- Task leader, Defense Research Studies--Thailand

OTHER PROFESSIONAL EXPERIENCE

- Task leader, Cornell Aeronautical Laboratory, Inc.; Village Television Study
- Assistant project engineer, Jansky and Bailey Division of Atlantic Research Corporation: planned, staffed, and conducted radio propagation experiments; established and operated electronic maintenance and calibration facilities at several remote locations
- Operations officer and electrical engineering officer, U.S. Army Security Agency

ACADEMIC BACKGROUND

B.E.E. (1961) and M.E.E. (1962), Cornell University; in-house course in discrete event simulation using GPSS (1973), Kalman and Generalized Kalman Estimation and Filtering Course (1976), University of Southern California

PROFESSIONAL ASSOCIATIONS AND HONORS

American Radio Relay League; Institute of Electrical and Electronics Engineers; IEEE Computer Society; Eta Kappa Nu

IAN MACKY
Programmer
Network Information Systems Center
Computer and Information Sciences Division

SPECIALIZED PROFESSIONAL COMPETENCE

TOPS-20 and ITS systems programming; TOPS-20 KCC compiler and runtime libraries (STDIO, math package, etc); DoD Internet network servers and clients; NIC database package, utilities, and user lookup programs.

Fluent in C and all PDP-10 assemblers; some programming experience with LISP, FORTH, Pascal, Basic, PL/1, ALGOL, COBOL, and FORTRAN.

Hardware experience on TOPS-20, ITS, Unix, Lisp Machines, VMS, RSTS, HP-2000, Signetics 2650, and various micros.

REPRESENTATIVE RESEARCH AT SRI (since 1983)

Wrote and maintain NIC public-access utilities WHOIS, TACNEWS, NIC/Query, PERFORMANCE, and REGISTER. Extensive additions to the NIC proprietary database utility, VOID. Worked on KCC compiler and runtime libraries: wrote entire STDIO and UIO (Unix I/O simulation) layers, put together math package, filled out general libraries to full ANSI/CARM II compatability. Performed system programmer duties including work on the monitor, EXEC, and numerous user programs.

PREVIOUS PROFESSIONAL EXPERIENCE

Previously TOPS-20 systems programmer at the MIT Artificial Intelligence Laboratory from 1982 to 1983. Performed systems programmer duties, wrote INQUIR/FINGER database system, WEBSTER online dictionary (including network servers), Chaosnet and Internet servers (FILE, NAME, SEND, MAIL, etc). Lesser accomplishments are too numerous to list.

Earlier experience in small standalone 8-bit microcomputer applications (for Databex in Mexico), and wrote entire operating system (purchasing, stocking, inventory, accounts) for small vending machine company. Some hardware experience with PC board generation: design, artwork, fabrication, testing, debugging.

ACADEMIC BACKGROUND

Completed two years of study towards a B.S. in computer science at San Diego State University, 1980 to 1982.

APRIL MARINE
Research Associate; Supervisor, Reference Services
Network Information Systems Center
Computer and Information Sciences Division

SPECIALIZED PROFESSIONAL COMPETENCE

Coordinate network user support activities; supervise user support staff; plan training; develop user manuals; develop information organization procedures; design online information retrieval systems; identify new user services; abstract technical documents; plan and maintain a bibliographic database; test support software.

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (Since 1985)

Overseeing the user services task of the Defense Data Network (DDN) Network Information Center (NIC), including supervising electronic mail handling, coordinating response to user needs, and informing client of network trends.

Providing coordination for responding to daily user assistance requests, as well as anticipating future needs and planning ways to meet them.

Testing the Biblio, DOTS, and Catalog programs; assisted in their design and specification; participated in writing support documentation and online help information; instructed end-users in their use; wrote abstracts and keywords for thousands of technical documents.

OTHER PROFESSIONAL EXPERIENCE

Lead Interpreter, San Jose State University: supervised sign language interpreting services for all hearing impaired students; wrote procedures manual.

Referral Specialist, Deaf Counseling, Advocacy and Referral Agency: coordinated freelance interpreter assignments for Santa Clara County.

ACADEMIC BACKGROUND

B.A. (1978, magna cum laude) Linguistics, University of California, Berkeley.

Certificate in Sign Language Interpreting, Ohlone College, Fremont CA.

Additional course work in technical writing, telecommunications, network protocols.

VIVIAN F. NEOU
Manager, NIC Computer Facility
Network Information Systems Center
Computer Science and Technology Division

SPECIALIZED PROFESSIONAL COMPETENCE

Programming in Pascal, SAIL, Fortran, and Macro. Experience in using TeX, LaTeX, Scribe, and METAFONT (a font design program).

REPRESENTATIVE RESEARCH AT SRI (since 1981)

Organized the Operator's Manual for NIC Operations staff. Edited NIC Font Manual. Maintained accounting programs on several DEC 20s and VMS systems. Maintained Scribe databases on several DEC 20s.

ACADEMIC BACKGROUND

Work toward B.S. in mathematical and computational sciences, Stanford University.

PROFESSIONAL ASSOCIATIONS

DEC Users Society, SUN Users Group

MIMI M. RECKER
Programmer
Network Information Systems Center
Computer Science and Technology Division

SPECIALIZED PROFESSIONAL COMPETENCE

Programming in L10, Assembler, and Pascal.

REPRESENTATIVE RESEARCH AT SRI (since 1983)

Responsible for Augment system software, and database interface.

Developed tools for producing DDN host table, automating the registration of Network users, and maintaining the MILNET Hotlist.

ACADEMIC BACKGROUND

B.A. in computer mathematics (1983), University of Pennsylvania.

ELIZABETH REDFIELD
Manager
Network Information Systems Center
Computer and Information Sciences Division

SPECIALIZED PROFESSIONAL COMPETENCE

Design & management of library services, online information databases, & information retrieval systems & associated procedures; management of reference services & support activities; development of user manuals, online user interfaces, data entry procedures, & document organization systems; cataloging, abstracting, & indexing technical literature; online literature searching; text & copy editing

REPRESENTATIVE RESEARCH AT SRI (since 1984)

Management of the Defense Data Network (DDN) User Assistance services & support staff task (10 PTE), including ongoing development of both manual & automated reference tools & services.

Expansion & management of the bibliographic databases task, including development of the BIBLIO, DOCS, & REPORTS online databases, data entry procedures & standards, user manuals and interfaces, & quality control procedures.

Supervision of the Engineering Division's Computer Science Literature Center & support staff (1 PTE).

Establishment & development of the offsite DCA DDN Technical Document Center (1 FTE, 2 PTE).

Participation in DDN NIC management team administrative activities.

Development of manual & online organizing procedures & support documentation for all bibliographic databases; participation in design of user interface for both DOTS & DOCS PC software data entry tools.

PREVIOUS PROFESSIONAL EXPERIENCE

Head, Catalog Department, Humboldt State University (2 yrs.)

Data Base Coordinator, Naval Underwater Systems Center Technical Library (3 yrs.)

Catalog Librarian, University of Rhode Island Library (4 yrs.)

Cataloger, Reference Librarian (part time), Sunnyvale Public Library (1 yr.)

ACADEMIC BACKGROUND

B.A. (1973, highest honors), University of New Hampshire (English); Masters in Library Science, University of Rhode Island; 54 post-Masters credits, (psychology, counseling, information handling) URI, HSU, SJSU, SFSU

PUBLICATIONS

Torpedo MK 48 ADCAP Program: Technical Information Center Catalog. NUSC-TD-5794. 281 p. Co-author & editor. Naval Underwater Systems Center, 1979.

ASOW Program: Technical Information Support Documentation. NUSC-TD-5828. 324 p. Co-author & editor. Naval Underwater Systems Center, 1980.

LMARS cataloging: theory & practice. NUSC-TD-5850. 82 p. NUSC, 1980.

"Student response to challenges...", Rhode Island Library Association Bulletin, V:48 #12 (June 1976).

PROFESSIONAL ASSOCIATIONS

American Library Association, Special Library Association.

DAVID YORK RICHARDSON

Senior Research Engineer
Systems Development Division

SPECIALIZED PROFESSIONAL COMPETENCE
Systems engineering; applied mathematics; simulation; software development

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI (Since 1973)
Development of Range Applications Joint Program Office (RAJPO) Global Positioning System (GPS) Equipment Specification
Analysis of RAJPO GPS differential test data
Requirements analysis for Missile Endgame System (MEGS)
Task Leader--Development of specification for a cost model for use by planners of Dial-911 emergency service systems
Project Leader--Characterization of physical security sensors to provide inputs to previously developed methods and development of additional methods to assess the vulnerability of nuclear facilities to theft of special nuclear materials
Formulation of a technique for comparison of the performance of physical security equipment without adequate quantitative test data
Analysis of the Tactical Aircrew Combat Training System (TACTS)--analysis of and contribution to software filter design; development of a method to measure angle of attack beyond air data sensor limits; contributor to a study to replace full-size computers with minicomputers; analysis of tracking data to uncover and correct deficiencies in system performance
Project Leader--TACTS computer program validation for ACEVAL/AIMVAL tests
Construction of a computer simulation of radar pulse streams and pulse stream deinterleavers to analyze present pulse-sorting capabilities and contribute to improved deinterleaver designs
Construction of a computer simulation of a message-switched communications network (Packet Radio) and use of this simulation to determine traffic loading and message delays for various networks and network access schemes
Construction of a computer simulation of resort condominium reservation schemes to analyze probability of customer satisfaction
General Purpose Simulation System (GPSS) computer language consultant

OTHER PROFESSIONAL EXPERIENCE
Member of technical staff, Advanced Aircraft Design Group, North American Rockwell Corporation (Columbus, Ohio)
Teacher of mathematics, junior high school

ACADEMIC BACKGROUND
B.S. in Mathematics (1965), University of Michigan; M.S. in Industrial and Systems Engineering (1973), Ohio State University

PUBLICATIONS
Author or coauthor of numerous technical reports

GLENN SIEBERT

Senior Research Engineer
Systems Development Division

SPECIALIZED PROFESSIONAL COMPETENCE
Operations research, algorithm development, mathematical optimization, real-time software, reliability and statistical modeling, C programming, satellite orbital elements, embedded microcomputer systems, software engineering

REPRESENTATIVE RESEARCH ASSIGNMENTS AT SRI
Analysis, modeling, and prediction of GPS satellite availability
Study of optimal pseudo-satellite locations for GPS-aided tracking of missiles
Software development for microcomputer applications

OTHER PROFESSIONAL EXPERIENCE
Principal Engineer, The Boeing Company: Real-time software engineering, advanced tactical algorithms, computer-aided engineering applications development
Systems Analyst, Computing, Boeing Computer Services Company: Applied mathematician specializing in operations research, optimization, reliability and statistical modeling, multiobjective optimization, fault tolerant computer modeling, project management
Senior Research Associate, The Urban Institute: Program evaluation and statistical analysis
Operations Research Analyst, State of California: Operations research, program effectiveness and cost reduction, cost estimation, research management
Lecturer, University of California at Berkeley
Naval Aviator, United States Naval Reserve

ACADEMIC BACKGROUND
B.A. in Mathematics (1964), San Jose State University; M. S. in Operations Research (1970), University of California at Berkeley; Ph.D. in Systems Research (1974), University of California at Berkeley

PUBLICATIONS
Author or coauthor of numerous reports

MARY K. STAHL
Manager, NIC Data Base Services
Network Information Systems Center
Computer Science and Technology Division

SPECIALIZED PROFESSIONAL COMPETENCE

Technical writing and editing; text processing; data base design and maintenance; data base and documentation standards; online information retrieval; electronic document design, production, and layout; user documentation; design of forms and tables

REPRESENTATIVE RESEARCH AT SRI (since 1978)

Produced host name and address tables for the Defense Data Network and maintained all host table data.

Maintained online ARPANET Resource Handbook and NIC Query data files.

Assistant editor of ARPANET Resource Handbook (1980).

Published ARPANET Directory (1982) and DDN Directory (1984).

Provided online and telephone reference services to the Defense Data Network user community.

Organized and maintained hardcopy reference files and NLS document collection for DDN Network Information Center (NIC).

Edited and published DDN Protocol Handbook (1985) and DDN New User Guide (1985).

Published ARPANET Information Brochure (1985).

Managed network naming and addressing task for NIC project.

Coordinated data base maintenance and enhancements to online information servers.

Supervised NIC document design and production; researched and compiled style manual for NIC document production.

Coordinated working group on domain naming issues.

Managed NIC document sales business.

PREVIOUS PROFESSIONAL EXPERIENCE

Instructional Aide, Early Childhood Education, Palo Alto Unified School District, Palo Alto, CA.

Instructional Aide, Special Education, Palo Alto Unified School District, Palo Alto, CA.

Independent contractor, Art Teacher, City of Palo Alto, CA.

ACADEMIC BACKGROUND

B.A. in Art; West Liberty State College, West Liberty, WV.

Course work in graphic arts production, American Sign Language; Foothill and De Anza Community Colleges.

Workshops and seminars on user documentation, technical writing, project management.

PUBLICATIONS

RFC 1032, Domain Administrators Guide. November, 1987.

1983 presentation

Susan Kahn	KLH?
Jake Feinler	Fran P?
Col. Heidi Heiden	(can't remember)

Dog & Pony show to introduce TAC Access & User Registration

2817-83

Viewgraphs presented to DCA explaining the TAC Access and user registration

SRI International, DDN Network Information Center
Menlo Park, CA 94025

[October 1983]

USER REGISTRATION AND TAC ACCESS AUTHORIZATION

- User Registration Drive
- TAC Access Cards
- User Registration Template
- Plans for On-going User Registration

USER REGISTRATION DRIVE

- Files on-line for Host Administrators
- Corrected files returned via network mail to NIC
- Host Administrator mailbox
- REGISTRAR@SRI-NIC mailbox
- Testing period
- TAC Access Card mailing

SAMPLE USER REGISTRATION TEMPLATE

Handle: SK4

Full name: Kahn, Susan

U.S. mail address: SRI International
Telecommunication Services
Network Information Center
333 Ravenswood Avenue
Menlo Park, California 94025

Phone: (415) 859-6111

Authorizing host: SRI-NIC

Primary login name: SKAHN

Primary network mailbox: SKAHN@SRI-NIC

Alternate network mailboxes: SKAHN@SRI-KL

TAC access requested? (y/n): y

Delete? (y/n):

USER REGISTRATION TEMPLATE

Handle

Full name

U.S. mail address

Phone

Authorizing host

Primary login name

Primary network mailbox

Alternate network mailboxes

TAC access requested? (y/n)

Delete? (y/n)

USER REGISTRATION TEMPLATE

[redacted]

Full name

U.S. mail address

Phone

Authorizing host

Primary login name

Primary network mailbox

Alternate network mailboxes

TAC access requested? (y/n)

[redacted]

TAC ACCESS CARD

- Printed by NIC
- Sent directly to user
- Copy sent to host administrator
- Copy retained by NIC

DDN TAC ACCESS CARD

USER ID

ACCESS CODE

NAME

ISSUED CARD NO.

IN CASE OF LOSS CONTACT

HOST

HOST ADMINISTRATOR

USER LOGON NAME
USER PHONE
USER PRIMARY NET MAILBOX

USER INSTRUCTIONS

SAMPLE

DDN TAC ACCESS CARD

USER ID HH6.DDN1

ACCESS CODE 22ABCDEFG

NAME Heiden, Heidi

ISSUED 11/4/83 CARD NO. 1001

IN CASE OF LOSS CONTACT [illegible]

HOST DDN1

HOST ADMINISTRATOR Goodridge, Jon S. (JSG5)

USER LOGON NAME HEIDEN
USER PHONE (703) 285-5010 (AV)356-5010
USER PRIMARY NET MAILBOX HEIDEN@DDN1

USER INSTRUCTIONS [illegible]

HEIDEN, Heidi
Defense Communications Agency
DDN Program Management Office
CODE B610
Washington, D.C. 20305

[illegible]

GUEST TAC ACCESS CARDS

- For "emergency" use
- Issued by NIC
- Sent to host administrators
- 25 per host
- Automatic expiration

SAMPLE

DDN TAC ACCESS CARD

USER ID NIC12.GUEST

ACCESS CODE 22ZYXWVUT

NAME GUEST

ISSUED 11/25/83 CARD NO. 20001

IN CASE OF LOSS CONTACT [illegible]

GUEST

HOST NIC

HOST ADMINISTRATOR Feinler, Elizabeth (Jake)

USER LOGON NAME
USER PHONE
USER PRIMARY NET MAILBOX

USER INSTRUCTIONS [illegible]

COMPROMISED TAC ACCESS CARDS

- Report to NIC
- Hot Listed
- New TAC Access Card

FUTURE ON-GOING USER REGISTRATION

- User registration programs on local hosts
- Filled-in template sent to REGISTRAR@SRI-NIC
- TAC access authorization
- Host administrator's mailbox
- Acknowledgement

WHAT IS A HOST ADMINISTRATOR?

THAT PERSON WHO HAS LOCAL ADMINISTRATIVE AUTHORITY OVER POLICIES, PRACTICES, AND USER ACCESS ON HOSTS ATTACHED TO THE DDN

WHY HAVE HOST ADMINISTRATORS?

THEY ARE NEEDED . . .

- TO ASSIST WITH ADMINISTRATION OF THE NETWORK AT THE HOST LEVEL
- TO SERVE AS AN ADVISORY BOARD TO DCA AND DARPA TO HELP SET AND CARRY OUT WORKABLE NETWORK POLICIES
- TO PROVIDE USEFUL INPUT TO DCA AND DARPA FOR PLANNING
- TO ASSIST DCA AND DARPA IN SETTING NETWORK ACCESS AND USE GUIDELINES
- TO HELP IN CASE OF EMERGENCY OR SERIOUS NETWORK BREAKIN

HOW IS A HOST ADMINISTRATOR DIFFERENT FROM A LIAISON?

HOST ADMINISTRATOR

ADMINISTRATIVE ADVISOR

LIAISON

TECHNICAL ADVISOR

WHAT ARE THE GROUND RULES?

- EACH HOST ON MILNET/ARPANET MUST HAVE A HOST ADMINISTRATOR
- EACH HOST ON MILNET/ARPANET MUST HAVE A LIAISON
- EACH HOST ADMINISTRATOR AND LIAISON MUST HAVE A NETWORK MAILBOX
- THERE WILL BE ONLY ONE OF EACH PER HOST
- AN INDIVIDUAL CAN SERVE AS HOST ADMINISTRATOR AND/OR LIAISON FOR MORE THAN ONE HOST
- THE SAME INDIVIDUAL CAN SERVE AS BOTH HOST ADMINISTRATOR AND LIAISON

WHAT IS THE SPECIFIC ROLE OF THE HOST ADMINISTRATOR IN TAC ACCESS AND USER REGISTRATION?

- TO BE RESPONSIBLE FOR VALIDATING NETWORK AND TAC USERS
- TO ASSIST DCA AND DARPA WITH ADMINISTRATION OF TAC LOGIN AND USER REGISTRATION

HOST NAME AND WHOIS SERVICES

THE NIC IS THE MILNET/ARPANET REGISTRAR AND ADMINISTRATOR FOR

- NETWORK NAMES AND ADDRESSES
- GATEWAY NAMES AND ADDRESSES
- TAC NAMES AND ADDRESSES
- HOST NAMES AND ADDRESSES
- USER REGISTRATION INFORMATION
- OTHER NAMED ENTITIES

THE NIC IS COORDINATING REGISTRAR POLICIES AND PROCEDURES WITH

- DCA DDN-PMO
- DARPA
- INTERNET WORKING GROUP (JON POSTEL)
- BBN

- MARY DYER IS THE NIC "HOST MASTER"

- KEN HARRENSTIEN IS THE NIC NAME SERVER CONTACT

PROTOCOLS NEEDED FOR TRANSITION

- EACH HOST IS REQUIRED TO IMPLEMENT
  - WHOIS ACCESS (RFC 812)
  - NAME SERVER ACCESS (RFC 811)
- TO ASSIST, THE NIC WILL PROVIDE SAMPLE PROGRAMS FOR LOCAL HOST ACCESS TO THE NIC WHOIS AND NAME SERVICE FOR TENEX, TOPS20, AND UNIX.

HOW TO UPDATE LOCAL HOST TABLES

- OPEN A CONNECTION TO PORT 101 (DECIMAL)
- GIVE AN APPROPRIATE KEYWORD FOLLOWED BY <CR>
- GIVE THE KEYWORD "HELP" FOR A LIST OF KEYWORDS AND INSTRUCTIONS

HOST TABLE TRANSITION

- "PLAIN VANILLA" KEYWORDS WILL ALWAYS PROVIDE THE RIGHT TABLES ON ANY GIVEN DAY, INCLUDING TEST DAYS.

  EXAMPLES:
  - ALL
  - ALL-HSTNAM
  - ALL-INGWAY
  - ALL-MULTINET
  - HELP

  etc.

- AFTER SEPT. 1, KEYWORDS WITH THE ADDITION OF "-SPLIT" WILL GIVE SPLIT VERSIONS OF THE HOST TABLES FOR TESTING LOCAL PROGRAMS

  EXAMPLES:
  - ALL-SPLIT
  - ALL-HSTNAM-SPLIT
  - ALL-INGWAY-SPLIT
  - ALLMULTINET-SPLIT
  - HELP-SPLIT

  etc.

- AFTER OCT. 4, ALL "-SPLIT" KEYWORDS WILL BE REMOVED

HOW TO USE WHOIS

- THERE MUST BE A USER PROGRAM AVAILABLE ON EACH LOCAL HOST TO ACCESS THE NIC WHOIS SERVER.

- ON MOST HOSTS THE USER WILL TYPE
  "WHOIS <SP> LASTNAME <CR>"
  WHERE "LASTNAME" IS THE LAST NAME OF AN INDIVIDUAL.

  THIS WILL RETURN
  FULL NAME
  U.S. MAIL ADDRESS
  NETWORK MAILBOX
  PHONE
  FOR THAT INDIVIDUAL

- THE USER CAN TYPE
  "WHOIS <SP> HELP <CR>"
  TO GET HELP OR TO INVESTIGATE OTHER FEATURES

- JOHANNA LANDSBERGEN IS THE NIC "REGISTRAR"

- SUSAN KAHN IS THE NIC TAC ACCESS CONTACT

INSTRUCTIONS FOR NETWORK USER REGISTRATION DRIVE

October 1983

SRI International
Network Information Center
Menlo Park, CA 94025
(REGISTRAR@SRI-NIC)

INSTRUCTIONS FOR NETWORK USER REGISTRATION DRIVE

I. BRIEF OVERVIEW

The Defense Data Network Program Management Office (DDN-PMO) and the Defense Advanced Research Projects Agency (DARPA) have authorized the Network Information Center (NIC) to register users on the MILNET and the ARPANET. After Feb. 15, 1984 no user will be able to use a MILNET TAC without logging in with a userid and access code. To facilitate this MILNET TAC login procedure, the NIC will also issue TAC Access Cards, containing an assigned userid and access code, to registrants requesting MILNET TAC access.

Briefly, user registration will proceed as follows:

1. The NIC will prepare filled-out templates describing users already in our data base whose primary mailbox is on one of the hosts for which you are Host Administrator. The templates will be available on November 1, 1983.

2. You will retrieve the templates from the NIC and correct them.

3. You will fill out additional templates for any users you wish to register, who were not included in the templates we prepared.

4. You will return the corrected templates and the new templates to the NIC. Templates for users that need access to MILNET TACs must be so marked, and must be sent to us from the mailbox of the authorizing Host Administrator. Templates are due at the NIC by Dec. 1, 1983.

5. The NIC will edit the data and enter it into the WHOIS Identification Data Base.

6. The NIC will issue TAC Access Cards directly to MILNET TAC users with copies of the form (minus the access code) also sent to the Host Administrator.

7. The NIC will issue TAC Access GUEST cards to each Host Administrator for temporary 'guest' access.

8. MILNET TAC login will begin on Feb. 15, 1984.

9. The NIC will publish TAC phone numbers and a hardcopy directory.

10. Registration of users will continue on an ongoing basis and can be viewed using the WHOIS program described in RFC 812.

II. GUIDELINES AS TO WHO MAY BE A REGISTERED USER OF THE MILNET/ARPANET

Users of the network should be engaged in U.S. government business or research, or should be actively involved in providing operations or system support for government-owned or government-supported MILNET/ARPANET computer communications equipment. Any MILNET or ARPANET user with a valid account on a network host may be included in the NIC WHOIS Identification Data Base.

The intent of the DDN-PMO is to let the local hosts manage themselves responsibly within the guidelines set down by the government. In accordance, each Host Administrator is responsible for users that he or she has authorized to use the network. The DDN-PMO will work with the Host Administrators should any problems arise.

III. OBTAINING LISTS OF USERS CURRENTLY IN THE NIC DATA BASE

The NIC will generate files of templates for individuals currently registered in the NIC WHOIS Identification Database. These files will be available on November 1, 1983. There will be one file for each host, and each file will contain templates describing individuals whose primary mailbox is on that host. These files should be pulled over to your local host via FTP and updated. The updated entries should be reviewed and authorized by you, the Host Administrator, and the list returned VIA NETWORK MAIL to REGISTRAR@SRI-NIC on or before December 1, 1983.

