SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

This is the proposal sent to OSHA in June 1975.

SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

10-JUN-75
SRI-ARC 25901

1m SRI Proposal No. ISU 75-116

1n NLS Workshop Support for OSHA

1o Part One---Technical Proposal

1p Prepared for:

Occupational Safety and Health Administration
200 Constitution Ave.
Washington, DC 20010

Attn: Dr. Dan Boyd

1q Prepared by:

James C. Norton, Assistant Director
Augmentation Research Center

1r Approved:

Douglas C. Engelbart, Director
Augmentation Research Center

Bonnar Cox, Executive Director
Information Science and Engineering Division
Stanford Research Institute

1a

I INTRODUCTION

1a

1a1 A. Brief Scope Statement

1a1

1a1a The purpose of this proposal is to request support for the use of knowledge workshop technology developed at the Augmentation Research Center (ARC) of SRI by the Occupational Safety and Health Administration (OSHA). The service would be used by those OSHA-selected people who are willing to undertake exploratory use of knowledge workshop techniques through the use of the online system (NLS) and participate in a knowledge workshop community. 1a1a

1a1b The support is required for two activities: computer services and technical services. 1a1b

1a1b1 The computer services are being supplied through the ARPANET and other communication means to geographically distributed user groups from computer facilities maintained and operated by subcontractors under ARC. As prime contractor, ARC handles all service subcontracts. 1a1b1

1a1b1a Presently, Tymshare, Inc. is providing computer services to the Workshop Community. 1a1b1a

1a1b2 The technical services provided by ARC personnel have the following objectives: 1a1b2

1a1b2a Maintain and update the workshop community ("utility") version of our application software (NLS). 1a1b2a

1a1b2b Support the user groups in learning how to use these tools. 1a1b2b

1a1c Descriptions of the applications being suggested for exploratory use are given in a paper by Engelbart, Watson, and Norton [3] and in an earlier paper by Engelbart [2]. Copies of these documents are included with this proposal as Attachments A and B. 1a1c

1a2 B. Organization of this Proposal

1a2

1a2a This proposal is divided into two parts, each of which is broken down into several sections. 1a2a

1a2a1 Part One is the Technical Proposal, covering the proposed work and its background and context. 1a2a1

1a2a1a Section I is the introduction. 1a2a1a

1a2a1b Section II is a summary outline of proposed project activity. 1a2a1b

1a2a1c Section III is an extended discussion of proposed project activity. 1a2a1c

1a2a1d Section IV is a list of selected references. 1a2a1d

1a2a2 Part Two contains the Contractual Provisions, with sections covering such topics as estimated time and charges, reports, contract form, acceptance period, and a cost estimate with supporting schedules. 1a2a2

1a2b The Attachments contain additional supporting material. 1a2b

1a3 C. ARC's "Community Plan" 1a3

1a3a Introduction 1a3a

1a3a1 ARC is a one-organization community of researchers and system developers, supported by several different contracts. The research and development activities of ARC are aimed at exploring the possibilities for augmenting individuals and groups in the performance of knowledge work with the help of computer aids. These aids range from offline batch to online real-time facilities. Exploratory development and operation of augmentation systems have been our substantive work. 1a3a1

1a3b ARC's Research and Development Strategy 1a3b

1a3b1 An expanding stage of applications has been established with the advent of the second year of Workshop Utility service. We are involving a wider group of system users so that we can begin to transfer the results of our past work to others, and so that we can obtain feedback needed for further evolution from wider application than is possible in our Center alone. We have been providing Workshop support service to selected groups who are willing to take extra trouble to be exploratory, but who: 1a3b1

1a3b1a 1) are not necessarily oriented to being workshop system developers (they have their own work to do), 1a3b1a

1a3b1b 2) can see enough benefit from the system's application and from the experience of trying it so that they can justify the extra risk and expense of being "early users," and 1a3b1b

1a3b1c 3) can accept our assurance that reliability, system stability, and technical application help will be available to meet their conditions for risk and cost. 1a3b1c