The file(s) which contains the list of templates of currently registered users on your host(s) will be located on the SRI-NIC machine [10.0.0.51 or 26.0.0.73] as

<USER-DRIVE>hostname.USERS

Where 'hostname' is the OFFICIAL HOSTNAME for the host.

Examples:
<USER-DRIVE>USC-ISI.USERS
<USER-DRIVE>DDN1.USERS

IV. CORRECTIONS TO THE CURRENT LIST OF USERS

Replace any incorrect data in the templates provided to you by the NIC. Please follow the guidelines provided under Section X. It is important that you use the NIC template and try to adhere to the same data entry style as we have used. This will allow us to automatically input the data into our data base, and will minimize the amount of editing required. We will not accept data other than in the template form specified.

If you wish to send the filled-in templates to users so they can update their own information (e.g., so that they can include alternate

mailboxes at other hosts), you may. Have the users return the templates to you. Accumulate them into a single file. Review the lists (since you are responsible for the authorization of registered users on your hosts), and send us the files as messages to the mailbox, REGISTRAR@SRI-NIC. (For further discussion, see Section IX.)

V. DELETIONS FROM THE CURRENT LIST OF USERS

To delete a user from the data base, fill in the 'Delete' field in the user's template. DO NOT DELETE the template itself.

VI. ADDITIONS TO THE LIST OF USERS

If you wish to register individuals with accounts on your hosts who were not included in the templates provided by the NIC, fill out the template included under Section XI. Complete a template for each new individual. Fill in all the relevant fields following the guidelines provided under Section X.

Alternately, you may send blank templates to your users to fill out. Have them return the filled in templates to you. (See Section VII, for instructions for registering users with several accounts). You can add these to the corrected entries or send them as a separate list, whichever you prefer.

VII. USERS WITH ACCOUNTS ON MORE THAN ONE HOST

A user should ideally be authorized by the Host Administrator of the user's 'primary' host, where 'primary' is defined as the 'home' host or the host on which the user has an account to do the primary work for which he or she is authorized to use the network. Some users will have several legitimate accounts, in which case the 'primary' host will probably be the one on which they receive electronic mail, or the one which they themselves identify as their 'home' host.

If users do have multiple accounts on more than one MILNET/ARPANET host, and if each Host Administrator fills in a template for every user on his or her host, the NIC may well receive multiple templates for some users. We are prepared to resolve any resulting duplication.

If a user tells you that a template has already been filled in for him or her by another Host Administrator, do not fill in another template unless you are sure that your host is the primary host for that user. If you are in doubt or don't know, then fill in a template for the user, and let the NIC screen for duplication.

If the user does not require MILNET TAC access, the template need not come from the authorizing Host Administrator's mailbox. However, as stated above the Host Administrator is responsible for the appropriateness of all use of the network by users accessing the net from his or her hosts. Therefore, it is important that the "Authorizing

Host" field reflect accurately the host which is the 'home' host or on which the user is doing his or her primary work.

VIII. USERS REQUESTING ACCESS TO MILNET TACS

Users who request MILNET TAC access constitute a special subset of registered users. The DDN-PMO requires that these users be individually screened and approved by the authorizing Host Administrator. Also, no one will be given MILNET TAC access without first having a valid account on a MILNET/ARPANET host. We have adopted the policy that a MILNET TAC user is 'authorized' if the user template indicating a need for MILNET TAC access comes to the NIC from the authorizing Host Administrator's mailbox. On an ongoing basis the NIC will confirm the registration of the MILNET TAC user back to the Host Administrator's mailbox. We do not intend to provide this confirmation for the initial sweep. The Host Administrator will also receive by U.S. mail a copy of the TAC Access form (minus the access code) that is sent by the NIC to the user. This step will be carried out for the initial sweep.

We think this authorization procedure is reasonable, and at the same time takes advantage of the online environment in which we all exist. The alternative would be a requirement for a hand-signed authorization form for each MILNET TAC user, which would introduce long delays in getting MILNET TAC users registered.

IX. ONLINE MAIL ADDRESS FOR COMPLETED TEMPLATES

Please send corrections and additions to

REGISTRAR@SRI-NIC

Remember, if users require MILNET TAC access, the list MUST be sent to us from the Host Administrator's mailbox. As stated, this is our guarantee that the users on this list are authorized to have MILNET TAC access.

Please send us all the templates as electronic mail. Do not include explanatory material or other text in the messages.

If the list is too long for your mail system to process, you may break the lists arbitrarily (between templates) and send them as a set of messages. If you do break up the list, please indicate in the subject field of each message: Part 1 of 4, Part 2 of 4, etc. To assure that the NIC mail system will be able to process your message, do not send a message of over 50,000 characters. You can prevent any message from exceeding this maximum size by limiting each message to 100 templates.

X. SPECIFIC INSTRUCTIONS FOR EACH TEMPLATE FIELD

If all users or a group of users in your list will have identical data in any field (i.e., same text of address, phone number, authorizing

host, etc.), please enter the full text of the field in the first template of the group in the list. You may then indicate that this information is to be repeated by simply entering "*" as the text of that field in subsequent templates, (* = ditto).

FULL NAME: The name may be entered in any of the following formats:

Lastname, Firstname I.
Lastname, Firstname
Lastname, I. Middlename
Lastname, Jr., Firstname I.
Lastname, III, Firstname I.

where 'I.' = an initial

Do not include military rank or professional titles.

U.S. MAIL ADDRESS: Some standard procedures:

The name of the organization or university should appear on the first line. Do not use acronyms for the name of the organization. The second line may contain information such as the department name, code, or attention line, followed by a line containing the building name or number, room number if you wish to include any of these. The next line should contain the street address or Post Office Box. The last line of the address field should contain the city, state and zip code. If you commonly use a 9 digit zip code, enter that.

DO NOT USE ANY ABBREVIATIONS OR ACRONYMS, with the exception of

Incorporated.....Inc.
Limited.....Ltd.
Corporation.....Corp.
Company.....Co.
Post Office Box....P.O. Box

Separate lines of the address by a carriage return.

PHONE: Acceptable formats:

U.S. numbers

(123) 456-7890
(123) 456-7890 ext 123
(123) 456-7890 (AV) 567-7890
(123) 456-7890 (AV) 567-7890 (FTS) 667-7890
(123) 456-7890 or 456-0987
(123) 456-7890 or 456-0987 (AV) 567-7890 or 567-0987

Overseas numbers

[49] 711-123456 or (AV) 420-1234 or (M) 8765-1234
(For overseas numbers, give number through country code with country code in brackets.)

AUTHORIZING HOST:

The name of the host which the user considers his or her 'home' host, or on which the user is doing the primary work for which he or she is authorized to use the MILNET or ARPANET.

Enter the OFFICIAL HOSTNAME rather than an approved nickname.

PRIMARY LOGIN NAME:

The primary login name/username/directory name of the user on the authorizing host.

If the login name is a part of the security system on your host and therefore should be kept secret, do not enter it in this field.

The primary login name may be a group directory name if it is the only one the individual uses.

PRIMARY NETWORK MAILBOX:

The mailbox where this individual prefers to receive mail. This may or may not be his or her primary login name on your host. If mail addresses are case dependent on your host, specify the mailbox string accordingly. Otherwise enter the string in caps.

Separate the username and hostname parts of the mailbox by "@".

Format: USERNAME@HOSTNAME, e.g. SMITH@SRI-NIC

ALTERNATE NETWORK MAILBOXES:

Do not enter names of group directories or alternate mailboxes unless the user actually wishes to receive and read network mail there.

Separate the username and hostname parts of the mailbox by "@", e.g., REGISTRAR@SRI-NIC. Separate multiple mailboxes by a space. If there is a space in the user-part of the mailbox, the user-part must be in quotes, e.g., "S KAHN"@CMU-CS-A. Any space character not in quotes in this field will be interpreted as being the separator between mailboxes.

Format: USERNAME@HOSTNAME USERNAME@HOSTNAME

MILNET TAC ACCESS? (y/n):

For a user to be authorized for MILNET TAC access, this field must be filled in with "y" or "yes". This is the means by which the Host Administrator indicates to us that this user is authorized for MILNET TAC access and will require a MILNET TAC Access Card. A TAC Access Card will be automatically generated for each individual whose template contains "y" or "yes" in this field, providing that the template is sent to us from the Host Administrator's mailbox.

TERMINATION DATE: The DEROS date (Date Ending Rotation of Service) for military users, estimated date of graduation for students, estimated elapse date for temporary users.

This field was requested for use on military hosts. Others may use the field if they wish.

Format: MO/YR, e.g., 10/83, 02/84

HANDLE: The handle is the unique identifying label for the record.

This field appears in templates of currently registered users;

DO NOT ALTER THIS FIELD.

This field does not appear in the blank template. Do not specify a handle for the ADDITIONS. Our program will automatically generate a unique identifier (handle) for each individual template.

DELETE? (y/n):

If the individual no longer has a login account on your host, mark this field with a "y" or "yes". DO NOT DELETE THE WHOLE TEMPLATE.

VIII. BLANK TEMPLATE FOR ADDITIONS

FULL NAME:
U.S. MAIL ADDRESS:
PHONE:
AUTHORIZING HOST:
PRIMARY LOGIN NAME:
PRIMARY NETWORK MAILBOX:
ALTERNATE NETWORK MAILBOXES (if any):
MILNET TAC ACCESS? (y/n):
TERMINATION DATE:

WHO ARE WE?

THE
NETWORK INFORMATION
SYSTEMS
CENTER

WHAT DO WE DO?

PROVIDE KNOWLEDGE WORKERS
WITH COMPUTER-BASED TOOLS,
CONTACTS, AND INFORMATION
TO DO THEIR WORK.

THE ENVIRONMENT

- COMPUTER COMMUNICATIONS NETWORKS IN PARTICULAR

  ARPANET

  MILNET

- TELEPHONE NETWORKS

- PEOPLE NETWORKS

NETWORK STATISTICS

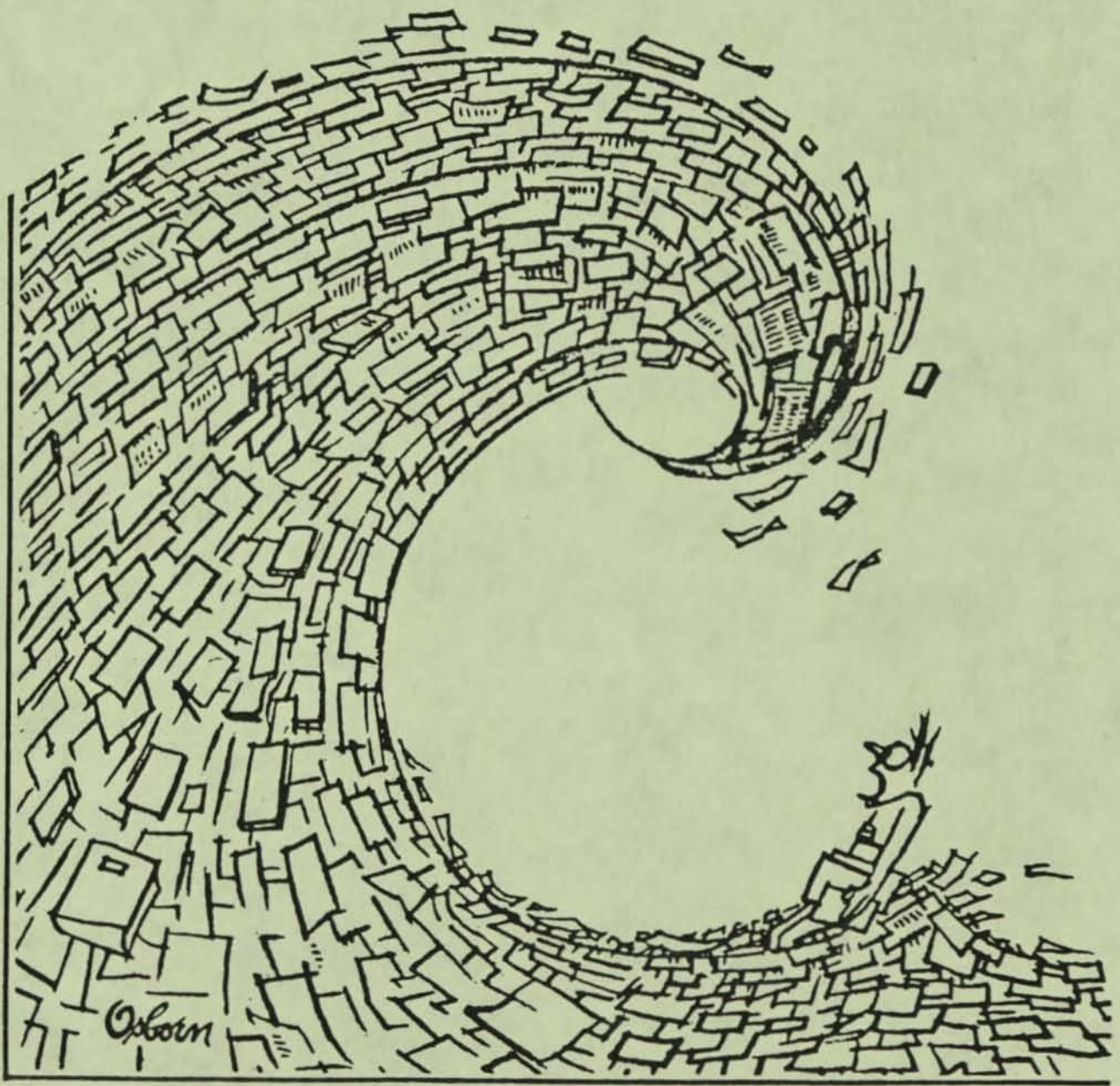
- NETWORKS 352
- GATEWAYS 96
- MILNET HOSTS 394
- MILNET NODES 127
- ARPANET HOSTS 125
- ARPANET NODES 48
- NAMING DOMAINS 58

THE PLAYERS

VIRTUALLY ANYONE WHO IS A MEMBER OF DoD
OR IS DOING BUSINESS WITH DoD
OR IS INVOLVED IN DoD RESEARCH

- KNOWLEDGE WORKERS
- DECISION MAKERS
- MANAGERS
- PLANNERS
- RESEARCHERS
- DEVELOPERS
- SUPPORT STAFF
- WRITERS/EDITORS
- U.S. MILITARY
- SEATO, NATO, SHAPE
- DoD CONTRACTORS
- DATA BASE MANAGERS
- PROGRAMMERS
- SCIENTISTS
- STUDENTS
- PROFESSORS
- VENDORS

THE PROBLEM



DRAWING BY ROBERT OSBORN

HELP!

··· HOW DO I GET ON?

··· WHO IS OUT THERE?

··· HOW DO I REACH THEM?

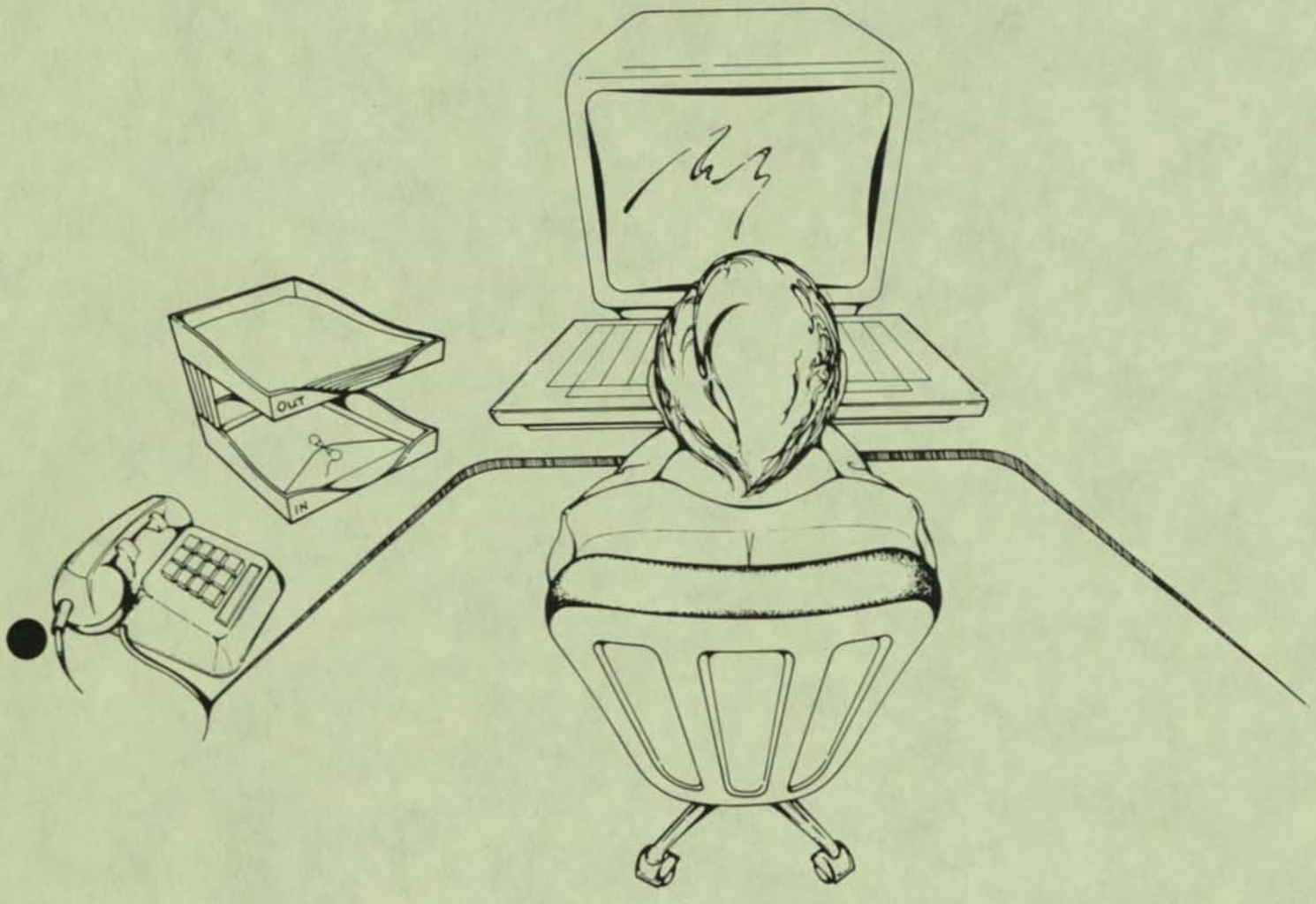
··· WHAT CAN I USE?

··· WHO CAN SHOW ME HOW?

BASIC NETWORK TOOLS

- ELECTRONIC MAIL
- FILE TRANSFER
- REALTIME REMOTE CONNECTIONS
- TERMINAL OR PC ACCESS

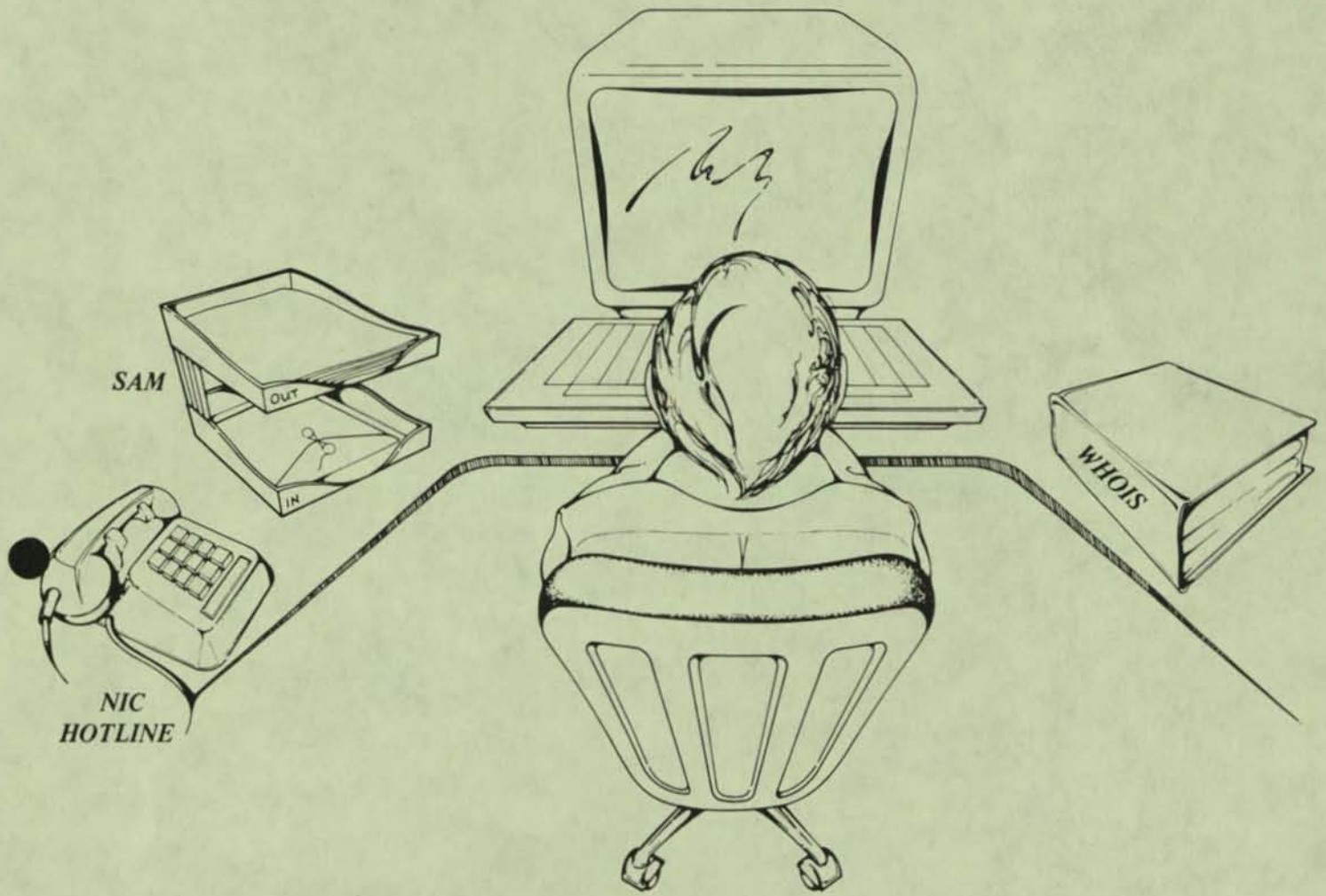
HOW WE HAVE APPROACHED THE PROBLEM



- GIVEN A TELEPHONE, A TERMINAL, AND THE NETWORK

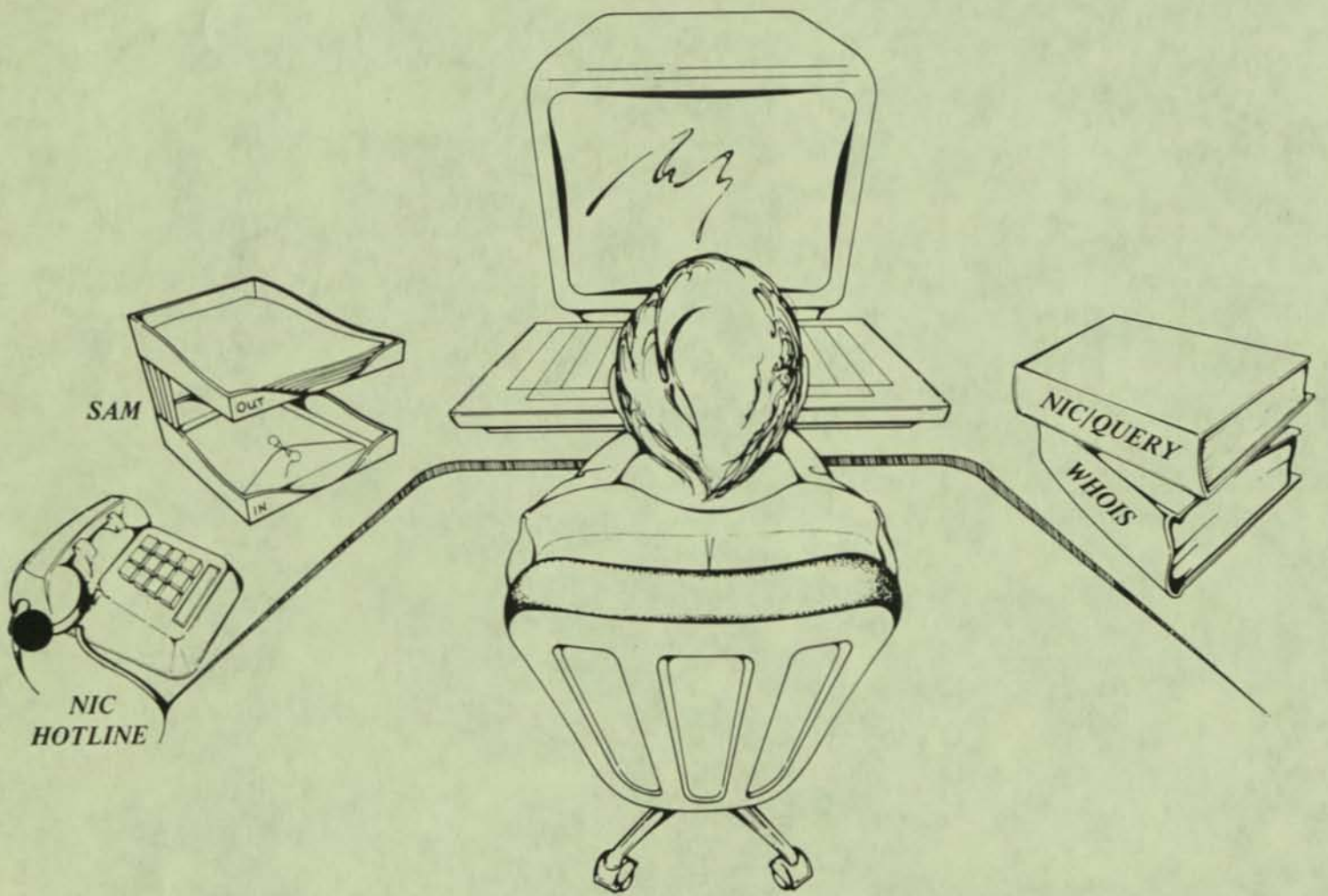
- WE BRING INFORMATION TOOLS TO THE KNOWLEDGE WORKER ELECTRONICALLY

WHOIS
(ELECTRONIC WHITE PAGES)



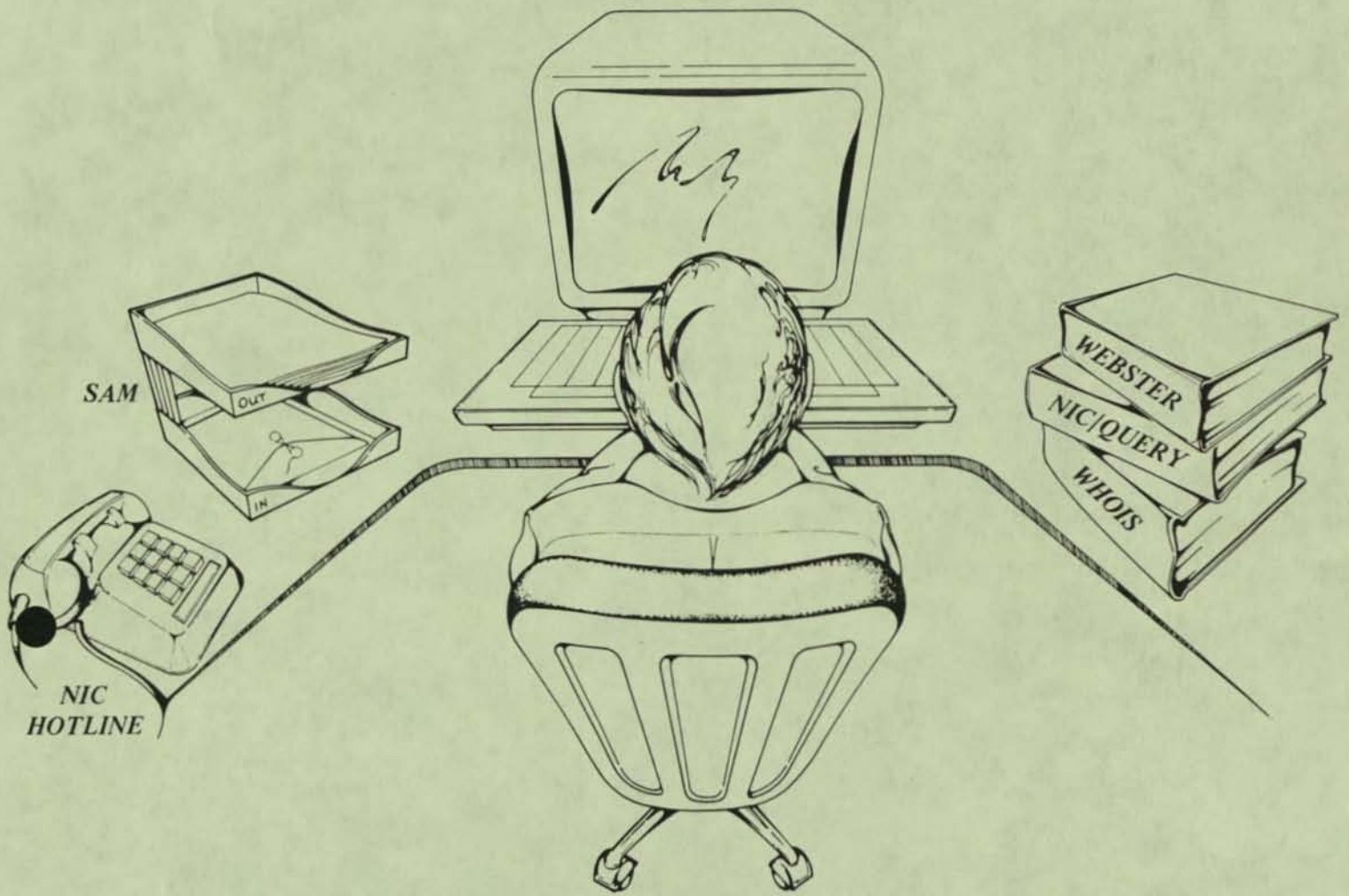

```
@whois miller, william

    Miller, William (WM6)    MILLER@SRI-KL
    SRI International
    333 Ravenswood Avenue
    Menlo Park, CA 94025
    Phone: (415) 859-4241
```

NIC/QUERY
(ELECTRONIC YELLOW PAGES)




```
@nic

   Choose a menu item.

   1. INTERNET PROTOCOLS     2. PERSONNEL
   3. HOSTS                  4. NIC DOCUMENTS

3  HOSTS -- Describes DDN hosts

   1. BY NAME  2. BY CPU  3. BY OS

3   List of hosts by Operating System

    1. CEDAR    2. CHRYSALIS    3. DOS
    4. TOPS20   5. VMS          6. UNIX

   etc.
```

WEBSTER
(DICTIONARY)

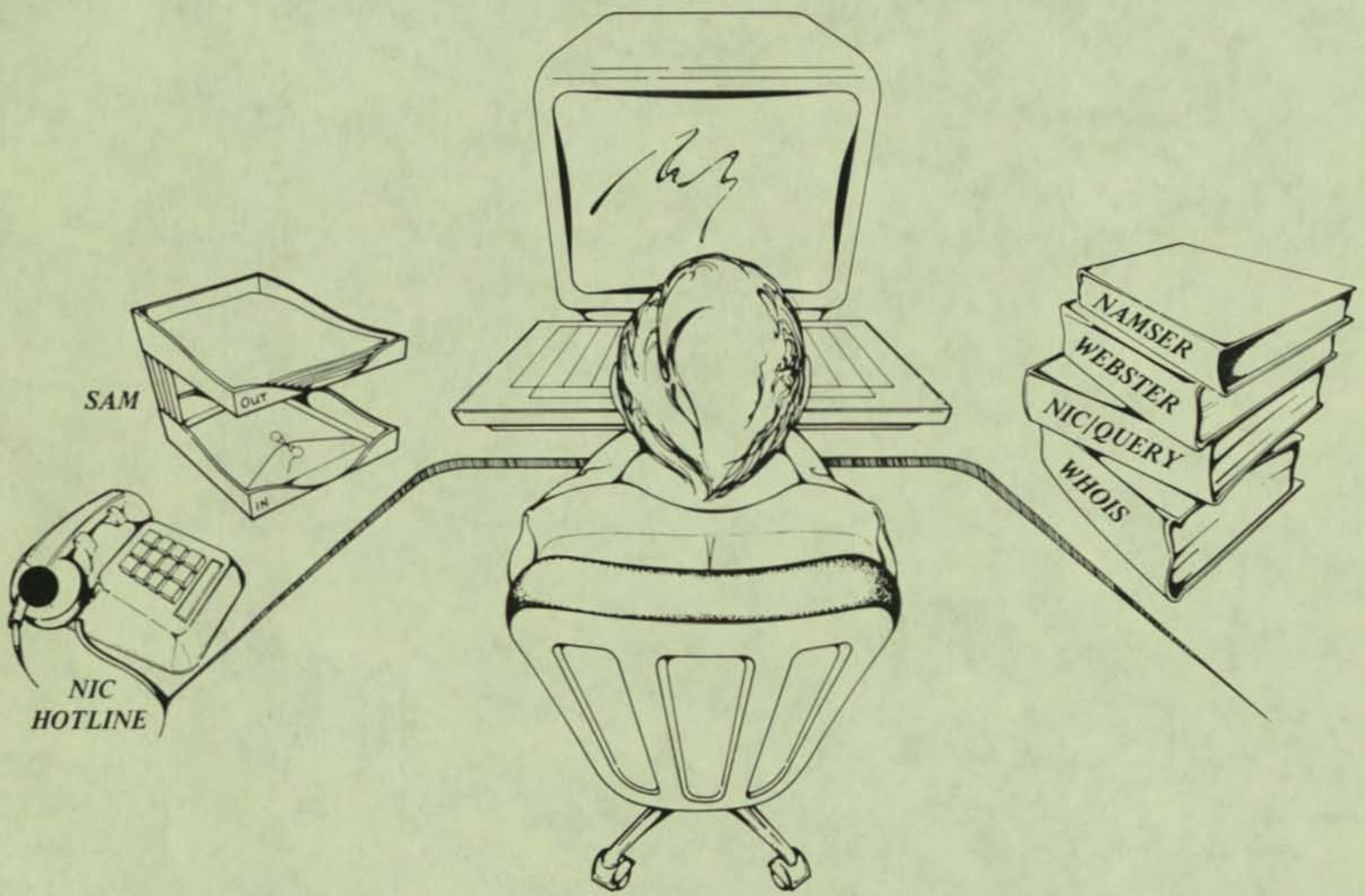


@webster

Word: acronym

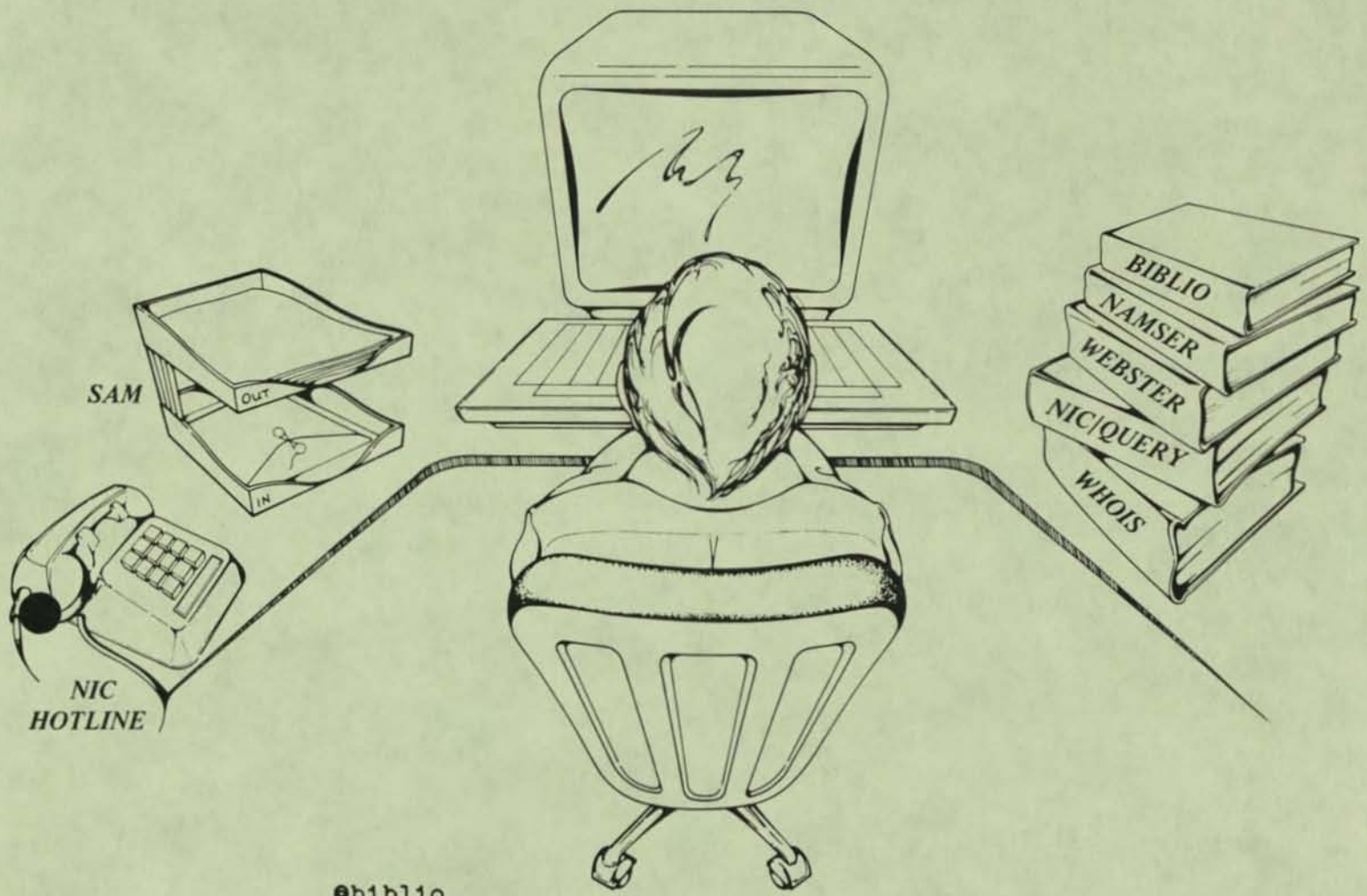
ac.ro.nym \'ak-r*-.nim\ n [acr- + -onym (as in homonym)] : a word (as radar, snafu) formed from the initial letter or letters of each of the successive parts or major parts of a compound term

NAMSER
(ROAD MAPS)



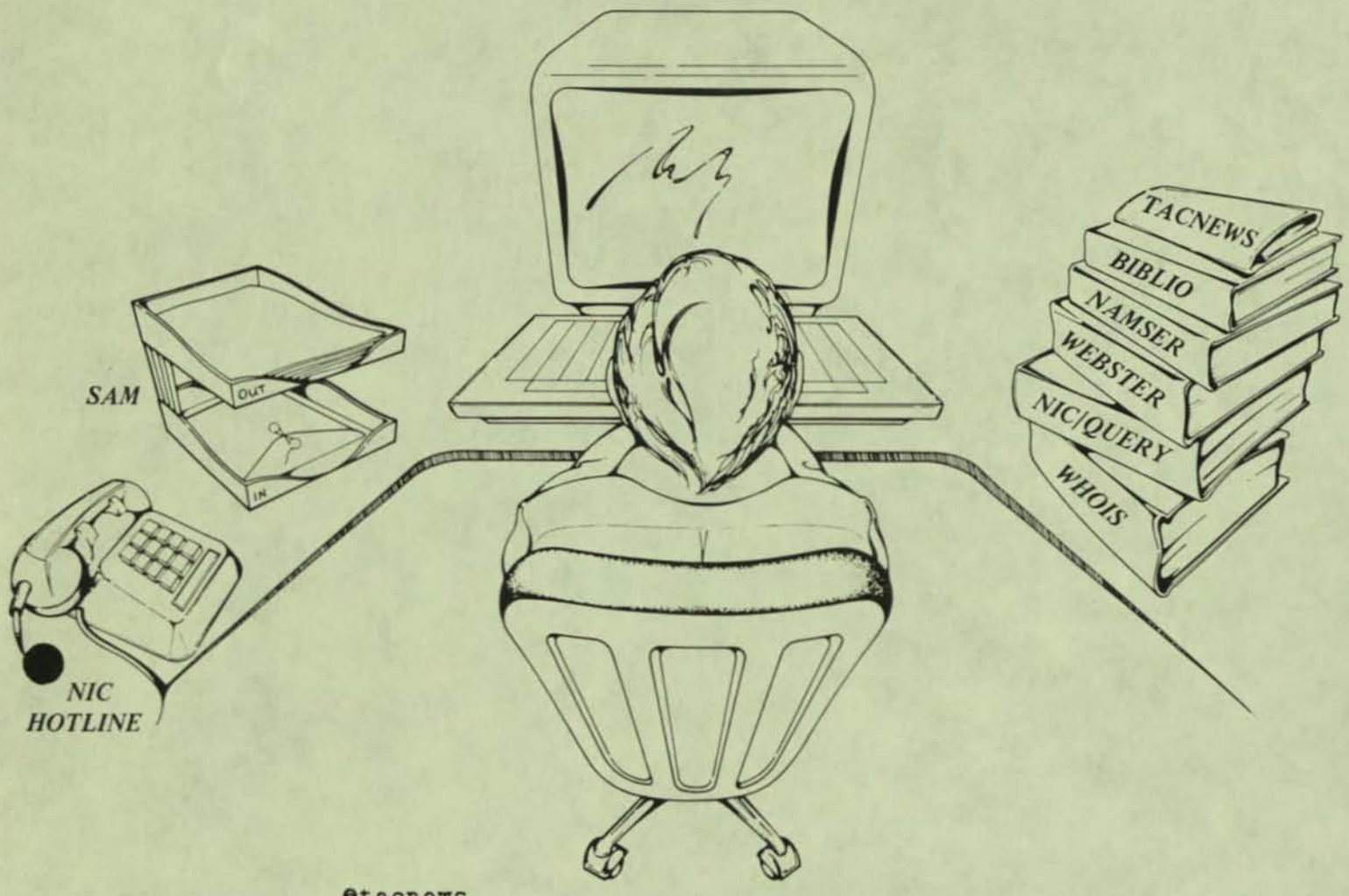

```
@host sri-nic

SRI-NIC.ARPA  (NIC)
   "SERVER" System:  TOPS20  CPU: DEC-2065
MILNET = 26.0.0.73  (Host 0, Imp 73) ....
ARPANET = 10.0.0.51  (Host 0, Imp 51) ....
```

BIBLIO
(PERSONAL LIBRARY)



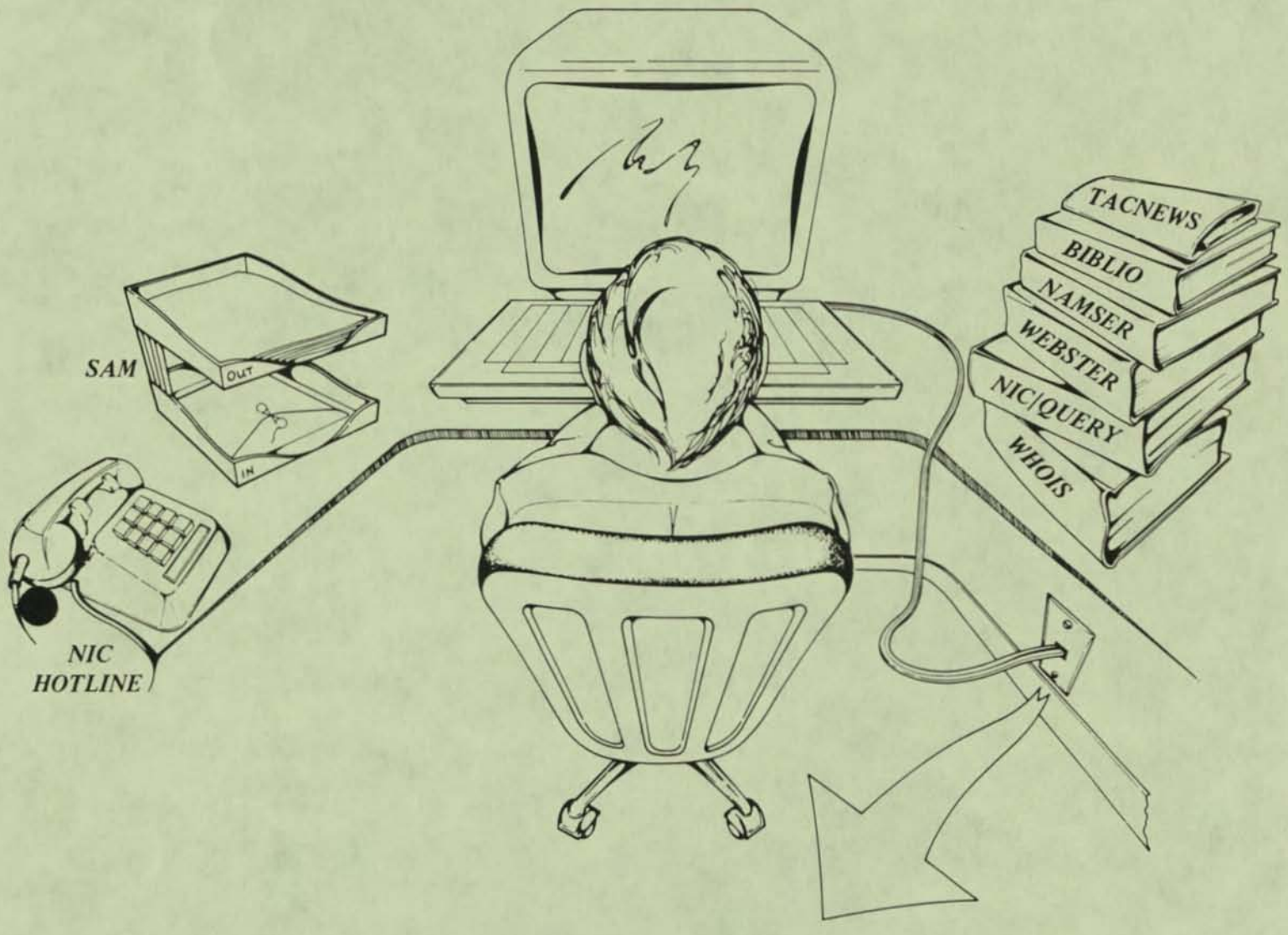

```
@biblio

B> fiND auTHOR is  "harrenstien"

   12 hit(s) found

B> disPLAY

   Feinler, E.J., Harrenstien, K., et al.
     DoD Internet host table specification,
     RFC 810, SRI International, Menlo Park,
     CA, 1 Mar 1982.  9 p.

   Harrenstien, K.  FTP extension: XSEN,
     RFC 737, SRI International, Menlo Park,
     CA, 31 Oct 1977.  1 p.

   etc.
```

TACNEWS




```
@tacnews

   1. DDN News     2. DDN Mgt Bulletins

   Type a menu number

2

   12 issues are available.  The latest are:

   28  14-Mar-85  ARPANET TAC ACCESS
                  CONTROL UNDERWAY
   29  30-Apr-85  NEW LOCATION FOR CONUS
                  MILNET MONITORING CENTER
   To view, type an issue number.

29

   [gives full text of news item].
```