1a3c Establishment of a Workshop Utility and promotion of the type of service work proposed herein are part of ARC's long-term commitment to pursue the continued development of augmented knowledge workshops in a pragmatic, evolutionary manner. Note that our last few years of work have concentrated on the means for delivering support to a distributed community, for providing teleconferencing and other basic processes of collaborative dialogue, etc.--consciously aiming toward having experience and capabilities especially applicable to support remote and distributed groups of exploratory users. 1a3c

1b II SUMMARY OF PROPOSED PROJECT ACTIVITY 1b

1b1 The proposed project work will include: 1b1

1b1a Providing training to OSHA-selected users as appropriate in the use of Display NLS (DNLS), Typewriter NLS (TNLS), and Deferred Execution (DEX) software subsystems. 1b1a

1b1b Providing technical assistance to an OSHA-selected "workshop architect" in the formulation, development, and implementation of augmented knowledge work procedures within user groups. 1b1b

1b1c Providing appropriate terminal equipment for OSHA use as mutually found to be necessary. 1b1c

1b2 The technical assistance will include help in the development of NLS use strategies suitable to the client's environment and procedures within its organization for implementing these strategies. 1b2

1b3 The service will also include the availability 20 hours a day, 7 days a week of Workshop Utility service via the ARPANET or specially arranged communication lines from a PDP 10 TENEX system operated by commercial facility management. 1b3

1c III EXTENDED DISCUSSION OF PROPOSED PROJECT ACTIVITY 1c

1c1 A. Objective 1c1

1c1a The objective of this effort is to work with OSHA personnel in the mutual development and use of procedures, methodology, software features, and other online tools; and in the training of users in NLS that will allow their exploratory use of our Workshop system. This objective has the following key components: 1c1a

1c1a1 1) Building an OSHA user group whose members will find real value in applying the service, and whose participation will contribute to OSHA organizational goals both directly (by making the users' OSHA-related activities more effective) and indirectly (by accelerating the maturation and acceptance of augmented knowledge workshop techniques). 1c1a1

1c1a2 2) Using and extending ARC's know-how and capability for integrating innovation with new-development transfer. 1c1a2

1c2 B. Background 1c2

1c2a The Augmentation Research Center has developed, over a period of years under government sponsorship, a general-purpose interactive augmentation system centering about what we now call an "Augmented Knowledge Workshop," abbreviated below as "Workshop." The goal of ARC's work has been to evolve a prototype Workshop system that will significantly improve the performance of individuals and teams engaged in knowledge-work activities, where the Workshop "system" involves daily use of coordinated tools, procedures, methodologies, and languages. 1c2a

1c2b For further background discussion, see [2] and [3], and the references in Section IV. 1c2b

1c2c While the discussion in Attachment B is oriented toward communities of discipline or mission oriented users, the same types of services and knowledge workshop orientation apply to individuals and groups of workers in a local environment. 1c2c

1c3 C. Scope of Proposed Work 1c3

1c3a Introduction 1c3a

1c3a1 The types of workshop services that we are beginning to support at varying levels of capability are described in [3] under the headings: 1c3a1

- 1c3a1a Collaborative Dialogue 1c3a1a
- 1c3a1b Document Development, Production, And Control 1c3a1b
- 1c3a1c Research Intelligence 1c3a1c
- 1c3a1d Community Handbook Development 1c3a1d
- 1c3a1e Computer-Based Instruction 1c3a1e
- 1c3a1f Meetings And Conferences 1c3a1f
- 1c3a1g Community Management And Organization 1c3a1g
- 1c3a1h Special Knowledge Work By Individuals And Teams 1c3a1h

1c3a2 Our present capabilities in the above areas are briefly indicated in [2] and [3]. For each area, there is an immediate applicability of the basic NLS provisions for composing, modifying, studying, publishing, and collaborating, and we have additional special provisions specifically supporting almost every area. 1c3a2

1c3b Technology Transfer 1c3b

1c3b1 We have started to transfer technology from our local group of experienced users to a wider group of inexperienced, geographically separate users. This technology consists of online software capabilities; a coordinated repertoire of online-assistance tools; associated concept and language additions dealing with the tools and with the information organization and task processes associated with their use; new aspects to intragroup organization and working methodology. Training a group in these new matters is necessary to the transfer; and to help others learn to train people in the new technology requires a transfer of the additional technology used to support the training. 1c3b1