BEHIND THE SCENES

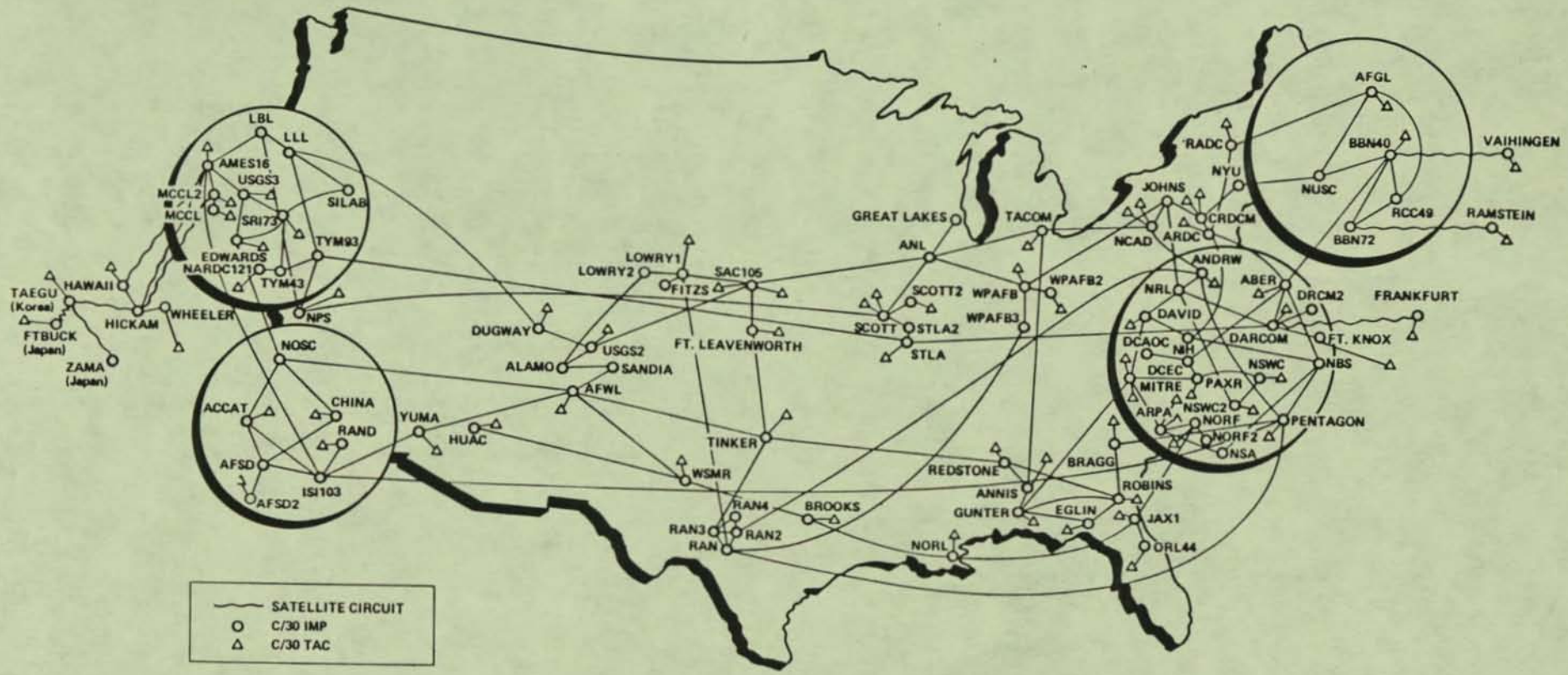


- BILLING
- ACCESS PERMISSION
- NAME SERVICE
- PROTOCOL INTERCONNECTION
- PRIVACY/AUDIT TRAIL

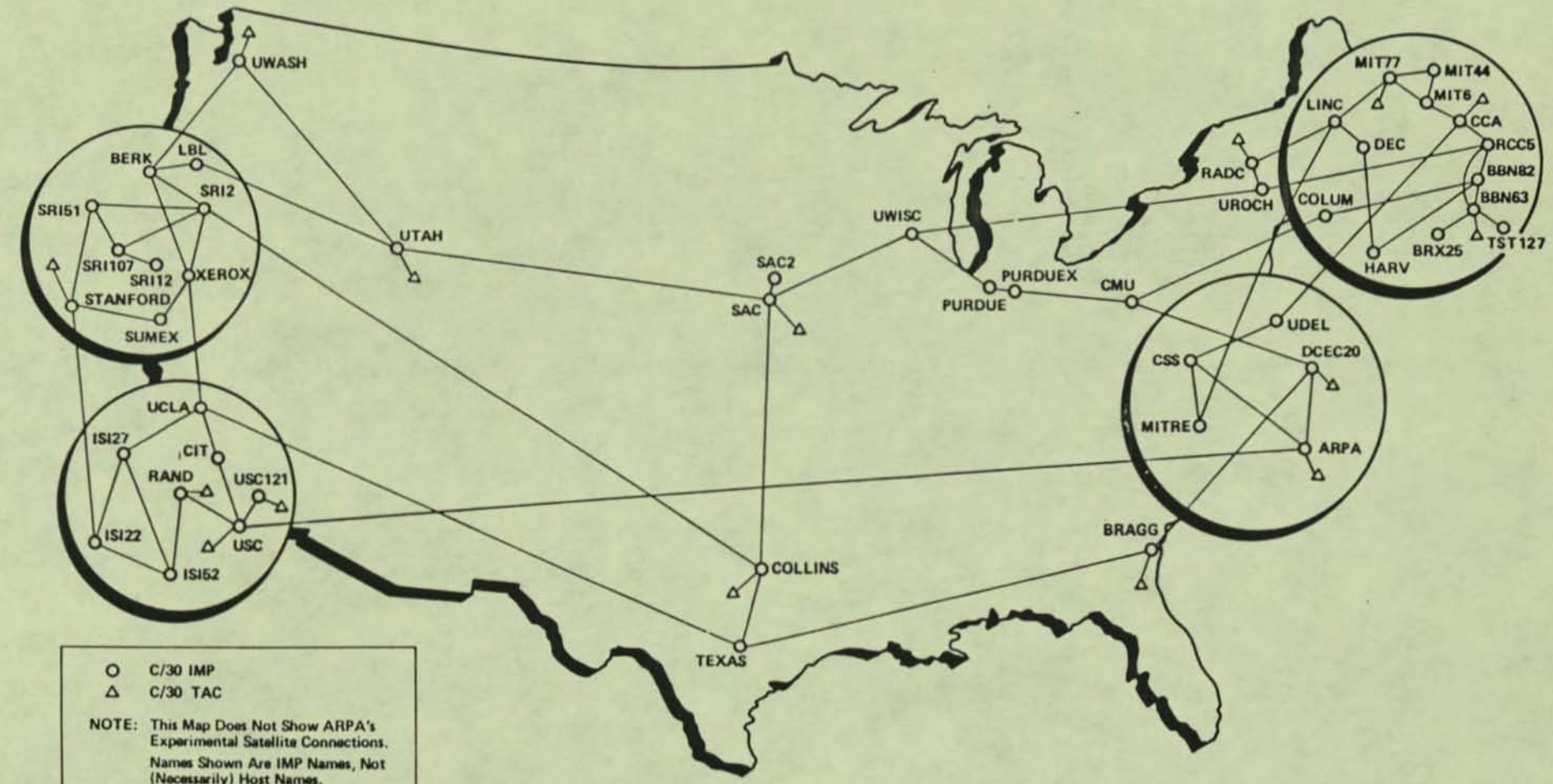
GOALS

- SIMPLICITY
- TRANSPARENCY
- UTILITY

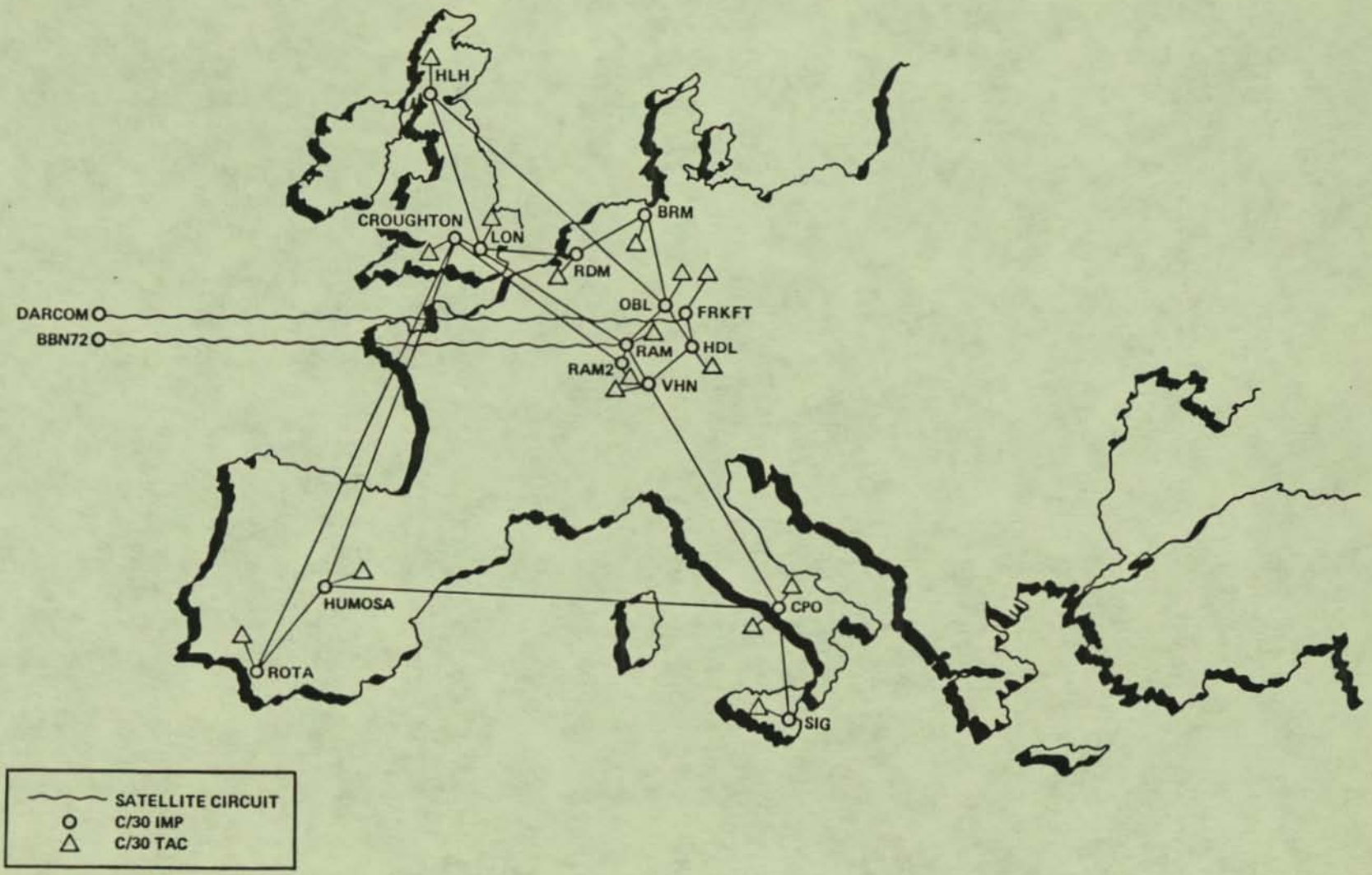
MILNET Geographic Map, 31 December 1985



ARPANET Geographic Map, 31 December 1985

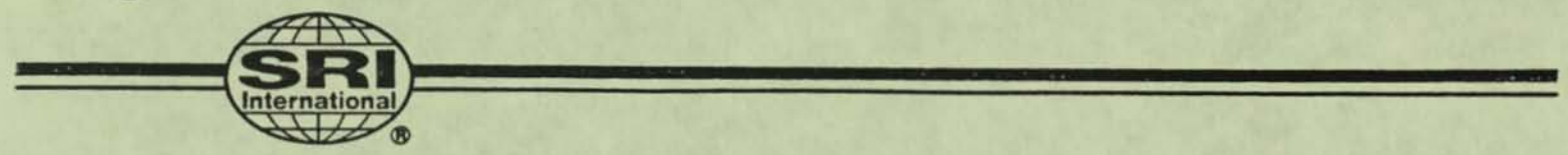


European MILNET Geographic Map, 31 December 1985



formerly

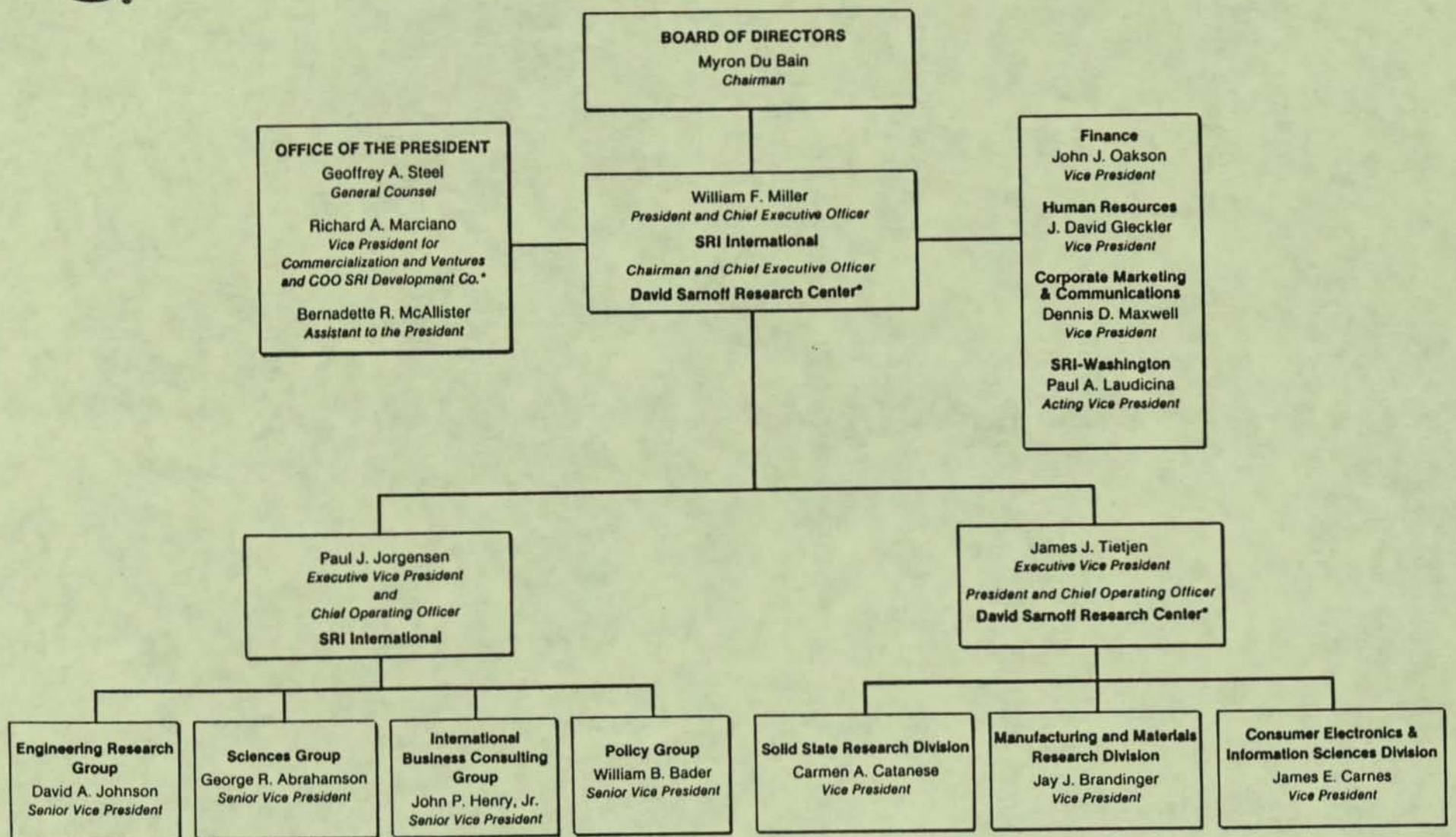
STANFORD RESEARCH INSTITUTE



INFORMATION BRIEFING

by
SRI International
for

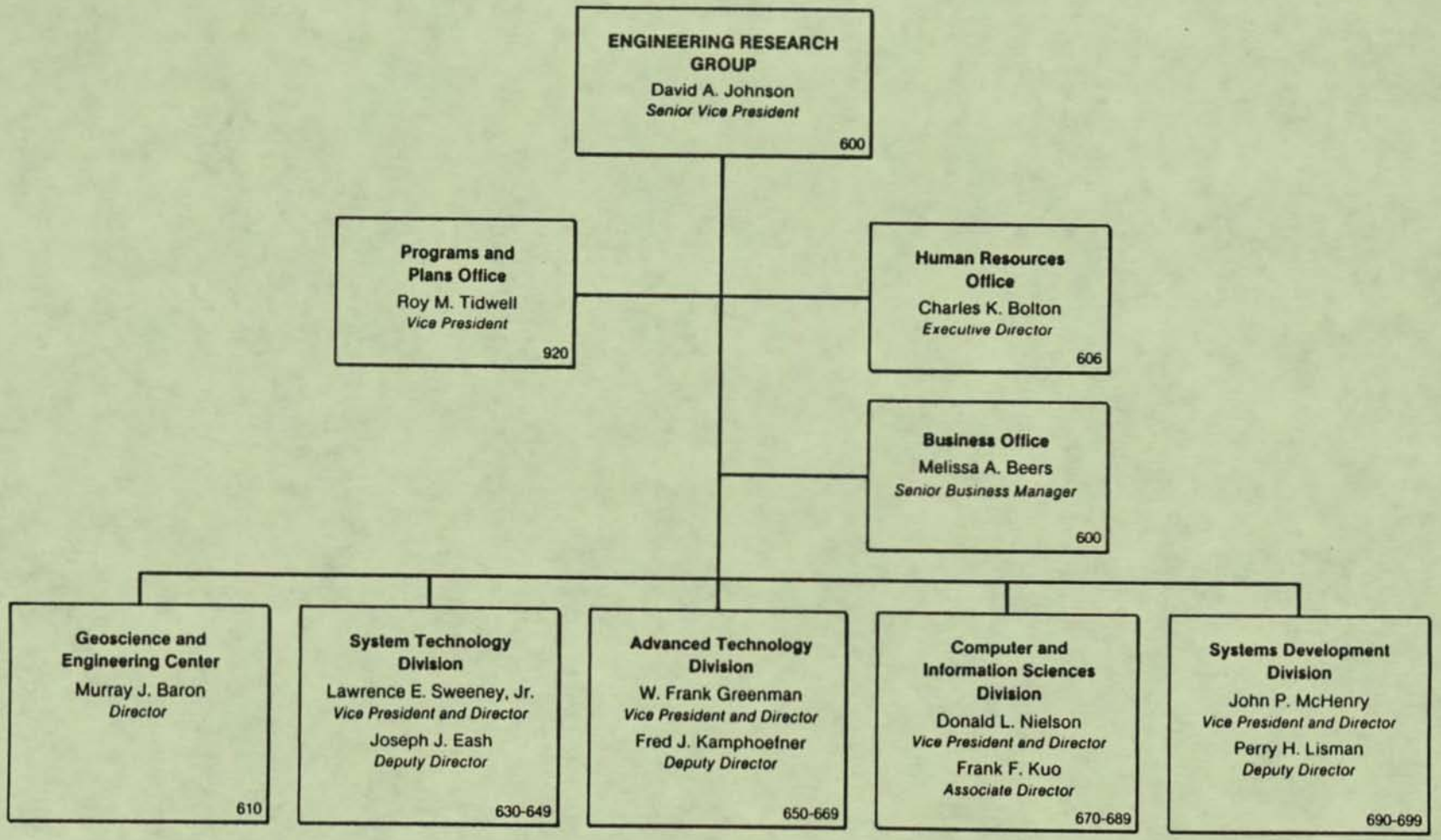
Col. Thomas Herrick
19 October 1988



*A wholly owned subsidiary of SRI.

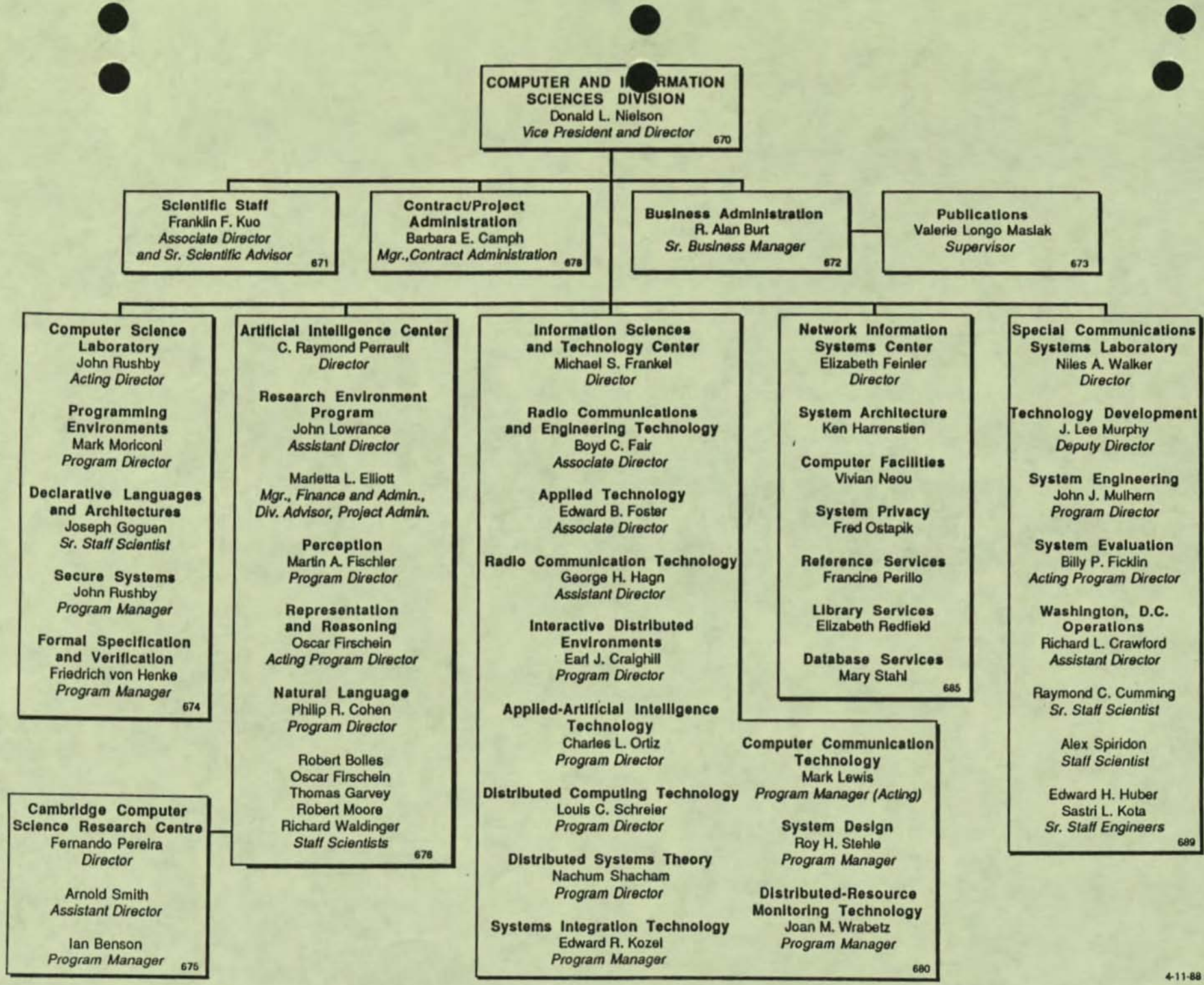
September 1988

ORGANIZATION CHARTS — 100
OFFICE OF THE PRESIDENT — 100



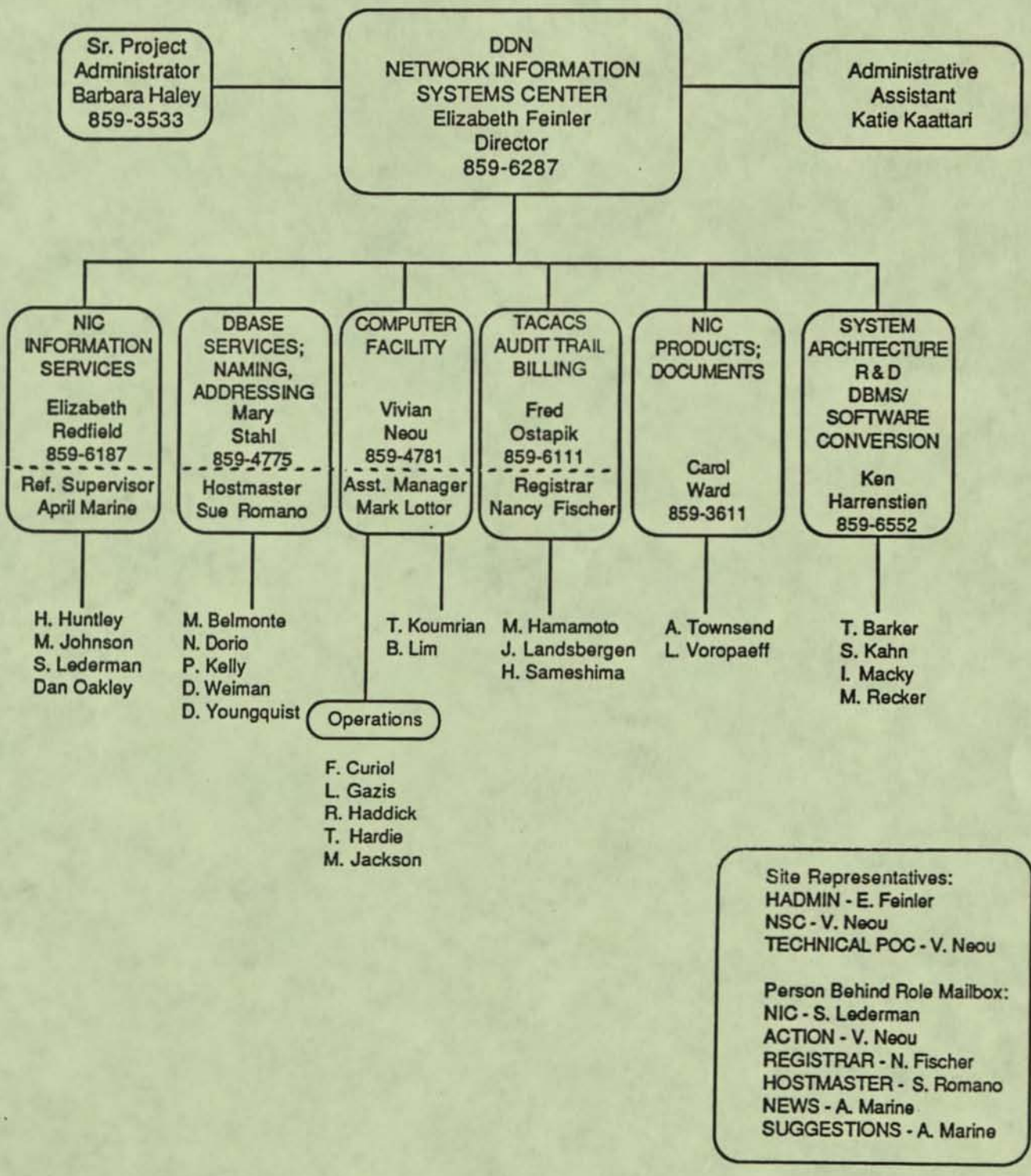
ORGANIZATION CHARTS — 100
ENGINEERING RESEARCH GROUP — 160

November 1987


COMPUTER AND INFORMATION SCIENCES DIVISION
Donald L. Nielson
Vice President and Director
670
Scientific Staff
Franklin F. Kuo
Associate Director and Sr. Scientific Advisor
671
Contract/Project Administration
Barbara E. Camph
Mgr., Contract Administration
678
Business Administration
R. Alan Burt
Sr. Business Manager
672
Publications
Valerie Longo Maslak
Supervisor
673
Computer Science Laboratory
John Rushby
Acting Director
Programming Environments
Mark Moriconi
Program Director
Declarative Languages and Architectures
Joseph Goguen
Sr. Staff Scientist
Secure Systems
John Rushby
Program Manager
Formal Specification and Verification
Friedrich von Henke
Program Manager
674
Artificial Intelligence Center
C. Raymond Perrault
Director
Research Environment Program
John Lowrance
Assistant Director
Marietta L. Elliott
Mgr., Finance and Admin., Div. Advisor, Project Admin.
Perception
Martin A. Fischler
Program Director
Representation and Reasoning
Oscar Firschein
Acting Program Director
Natural Language
Philip R. Cohen
Program Director
Robert Bolles
Oscar Firschein
Thomas Garvey
Robert Moore
Richard Waldinger
Staff Scientists
676
Information Sciences and Technology Center
Michael S. Frankel
Director
Radio Communications and Engineering Technology
Boyd C. Fair
Associate Director
Applied Technology
Edward B. Foster
Associate Director
Radio Communication Technology
George H. Hagn
Assistant Director
Interactive Distributed Environments
Earl J. Craighill
Program Director
Applied-Artificial Intelligence Technology
Charles L. Ortiz
Program Director
Distributed Computing Technology
Louis C. Schreier
Program Director
Distributed Systems Theory
Nachum Shacham
Program Director
Systems Integration Technology
Edward R. Kozel
Program Manager
Computer Communication Technology
Mark Lewis
Program Manager (Acting)
System Design
Roy H. Stehle
Program Manager
Distributed-Resource Monitoring Technology
Joan M. Wrabetz
Program Manager
680
Network Information Systems Center
Elizabeth Feinler
Director
System Architecture
Ken Harrenstien
Computer Facilities
Vivian Neou
System Privacy
Fred Ostapik
Reference Services
Francine Perillo
Library Services
Elizabeth Redfield
Database Services
Mary Stahl
685
Special Communications Systems Laboratory
Niles A. Walker
Director
Technology Development
J. Lee Murphy
Deputy Director
System Engineering
John J. Mulhern
Program Director
System Evaluation
Billy P. Ficklin
Acting Program Director
Washington, D.C. Operations
Richard L. Crawford
Assistant Director
Raymond C. Cumming
Sr. Staff Scientist
Alex Spiridon
Staff Scientist
Edward H. Huber
Sastri L. Kota
Sr. Staff Engineers
689
Cambridge Computer Science Research Centre
Fernando Pereira
Director
Arnold Smith
Assistant Director
Ian Benson
Program Manager
675
4-11-88

NIC HOTLINE (800) 235-3155
AREA CODE 415

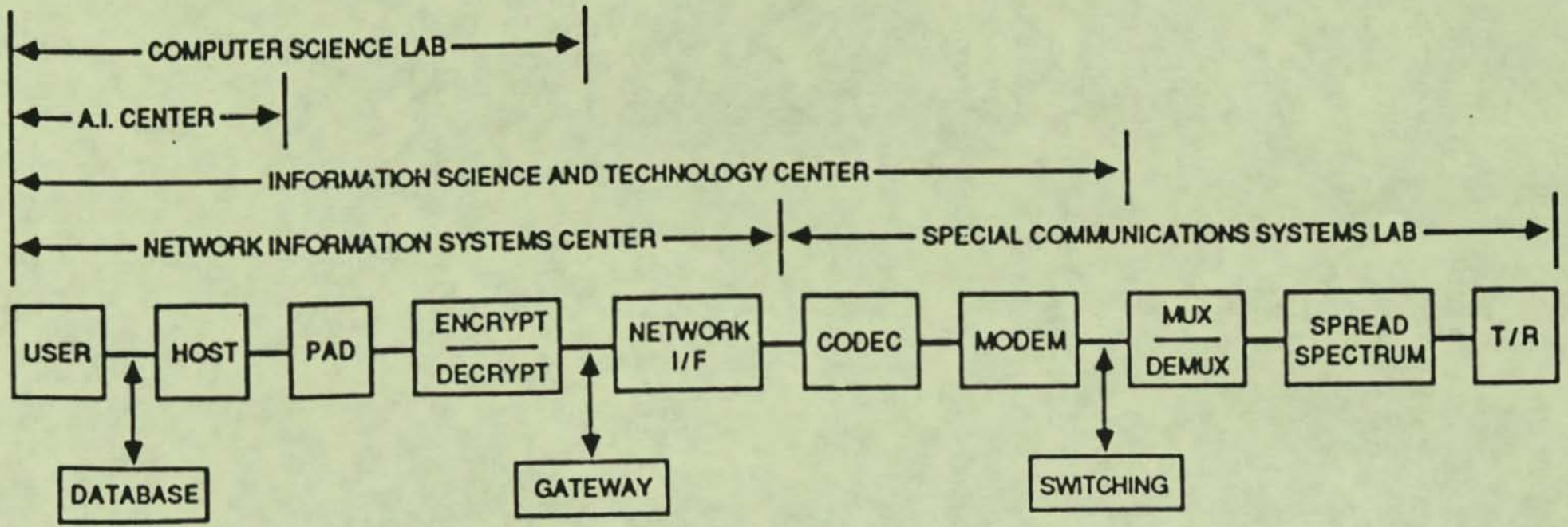
DDN Network Information Systems Center
SRI International
Menlo Park, CA



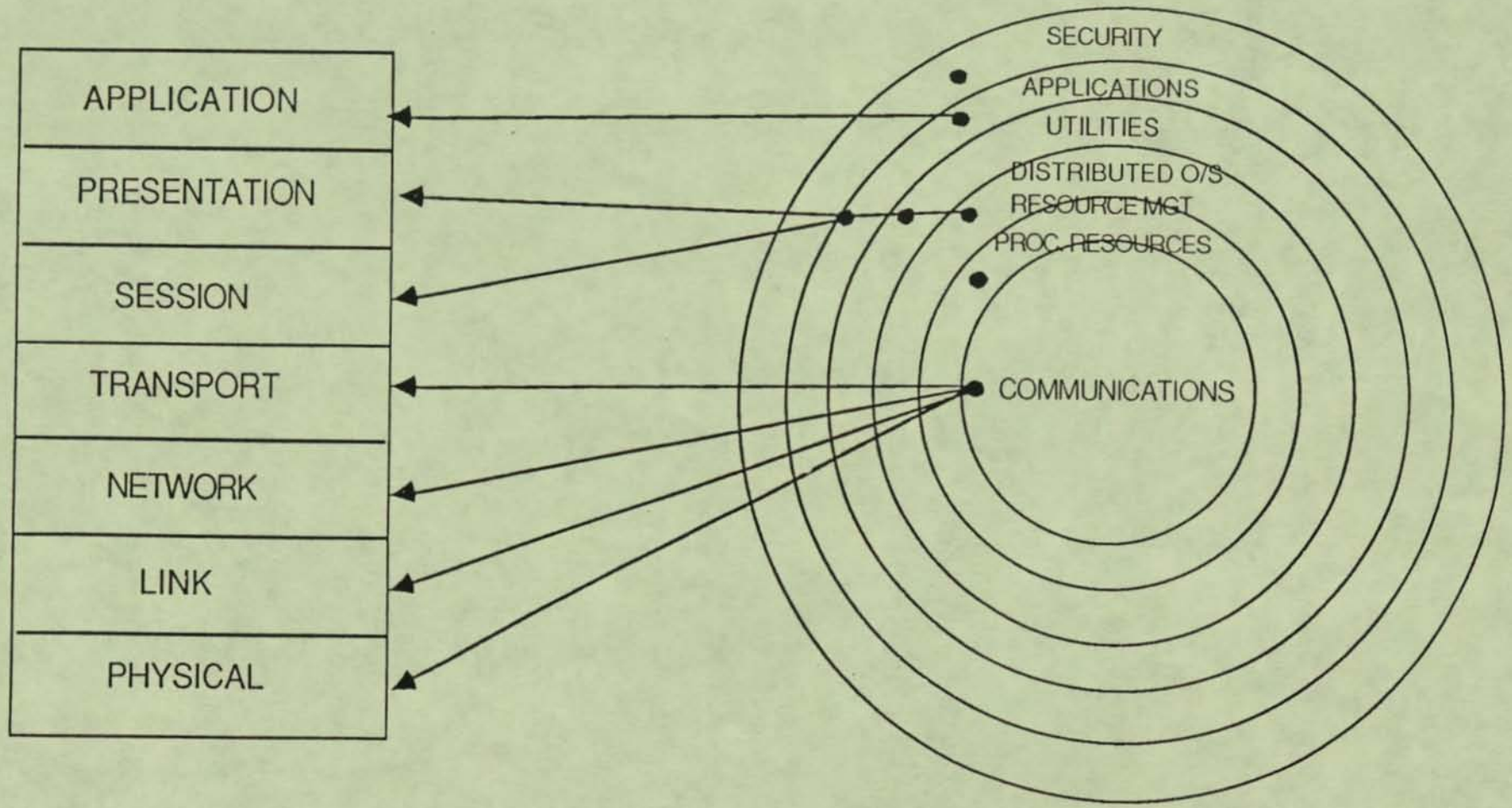
Site Representatives:
HADMIN - E. Feinler
NSC - V. Neou
TECHNICAL POC - V. Neou

Person Behind Role Mailbox:
NIC - S. Lederman
ACTION - V. Neou
REGISTRAR - N. Fischer
HOSTMASTER - S. Romano
NEWS - A. Marine
SUGGESTIONS - A. Marine

SRI CAPABILITIES IN COMMUNICATION-INFORMATION-COMPUTER SCIENCE



SRI EXPERTISE



OSI MODEL

SRI LABS

10/19/88

BURNING ISSUES

- DELIVERING BILLING SYSTEM
- COMPLETING C, UNIX AND RDBMS CONVERSIONS
- REPLACING DEC 2065 MACHINE
- TRANSITIONING TO DOMAIN NAMING – X.500 DIRECTORY SERVICE
- KEEPING USERS HAPPY, INFORMED AND PRODUCTIVE
- MANAGING COSTS

10/19/88

DELIVERING BILLING SYSTEM

10/19/88

NAURS TASKS

- Implement prototype NAURS on NAURSnet
- Implement Data Gathering Functions*
  - Need PSN Ports
- Incorporate INGRES into NAURS
  - Establish link to WHOIS Database
  - Do WHOIS/INGRES/MIS-DIS Data Structures
- Implement Interim Billing System
  - Need the requirements
- Transition to make use of NAURSnet features
  - Hardware redundancy
  - Historical Archive & Retrieval
  - Real-time Audit-trail Monitoring

10/19/88

PROBLEMS

- Reestablish Working Group Meetings
  - Need Interim Requirements
  - Coordination of tasks - DCA,SRI,BBN,DECCO
  - Establish Coordinated Milestones
- Need PSN Ports
  - Else Cannot Convert Data-gathering Functions
  - Foonly Support Ends -> Audit Data Loss
- Need to Correct Audit-Trail Errors
  - Errors on Over 40% of Data
  - Compromises Usage Data Also
- Need TAC Release 114 & Login Hosts
  - Hotlist May Not Handle Future TAC Verification

10/19/88

COMPLETING C, UNIX AND RDBMS CONVERSIONS

- NEED EVOLUTION NOT REVOLUTION)
- TECHNICAL VS ADMINISTRATIVE SOLUTION
- DISTRIBUTED SYSTEM
- WORKING GROUP APPROACH
- WELL-DEFINED GAMEPLAN
- ENOUGH SOFTWARE/HARDWARE TO DO THE JOB

3/11/88

ONGOING PROGRAMMING ACTIVITIES
All TASKS

- Maintenance of Current TOPS-20 Based Programs
- Programming Support of Naming and Addressing Work
- Modifying TACACS Registration Programs to Meet New Requirements
- Creating New Table Generation Programs As Needed
- Software Conversion Efforts

8/18/88

SOFTWARE CONVERSION PROGRESS

- C CONVERSION COMPLETED
- UNIX CONVERSION HALTED
- RDBMS CONVERSION MODIFIED

8/18/88

SOFTWARE CONVERSION PROBLEMS

- INGRES INSTALLATION
- UNIX CONVERSION

10/19/88

REPLACING DEC 2065

- NEED AN ARCHITECTURE
- NEED REPLACEMENT EQUIPMENT
- NEED GO AHEAD

NETWORK EQUIPMENT

- ONSITE
  - Milnet C/30 PSN
  - Arpanet C/30 & C/300 PSNs
  - Arpanet Login Host
  - Milnet User Database Host
- UNDER CONSIDERATION
  - NOC C/30 (For redundancy)
  - NACC

PROBLEMS - COMPUTER FACILITY

- PSN PORT ASSIGNMENTS
  - Needed for usage and billing
  - User database host
- ANOTHER COPY OF INGRES
- UNIX SOURCE CODE

TOPS20 REPLACEMENT

- ENTERING LAST YEARS OF DEC20 LIFE SPAN
- SWITCH TO LARGER MAINFRAME OR DISTRIBUTED SYSTEM?
- WHAT OPERATING SYSTEM?

10/19/88

NAMING TRANSITION

- AGREEMENT UPON GAMEPLAN
- GOOD ORCHESTRATION
- NO BIG SURPRISES
- MANAGE IMPACT ON SITES
- MAINTAIN INTEROPERABILITY
- MEET PROTOCOL SPECS

10/19/88

KEEPING USERS HAPPY

- MAKE USERS FEEL AT HOME ON THE NET, NOT ABANDONED
- BUILD A SOLID INFORMATION INFRASTRUCTURE
- COORDINATE AND REWARD THE POCS
- TRAIN THE TRAINERS
- ADVERTISE THE SERVICES
- ELIMINATE CONFUSION

10/19/88

WHAT NIC CAN DO

- ENHANCE DCSDS EFFECTIVENESS
- ASSIST WITH DCSDS USER MEETINGS
- HELP TRAIN THE TRAINERS
- PROVIDE TECHNOLOGY TRANSFER
- KEEP USERS INFORMED
- LEAD HADMIN WORKING GROUP WITH B641
- DEVELOP A "WELCOME PACKAGE" FOR NEW SITE POCS
- UPDATE THE NEW USERS GUIDE
- PUBLISH A DDN DIRECTORY

10/19/88

WHAT WE NEED

- CLOSE COORDINATION WITH B641
- KNOWLEDGE OF TIMELINES, GAMEPLANS, POLICIES, PROCEDURES
- HEADS-UP ON CHANGES, IMPACT DECISIONS
- ACCESS TO DDN TRAINING COURSES, MATERIALS, PROCEDURES, DOCUMENTS
- INFORMATION, INFORMATION, INFORMATION!

10/19/88

DOCUMENTS SHIPPED, 1988
as of 10/18/88

ARPANET Information Brochure	98
DDN New Users Guide	230
DDN Protocol Handbook	675
DDN Protocol Impl. and Vend. Guide	244
DDN Subscriber Interface Guide	135
DDN Subscriber Security Guide	96
DDN X.25 Specifications	102
RFCs	3,600
RFC Subscriptions	75

10/19/88

MANAGING COSTS

- STREAMLINING PROCEDURES
- AUTOMATING LABOR-INTENSIVE TASKS
- OFFLOADING DOCUMENT COSTS
- SHARING RESOURCES

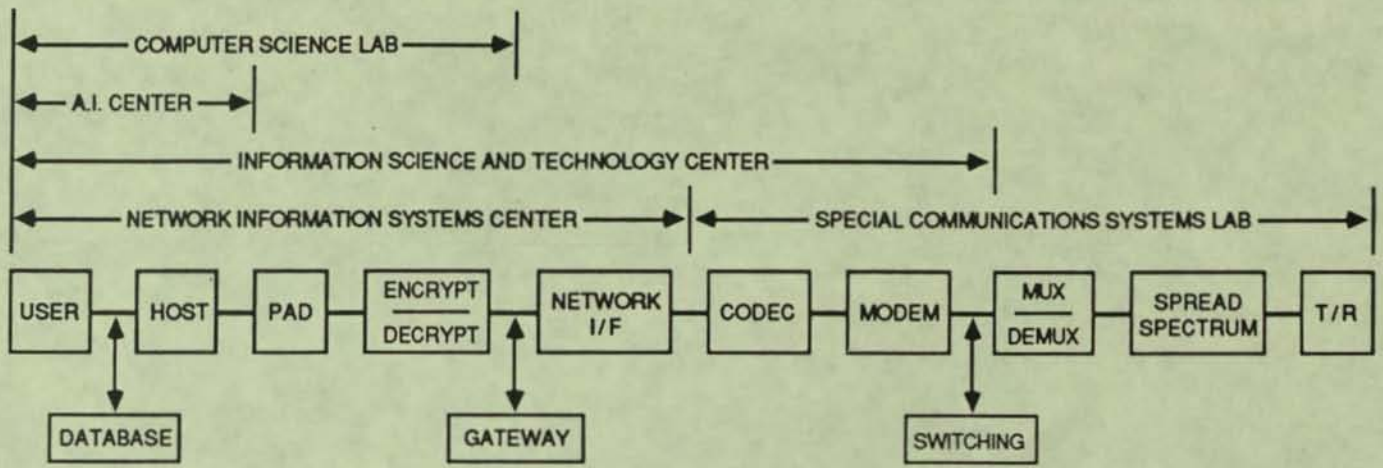
2820-88

Viewgraphs presented in NIC briefing to Gordon Soper
of the Defense Communications Agency

SRI Internation, DDN Network Information Center
Menlo Park, CA 94025

April 8, 1988

SRI CAPABILITIES IN COMMUNICATION-INFORMATION-COMPUTER SCIENCE



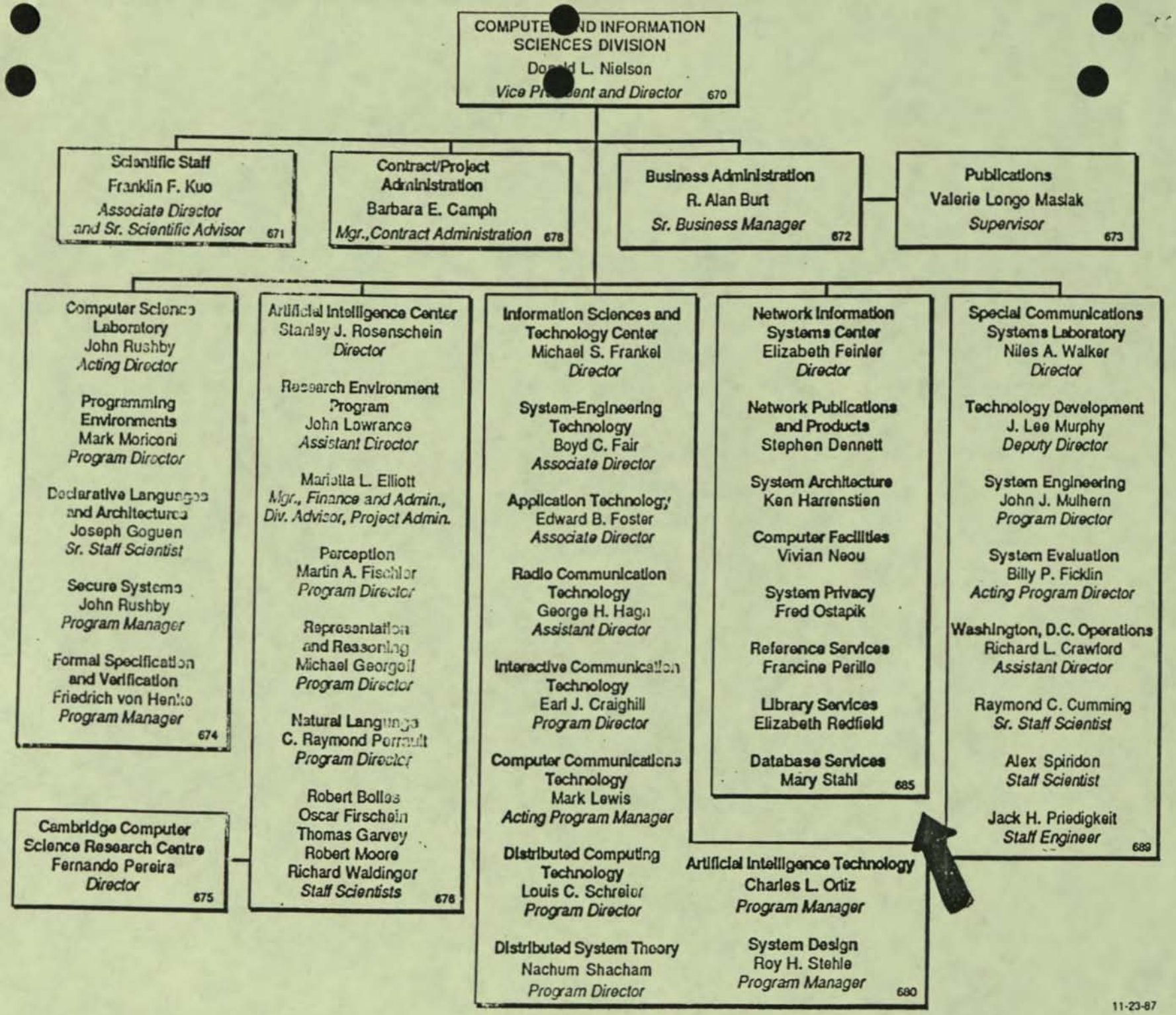
TOPICS TO BE COVERED

- DDN information infrastructure
- Augmenting users
- Naming and distributed domains
- Protocol transition and technology transfer
- Email for military users
- Information management tools

TOPICS NOT COVERED

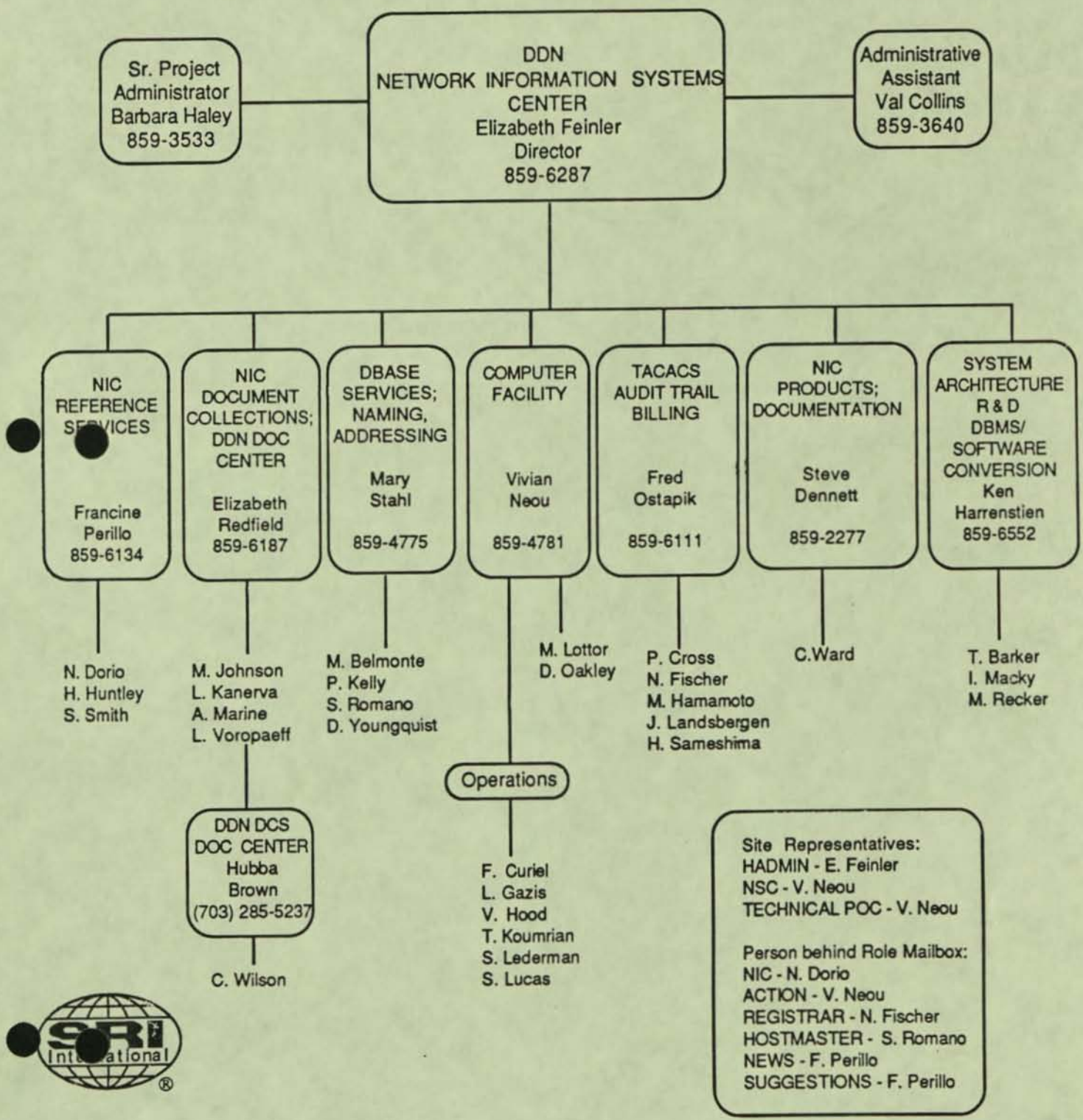
- Information architectures
- User registration
- Protocol implementation and testing
- Audit trail and billing
- Network journal and repository
- Onsite government computer facility
- POC coordination and training
- Electronic "yellow and white" pages

88-0880


COMPUTER AND INFORMATION SCIENCES DIVISION
Donald L. Nielson
Vice President and Director 670
Scientific Staff
Franklin F. Kuo
Associate Director and Sr. Scientific Advisor 671
Contract/Project Administration
Barbara E. Camph
Mgr., Contract Administration 678
Business Administration
R. Alan Burt
Sr. Business Manager 672
Publications
Valerie Longo Maslak
Supervisor 673
Computer Science Laboratory
John Rushby
Acting Director
Programming Environments
Mark Moriconi
Program Director
Declarative Languages and Architecture
Joseph Goguen
Sr. Staff Scientist
Secure Systems
John Rushby
Program Manager
Formal Specification and Verification
Friedrich von Henke
Program Manager
674
Artificial Intelligence Center
Stanley J. Rosenschein
Director
Research Environment Program
John Lowrance
Assistant Director
Marietta L. Elliott
Mgr., Finance and Admin., Div. Advisor, Project Admin.
Perception
Martin A. Fischler
Program Director
Representation and Reasoning
Michael Georgeff
Program Director
Natural Language
C. Raymond Perrault
Program Director
Robert Bolles
Oscar Firschein
Thomas Garvey
Robert Moore
Richard Waldinger
Staff Scientists 676
Cambridge Computer Science Research Centre
Fernando Pereira
Director 675
Information Sciences and Technology Center
Michael S. Frankel
Director
System-Engineering Technology
Boyd C. Fair
Associate Director
Application Technology
Edward B. Foster
Associate Director
Radio Communication Technology
George H. Hagn
Assistant Director
Interactive Communication Technology
Earl J. Craighill
Program Director
Computer Communications Technology
Mark Lewis
Acting Program Manager
Distributed Computing Technology
Louis C. Schreier
Program Director
Distributed System Theory
Nachum Shacham
Program Director
Artificial Intelligence Technology
Charles L. Ortiz
Program Manager
System Design
Roy H. Stehle
Program Manager
680
Network Information Systems Center
Elizabeth Feinler
Director
Network Publications and Products
Stephen Dennett
System Architecture
Ken Harrenstien
Computer Facilities
Vivian Neou
System Privacy
Fred Ostapik
Reference Services
Francine Perillo
Library Services
Elizabeth Redfield
Database Services
Mary Stahl 685
Special Communications Systems Laboratory
Niles A. Walker
Director
Technology Development
J. Lee Murphy
Deputy Director
System Engineering
John J. Mulhern
Program Director
System Evaluation
Billy P. Ficklin
Acting Program Director
Washington, D.C. Operations
Richard L. Crawford
Assistant Director
Raymond C. Cumming
Sr. Staff Scientist
Alex Spiridon
Staff Scientist
Jack H. Priedigkeit
Staff Engineer 689
11-23-87

NIC HOTLINE (800) 235-3155
AREA CODE 415

DDN Network Information Systems Center
SRI International
Menlo Park, CA

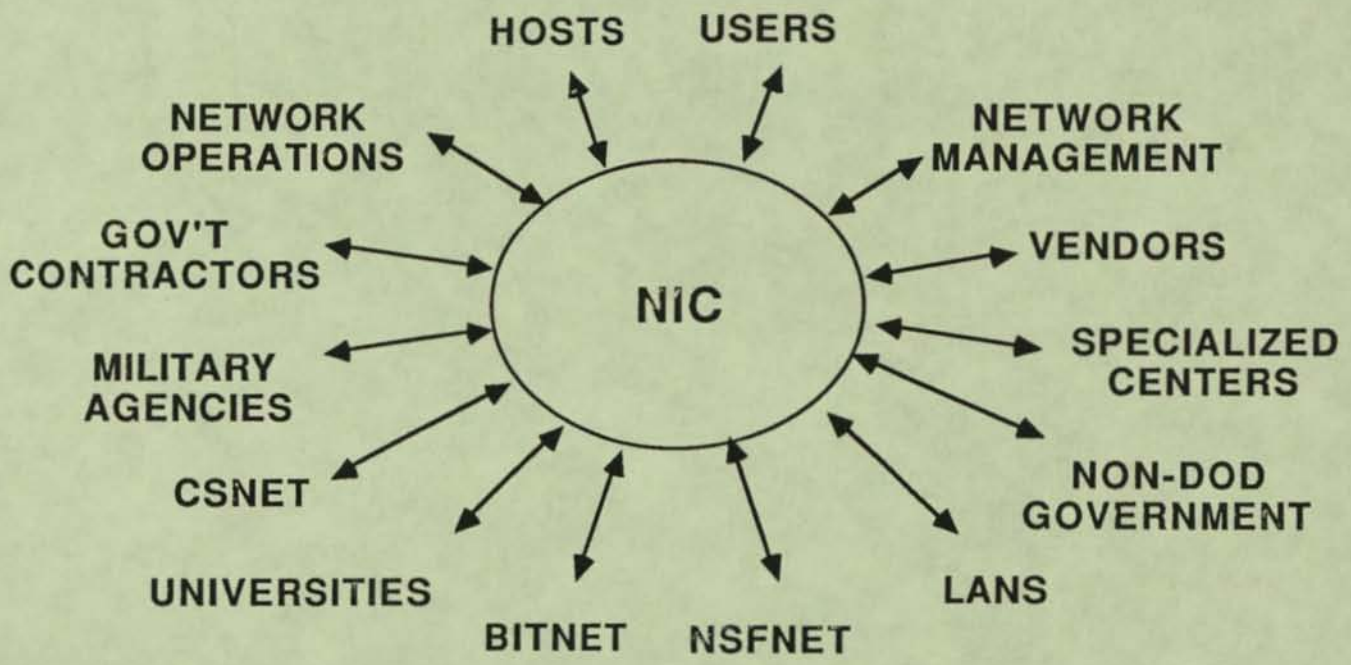


4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

INTERCONNECTIVITY AND INTEROPERABILITY



4/7/88

NEED MORE INTERCONNECTIVITY AND LIAISON AMONG MILITARY INFO CENTERS

DoD Internics

4/7/88

MORE DCA/NIC LIAISON NEEDED

- DCA Should Keep NIC Informed of
  - Policy
  - Publications
  - Procedures
  - Changes
  - Events
- Work as a Team
- Use NIC to Save Time for DCA

4/7/88

CURRENT PROBLEMS WITH DDN INFORMATION FLOW

- NIC/NMCs not kept informed
- Loops Badly
- Lacks Structure
- Much Overlap
- Duplication of Effort
- Many Gaps
- Conflicting Directives
- More Coordination Needed

RESULTS

- Technical Mistakes
- Competing Activities
- Wasted Funds
- Frustration
- Confusion
- Poor Use of Contractors
- "Bad Press" for DCA

4/7/88

SUGGESTED APPROACH

- An Internics Infrastructure
- Information Protocols
- A Military Advisory Committee
- A Network Distributed Archive System
- Clear Administrative Guidelines
- Replicated Services
- Delineation between Subscribers/End Users

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

USERS

- No One Knows Who They Are
- No One Knows How Many There Are
- No One Knows What They Are Trying To Do

4/7/88

USERS NEED

- An Introduction to the Network
- Ubiquitous, User-Friendly Services
- TAC Access and Registration
- Documentation
- Standard Protocol Interfaces
- Consistent Network Commands
- More Bandwidth
- Knowledge of Resources
- A Network Archive

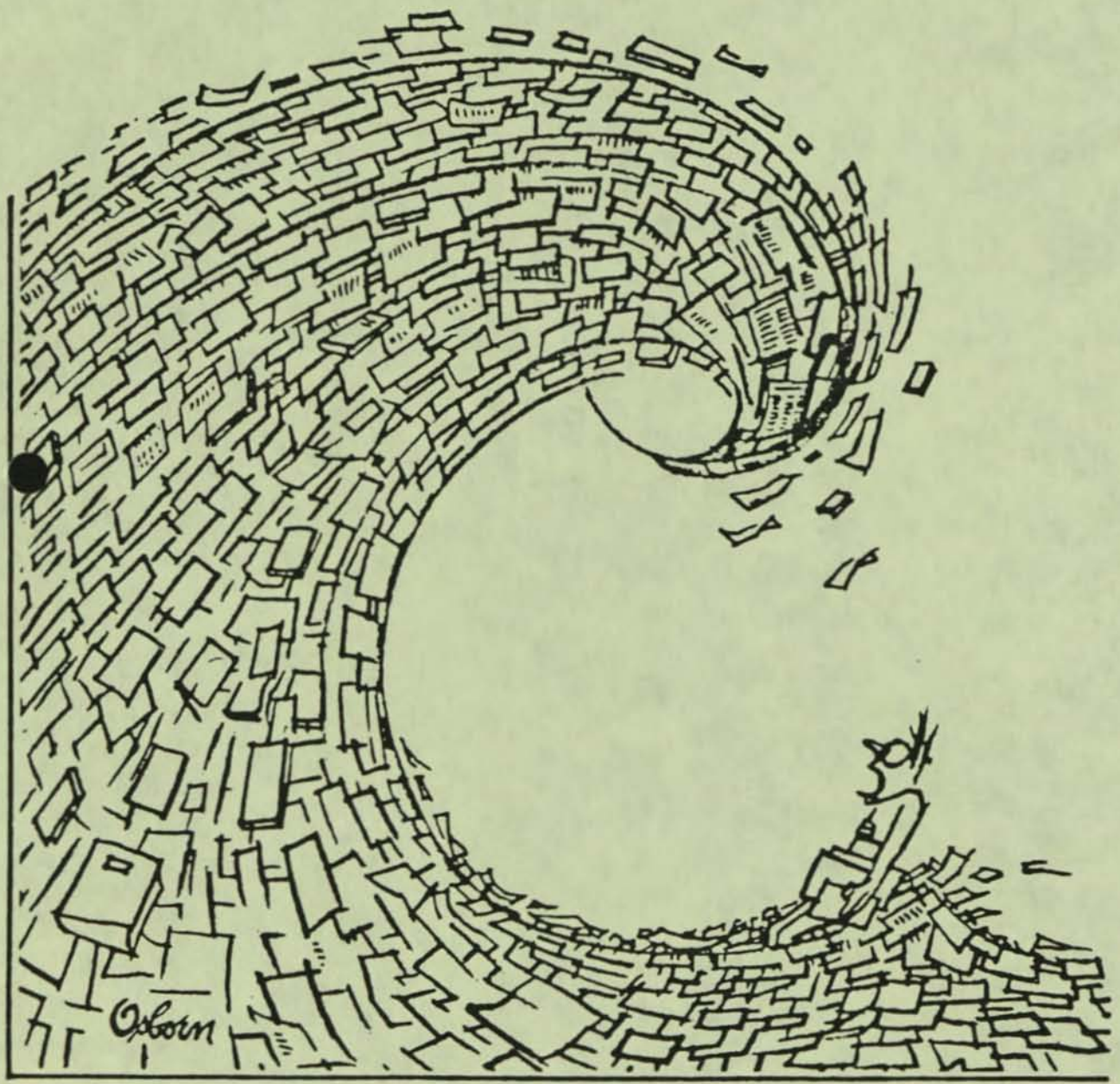
SUBSCRIBERS NEED

- An Introduction to the Network
- A Procedure Manual
- Immediate Network Access
- Administrative Guidelines
- Understanding of the DDN Architecture
- Vendor Product Information
- Protocols and Protocol Implementations
- Help for Their Contractors
- Test and Test Procedures
- Certification
- A Working-group Forum
- Adherence to the DDN Protocol Suite

POCS NEED

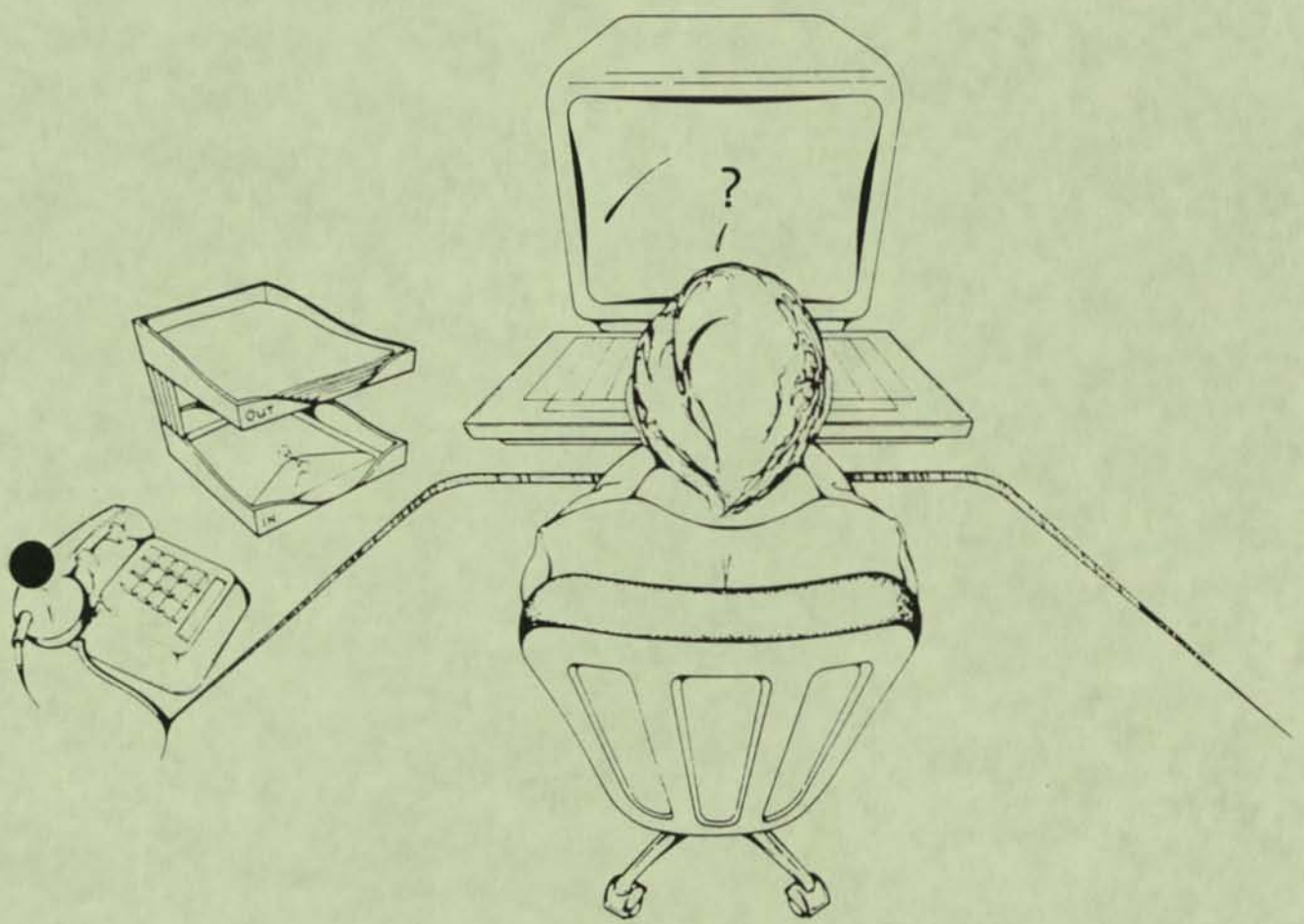
- An Introduction to the Network
- Immediate Network Access
- An Orientation Packet
- Clearly Defined Duties
- A Working-group Forum
- Recognition for the Role They Play

THE PROBLEM

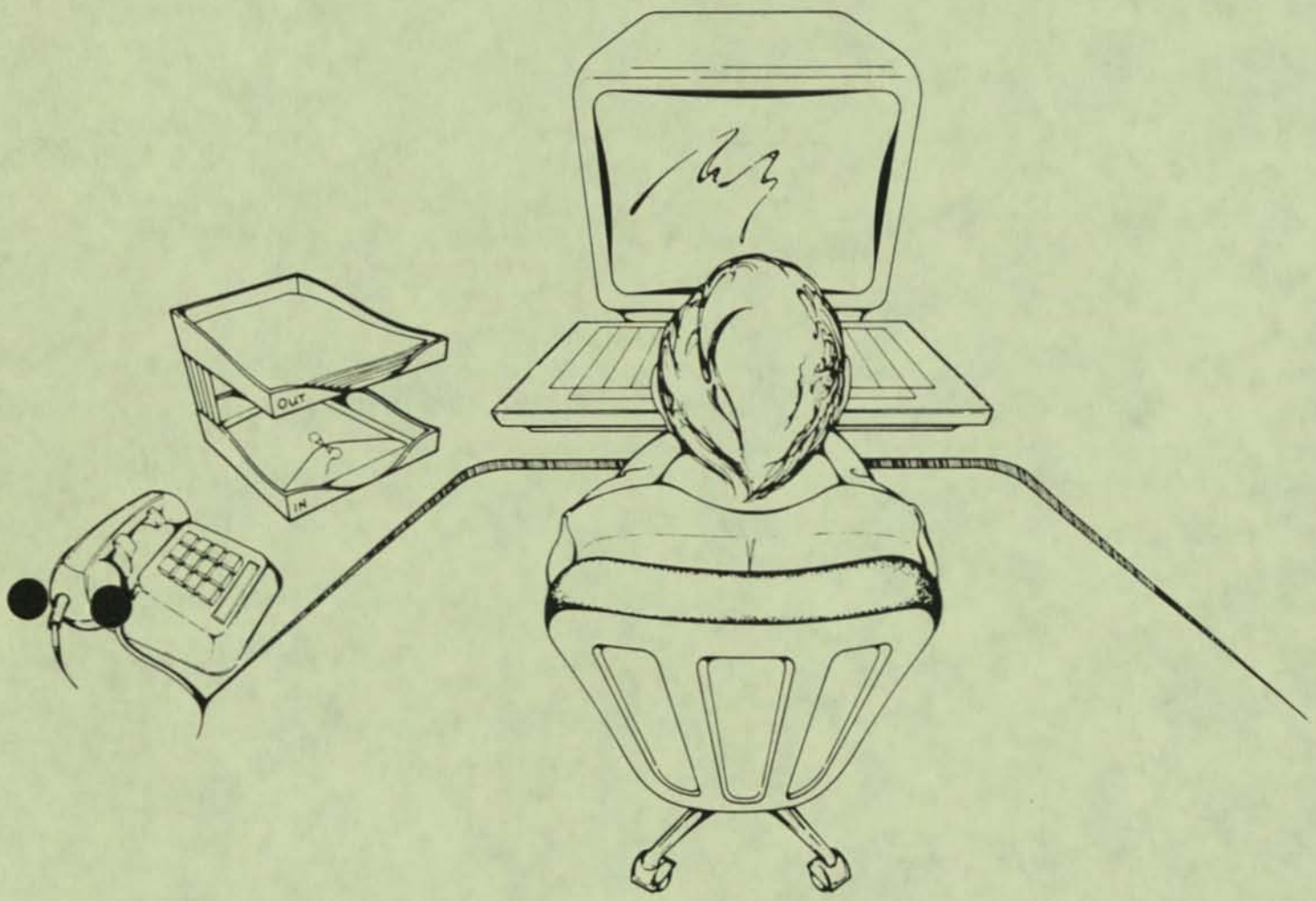


DRAWING BY ROBERT OSBORN

?????


?
OUT
IN

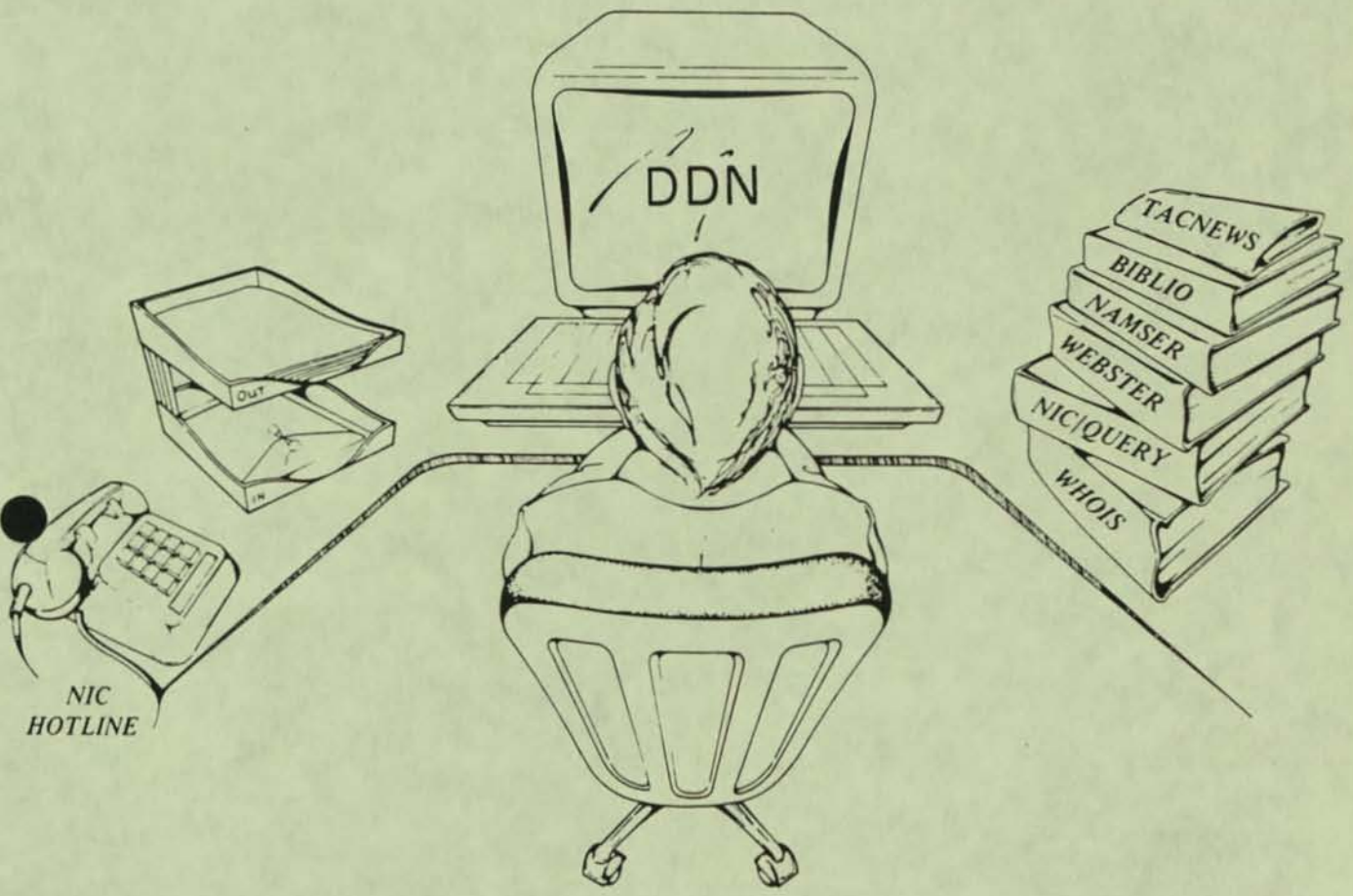
HOW WE HAVE APPROACHED THE PROBLEM



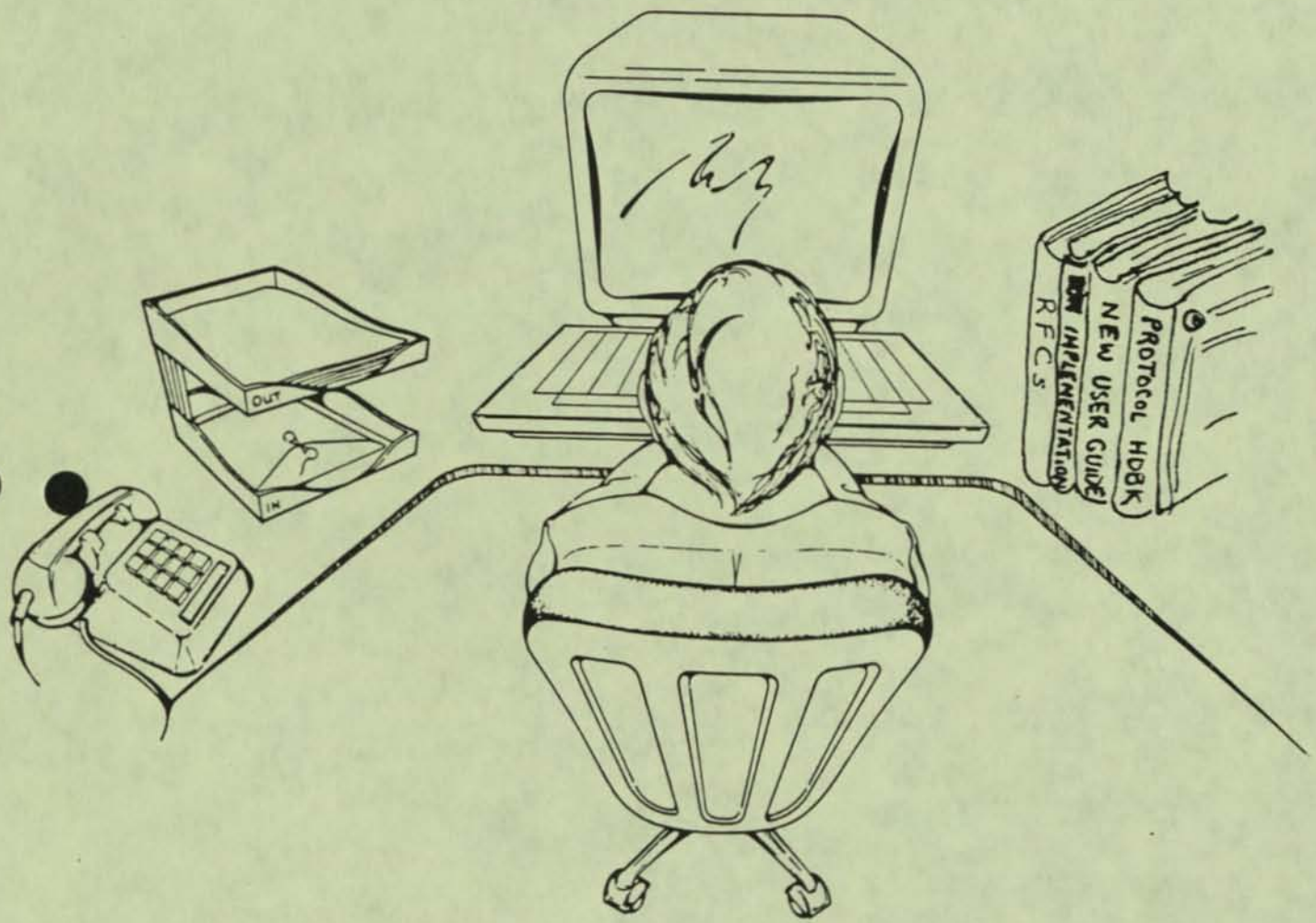
- GIVEN A TELEPHONE, A TERMINAL, AND THE NETWORK

- WE BRING INFORMATION TOOLS TO THE KNOWLEDGE WORKER ELECTRONICALLY

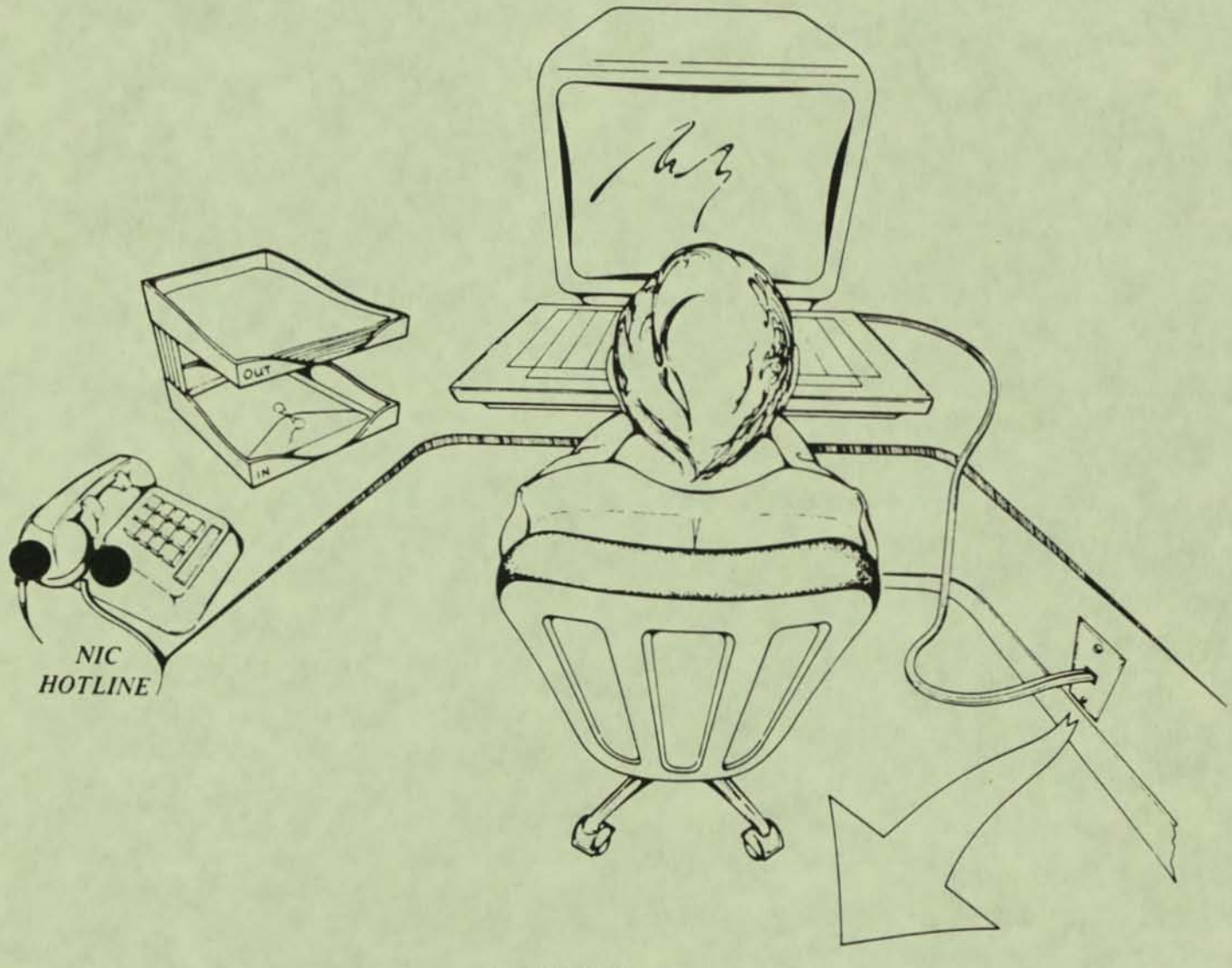
ONLINE SERVERS



USER DOCUMENTS

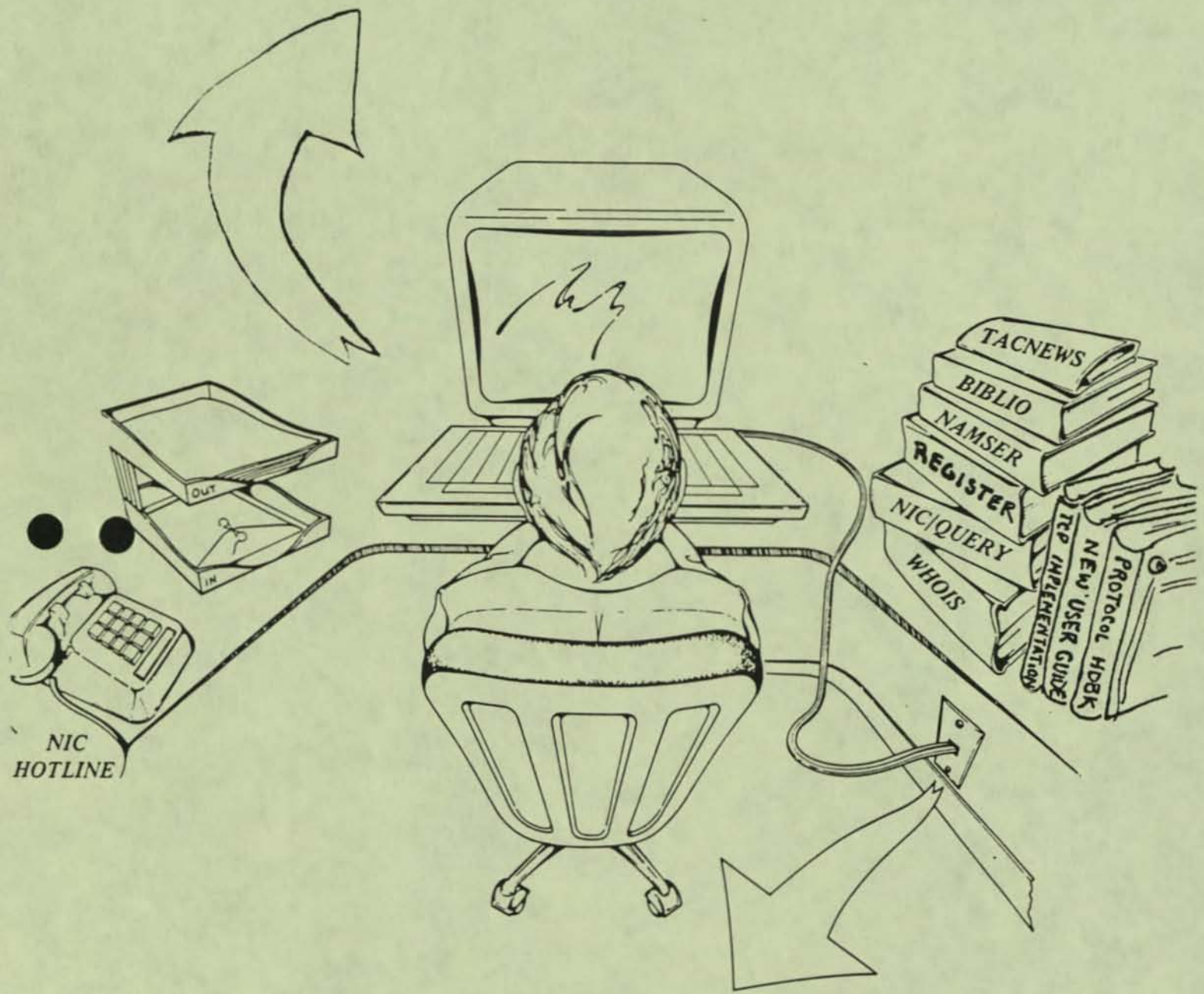


BEHIND THE SCENES



- BILLING
- ACCESS PERMISSION
- NAME SERVICE
- PROTOCOL INTERCONNECTION
- PRIVACY/AUDIT TRAIL

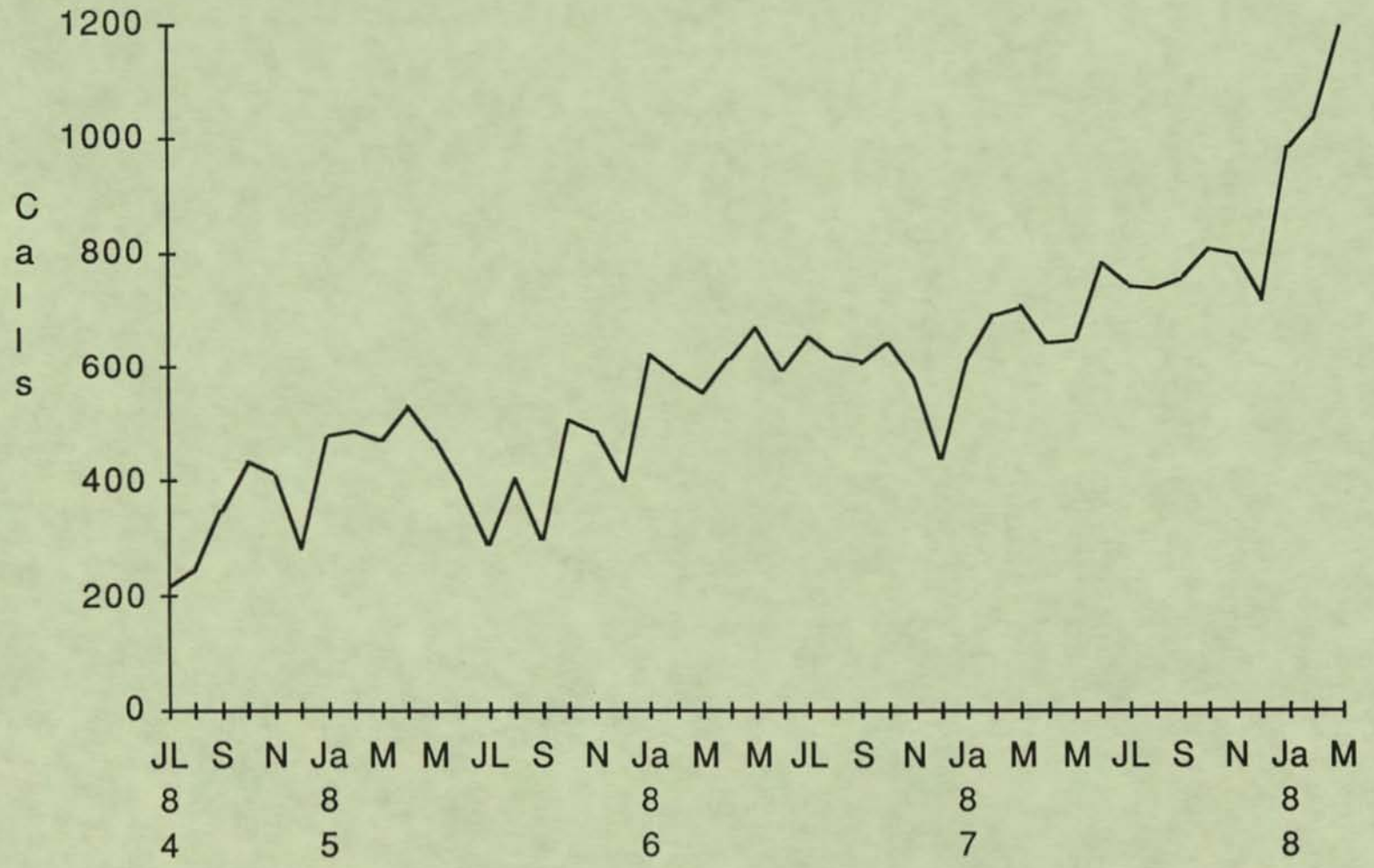
DDN NETWORK



- BILLING
- ACCESS PERMISSION
- NAME SERVICE
- PROTOCOL INTERCONNECTION
- PRIVACY/AUDIT TRAIL

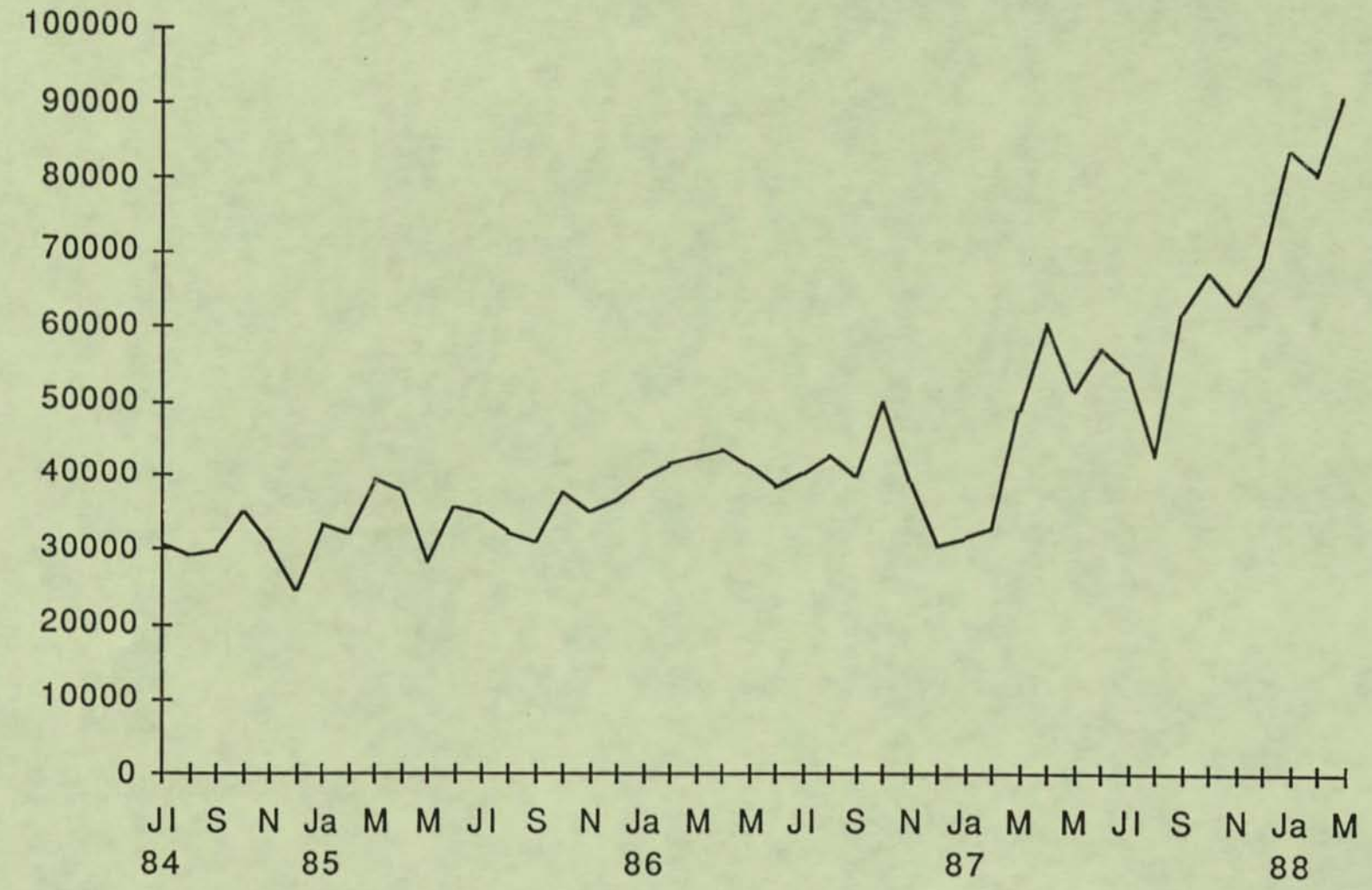
DDN Hotline Usage

July 1984 - Mar 1988



DDN Whois Usage

July 1984 - March 1988



3/11/88

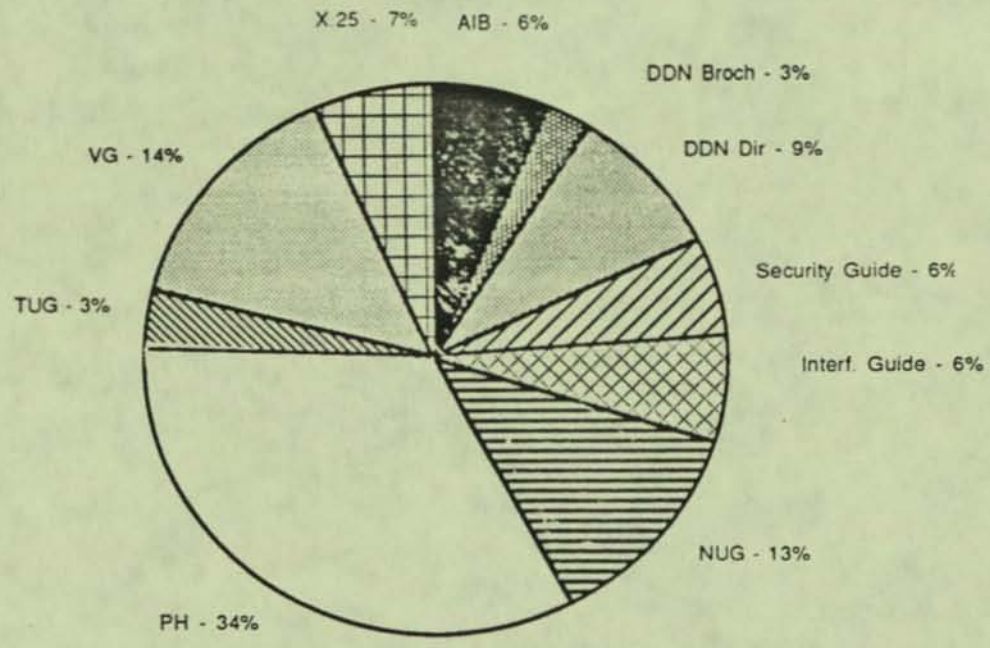
DOCUMENTS SHIPPED, 1987

ARPANET Information Brochure	188
DDN Brochure	62
DDN Directory	237
DDN New Users Guide	337
DDN Protocol Handbook	925
DDN Protocol Impl. and Vend. Guide	380
DDN Subscriber Security Guide	162
DDN Subscribe Interface Guide	165
DDN TAC User Guide	94
DDN X.25 Specifications	175
RFCs	18,300

3/11/88

Documents Distributed by SRI
1987

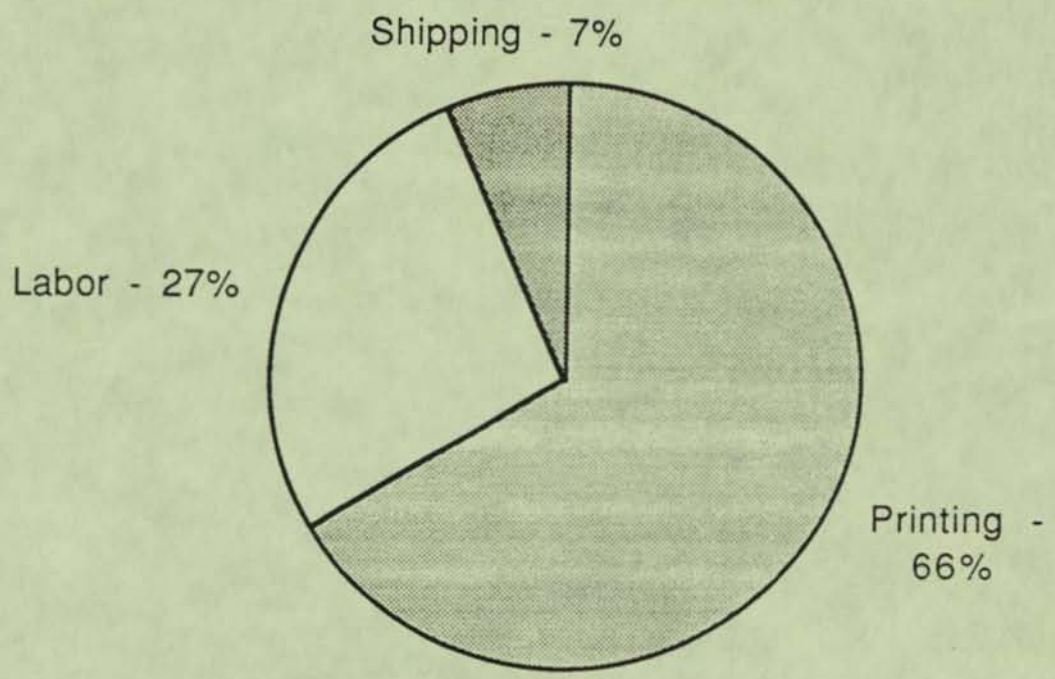
By Document Title (RFCs not included)



3/11/88

SRI Document Expenditures

By Category, 1987



Printing:	$ 51000
Labor:	$ 21000
Shipping:	$ 5000

Total SRI expenditures:	$ 77000

4/7/88

NIC PROVIDES ONE-STOP INFORMATION SHOPPING

- Answer Questions
- Provide POCs
- Identify Related Documents
- Provide Document Ordering Info
- Provide Documents Themselves
  - Low Cost, Pay-As-You-Go Services
  - Special Handling
  - Not Printed With Govt Funds
- Provide Info Products

4/7/88

NIC CREATES GOODWILL

- Welcome Users to the Network
- Orient Subscribers and Contractors
- Go That Extra Step for Answers
- Treat Customers Courteously
- Make a Good Showing on Behalf of DCA

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

4/6/88

DDN NAMING AND ADDRESSING

- Transition: Flat Naming -> Hierarchical Naming
- Transition: TCP/IP -> OSI

NIC Role

- Teamwork -OSD, DCA, DARPA, NSF, NIC, MITRE
- Registry for Hosts and Domains
- Administer Top-Level Domains
- Provide Data Files to Key Sites
- Provide Uninterrupted Network Operation
- Provide Official DoD Internet Host Table
- Assist Network Interoperability

4/6/88

NAME SERVICE RESEARCH EFFORT
DISTRIBUTED WHOIS
OSI DIRECTORY SERVICES

NIC is combining efforts with:

- DSAB WG
- IETF WG
- INTERNICS
- NSF
- NBS
- NARDAC

4/6/88

DDN Growth

Network Naming and Addressing Statistics

	Apr 1987	Apr 1988
Internet Hosts (includes ARPANET/MILNET)	3,372	5,548
ARPANET/MILNET Hosts	776	1683
ARPANET/MILNET TACs	141	182
ARPANET/MILNET GWs	133	179
Internet Gateways	182	233
ARPANET/MILNET Nodes	209	245
Connected Networks	587	865
Domains (top-level, 2nd-level)	282	506
Hostmaster online mail	1422	1626

(Size of current host table = 598,881 bytes)

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

4/7/88

SRI IS A WELL-KNOWN PROTOCOL INFORMATION SOURCE

- Helped Design ARPANET/DDN
- Wrote TCP/IP
- Assisted with TCP/IP Transition
- Have Implemented DoD Protocols
- Know all the Players
- Active in Standards Bodies
  - DoD, ISO, CCITT, IFIP, ANSI
- Take a Neutral Stance
  - No "Religion"
  - No Product Line
- Cooperate With
  - PSSG, IETF, MILCOMS
  - DCEC, ANSI, COS
  - NSF, NBS, DARPA
- Coordinate the Host Administrators
- SRI Research Expertise for Back-up

4/7/88

NIC ROLE IN TRANSITION

- Serve as Info Clearinghouse
  - Contractors
  - Vendors
  - Subscribers
  - Researchers
  - Users
- Provide POCs
- Provide Documentation
  - RFCs and IDEAS
  - Directives
  - Protocol Handbook
  - Sound the Alert
  - Mgt Bulletins
  - Heads-Up Broadcasts

Provide Protocol Repository

- Provide Liaison
  - POCs, NMCs, DTIC, Other Military NICs

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

4/7/88

NIC IS BOMBARDED BY
USERS
SUBSCRIBERS
POCs
WANTING ACCESS TO EMAIL

4/7/88

MORE THAN A THIRD OF THE HOST ADMINISTRATORS DO NOT HAVE EMAIL ACCESS

4/7/88

PROBLEMS CREATED

- DCA Cannot Manage Net Effectively
- POCs Do Not Receive Required Info
- POCs Do Not Know Environment
- Systems Do Not Function Properly
- Tables Are Outdated
- POCs Cannot Perform Role
- POCs Cannot Assist Users
- Time And $$ Are Wasted

ELECTRONIC MAIL EXPERTISE

Office Environment

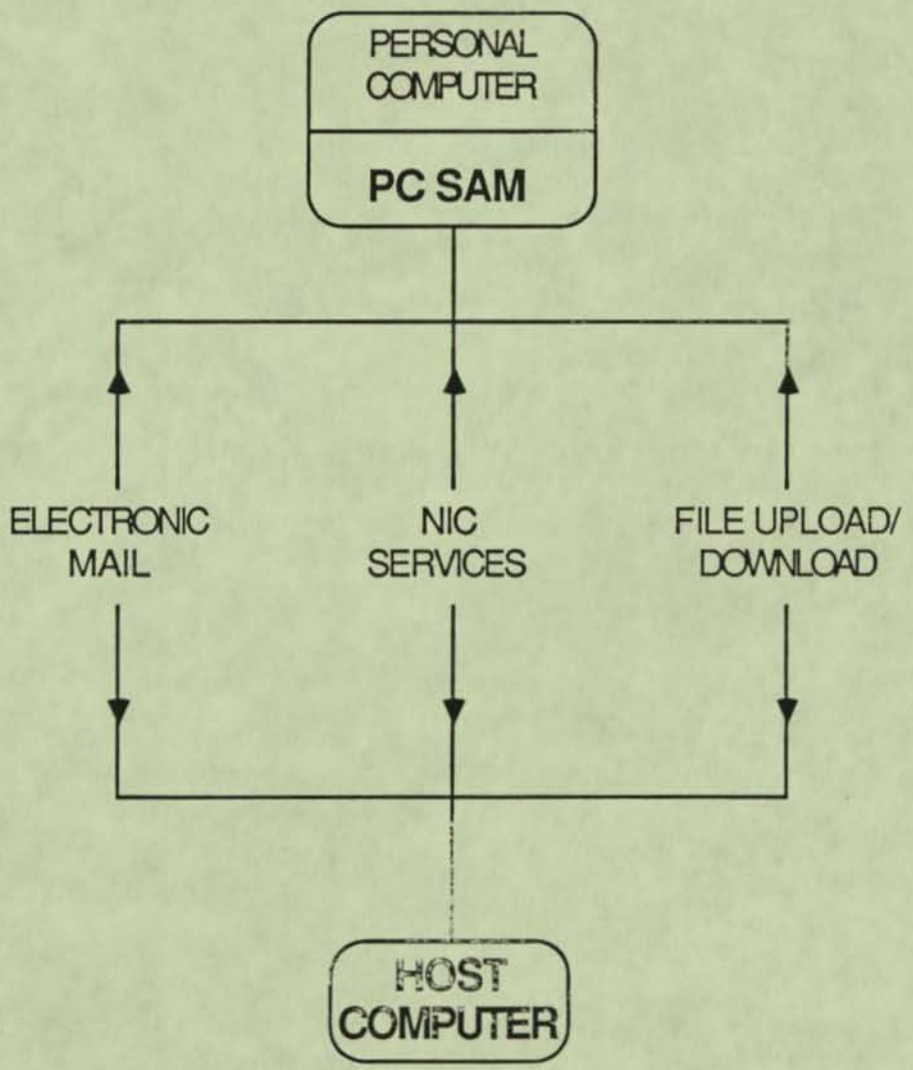
- Extensive PC and Workstation experience
- SAM

Campus Environment - SRINET

- Multiple hosts/operating systems
- Wide variety of mail handling programs
- Covers large campus
- Large number of users (1000+)
- Extensions to SRI Washington office

SRI/NISC MAIL SERVICE POSSIBLITIES

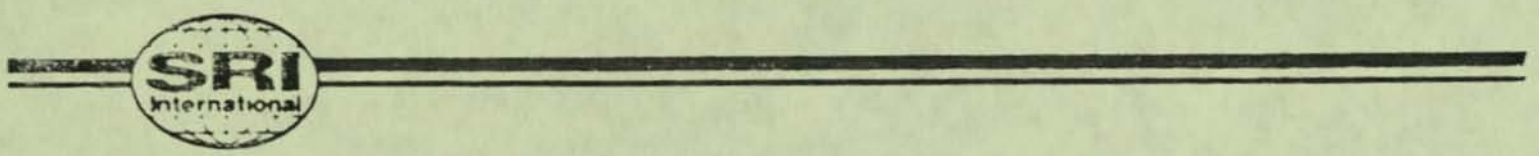
- Provide mailboxes for POCs
  - SRI host or other host
  - Self supporting via subscription
- Provide coordination with military commands
- Set up self supporting mail hosts
- SAM



NETWORK ACCESS VIA PC

PC SAM

Simple Access to e-Mail



Features

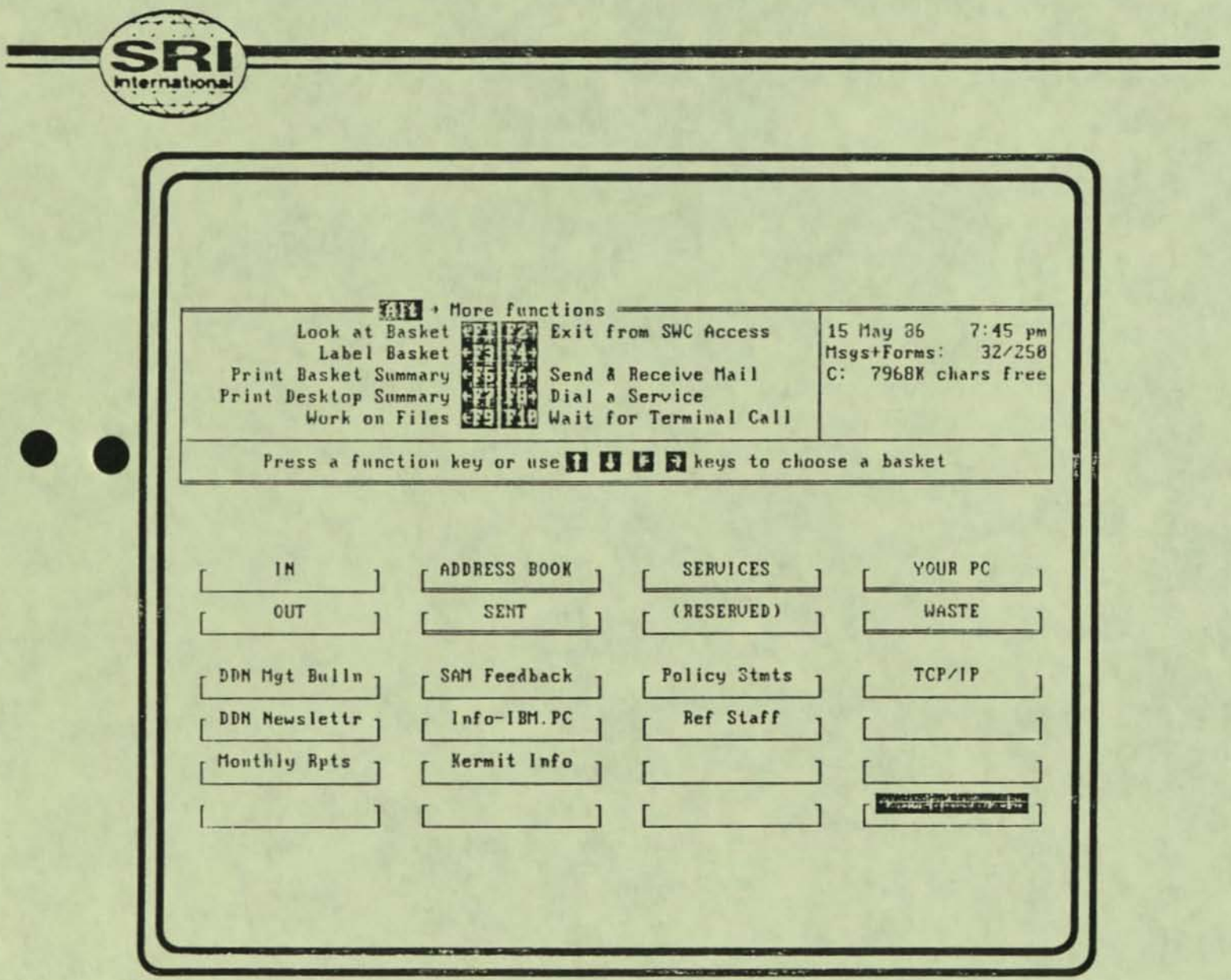
- Friendly User Interface
- Automatic Mail, Automatic Login
- VT100 Terminal Emulation
- Mail and DOS File Management

4/7/88

SAM, VERSION 2

- Background Operation
- Windows (Memory Dependent)
- Editor with Search Capability
- Enhanced KERMIT Capabilities
- Improved Password Protection
- Increased Basket Capacity
- Message Archiving
- Access to NIC Services
- Address Book
- Handles Large Messages as Files
- Online Screen Buffer
- Zenith COM3 Port Support
- VT100 Emulation in Mail Service

S A M Desktop

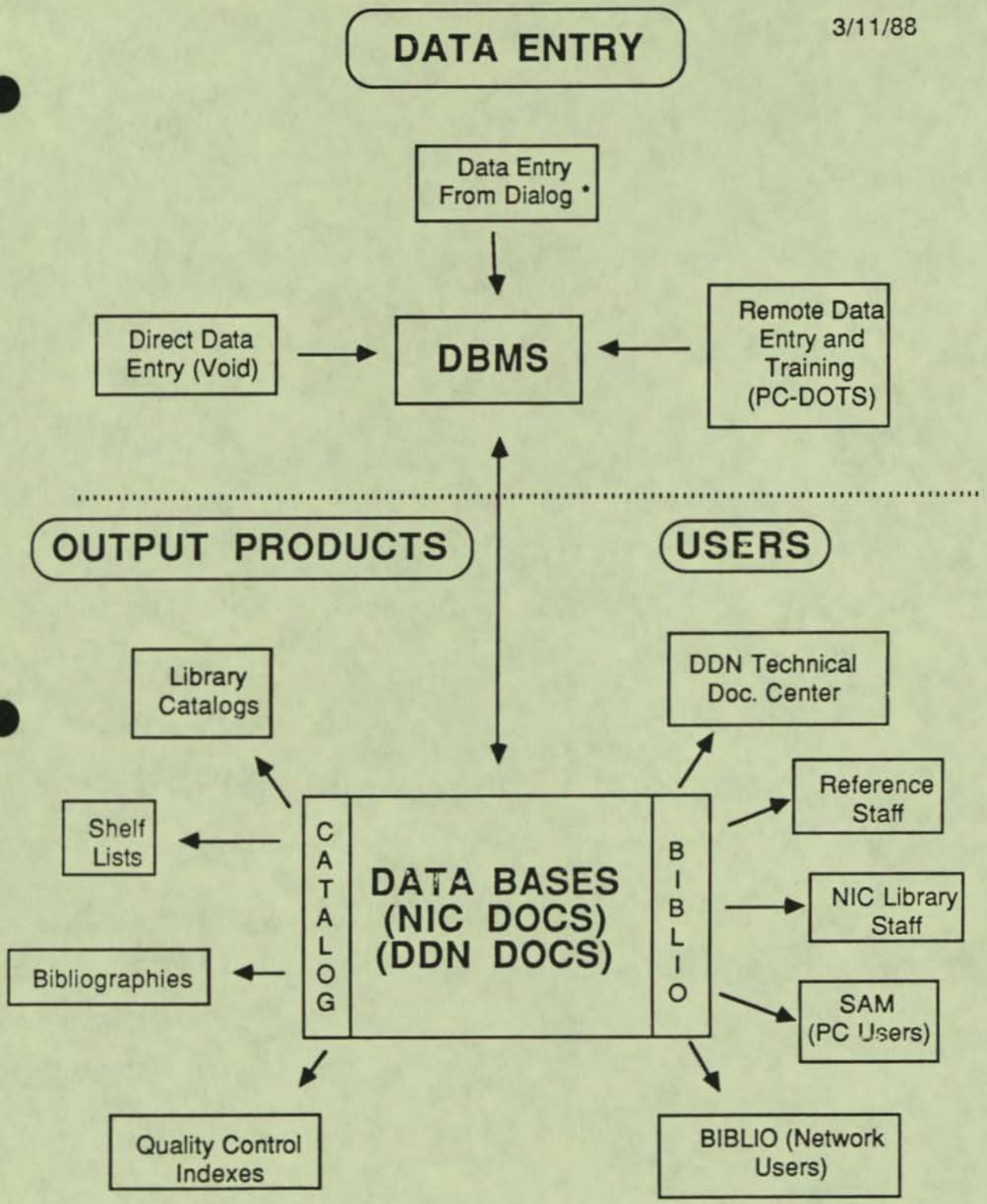

Alt → More functions
Look at Basket
Label Basket
Print Basket Summary
Print Desktop Summary
Work on Files
Exit from SWC Access
Send & Receive Mail
Dial a Service
Wait for Terminal Call
15 May 86 7:45 pm
Msgs+Forms: 32/250
C: 7968K chars free
Press a function key or use ↑ ↓ ← → keys to choose a basket
IN
ADDRESS BOOK
SERVICES
YOUR PC
OUT
SENT
(RESERVED)
WASTE
DDN Mgt Bulln
SAM Feedback
Policy Stmts
TCP/IP
DDN Newslettr
Info-IBM.PC
Ref Staff
Monthly Rpts
Kermit Info

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

3/11/88



NIC Information Tools

* Available but not currently used

4/7/88

NIC SOFTWARE STATUS

- Just Completing "C" Conversion
- Extensive "C" Program Library
- Converting to Relational DBMS
- Many UNIX-Based, Portable Tools
- Converting to Smaller, Cheaper Equipment for Easy Replication
- Can Act As Reference and Shareware Source for DCA
- Positioned for Distributed NIC Services
- All Systems Documented

4/7/88

NIC CAN SHARE RESOURCES

- Host Tables
- WHOIS Server
- Domain Name Server
- "C" Compiler
- VOID DBMS
- User-Interface Programs to Servers
- Remote Data Entry Programs

4/7/88

TOPICS TO BE COVERED

- DDN Information Infrastructure
- Augmenting Users and Subscribers
- OSI Naming and Distributed Domains
- Protocol Transition and Technology Transfer
- Email for Military Users
- Information Management Tools
- Audit Trail and Billing System

Network Audit and Control

- Tasked by Defense Data Network (DDN)

- Joint effort by DDN, SRI, BBN, AYDIN

- Three interlinked tasks:
  - TACACS
  - Network Audit Trail System (NAURS)
  - Network Billing and Usage System (NURS)

TACACS

Terminal Access Control System

- Register users
- Issue TAC Cards
- Rolling update
- Remove unauthorized users

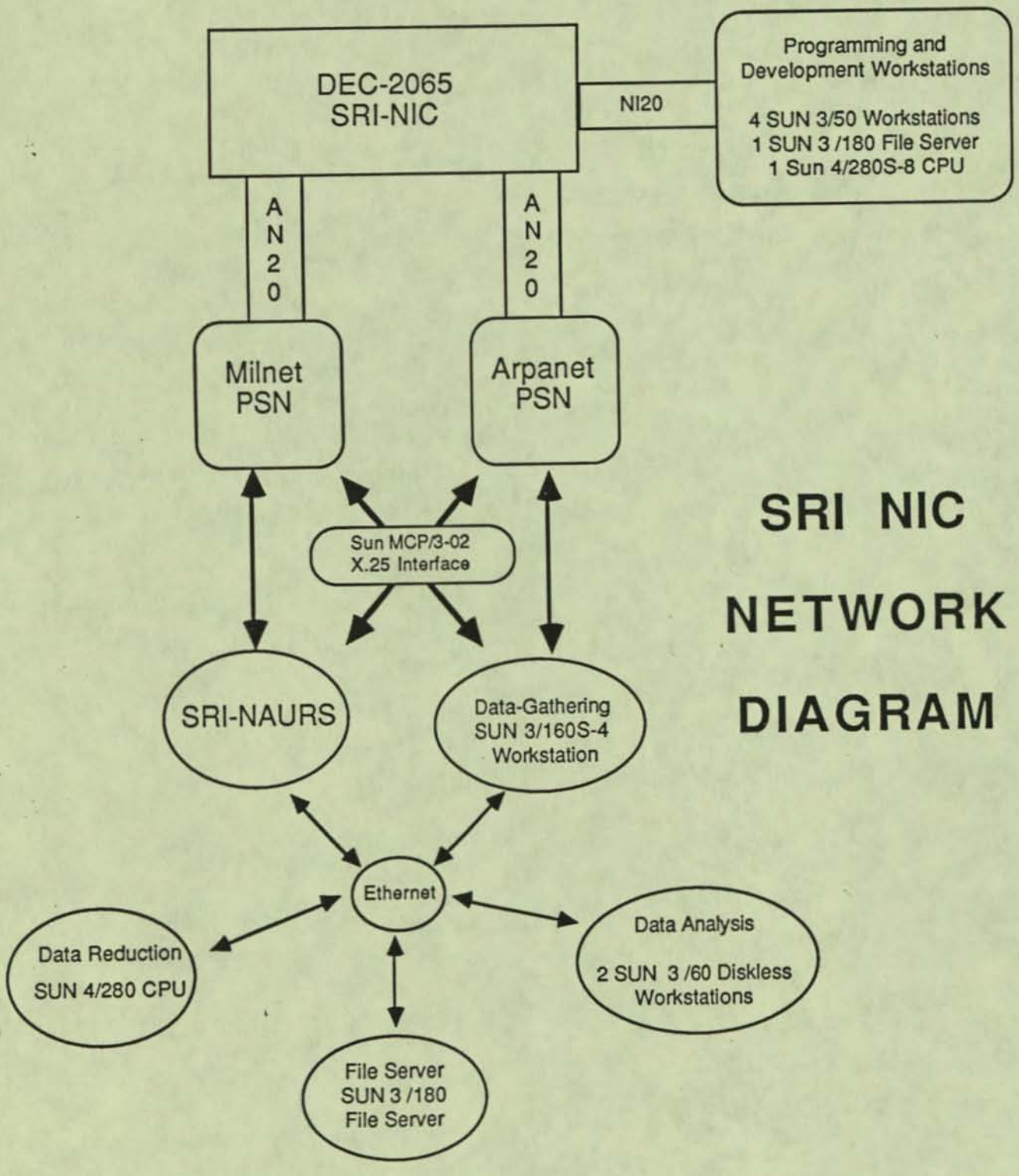
Network Audit Trail System

- TAC user activity
- Network utilization
- Capacity planning
- Network usage trends

Billing System

- Based on usage
- Accumulated by PDCs
- Customized billing for:
  - DCA (Total net activity)
  - Service branches
  - Organizations
  - Sites
  - Individuals

4/7/88



SRI NIC NETWORK DIAGRAM

4/7/88

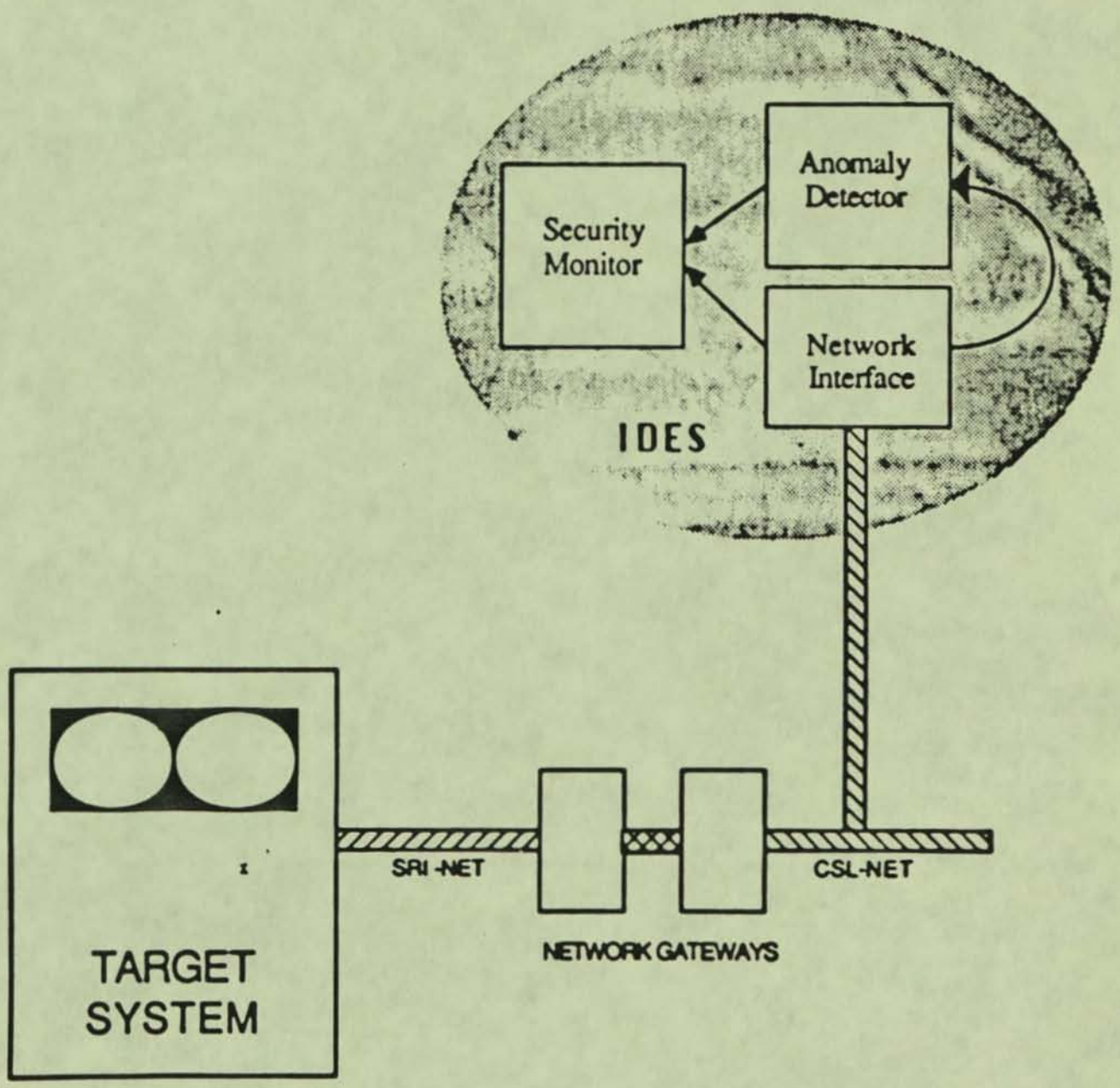
PROBLEMS

- Need Clean Data From NCDs, BBN
- Need Decisions By DCA/DECCO
- Need to Resume NAURS WG
- Stop Delays in Obtaining Equipment (2 1/2 Yrs for 8 Workstations)
- Deadline Is Approaching

Future

- Profile User Activities
  - An IDES application
- Expert system
- Audit-Trail Protocol enhancements
- Portable NAURS
- Applicability to other (classified) networks

SRI Intrusion Detection System



IMPACT OF COMPETITION

- Loss of Continuity
- Expensive to Move
- Confuses Users; Require Retraining
- NIC Loses "Neutral" Status
- Loss of SRI Co-Investment
- Contractor Forced Into Competitive Stance
- Interruption of Technology Transfer
- Loss of Valuable Information

ALTERNATE SUGGESTION

- Continue NIC as sole source contractor
- Set up military policy board
  - Policy
  - Services
  - Guidelines
- Sanction NIC as DCA online protocol and technology transfer POC
  - DDN software repository
  - Online services to DDN users
  - Assist DCA with info liaison to DTIC, NTIS, etc.
- Fund Internics activity to define
  - Infrastructure
  - Protocols
  - Administration