1c3b2 The process of technology transfer is not a simple process, judged by our and others' experiences. We base our "Community Plan" strategy upon our experience that there are at least two main requirements for successful transfer process that proceeds at a reasonable speed and cost: 1c3b2

1c3b2a 1) The group originating the technology and having the experience, enthusiasm, and initial commitment

to its value must follow through with training and application support of the end user groups until a critical mass of equivalently experienced and enthusiastic end users has developed. 1c3b2a

1c3b2b 2) The end user groups must each have at least one properly placed, active supporter of the transfer process. We have been using the term "local workshop architect" for this role. 1c3b2b

1c3b2b1 We find this concept is highly relevant both for the successful transfer of our technology and for keeping the cost of this transfer at a reasonable level. 1c3b2b1

1c3b3 We like to give particular emphasis to this second requirement -- that each coherent group planning to integrate the proposed services into its working life should have at least one member serving as a "workshop architect" or "group coordinator." The function of this person is to be familiar in detail with both the needs of his organization and the capabilities we are proposing. This person, knowing his group's needs and our capabilities, would help introduce a workshop system meeting these needs into his organization in the appropriate evolutionary stages. ARC personnel would work closely with the workshop architect -- in training him, in initially giving him significant help in his role, and in continuing exchange of technical information. 1c3b3

1c3b3a The labor-funding levels in this proposal are based on the assumption that when a client group is allocated a portion of the Utility Online Services, the corresponding allocation of direct technical support will go primarily to its workshop architect. We assume that much of the responsibility for integrating the workshop service into his organization or community will be handled by this person. If a workshop architect is not available within a client group, or if extra people need our direct technical support, then additional funding will have to be provided. 1c3b3a

1c3b4 For any group of users we expect evolutionary growth of their workshop service application, in both quantity and range. This growth will take guidance and support of the sort that in the commercial computer world would be offered by the applications specialists and "systems engineers." 1c3b4

1c3c Services Offered 1c3c

1c3c1 The proposed Workshop Utility service consists of two components: computer support and people support. We discuss these components in detail below. 1c3c1

1c3c2 Computer Services 1c3c2

1c3c2a The Underlying Computer Service Support 1c3c2a

1c3c2a1 We are offering a Workshop Utility version of ARC's online system (NLS), accessed over the ARPANET or specially arranged communication circuits, at least 20 hours a day, seven days a week. NLS features are described in the documents listed in Section IV. 1c3c2a1

1c3c2a2 This service is provided by a computer system operated and managed by a subcontracted timesharing utility company, rather than from a system directly operated by ARC. There are two important reasons for this arrangement: 1c3c2a2

1c3c2a2a 1) A commercial firm has the experience, facilities, leverage on vendors, and redundant equipment that make possible more reliable service than can be produced in a research and development environment. 1c3c2a2a

1c3c2a2b 2) It will be possible to expand the service in a more flexible manner in increments of whole or partial machines as usage grows. 1c3c2a2b

1c3c2b Service Partitioning 1c3c2b

1c3c2b1 We are now using a "group allocation" scheme for partitioning online access and service among groups of users. This guarantees each group its fair share of access to system resources while preserving both adequate responsiveness and independence for each group to plan its own usage loading. During this coming year, we plan to further develop the resource allocation system, working toward allocation of central processing unit (CPU) time, rather than login access. 1c3c2b1

1c3c2c File Privacy 1c3c2c

1c3c2c1 The Workshop Utility provides the necessary

standard TENEX software and facility operating procedures to ensure some privacy of file access. In addition, user-controlled NLS privacy features allow useful dialogue attended with flexible privacy restrictions. However, it is important to note that the visibility and availability of planning information and other recorded dialogue in ARC's currently open Journal System provide some of the more significant potential of our Workshop system. 1c3c2c1

1c3c2c2 We assume that ARC online-service personnel may occasionally have to access clients' user files (at a client's request only) as required from an operational standpoint; however, other users of the Workshop Utility Service will be denied read, write and list access to a client's files, unless he specifically releases files for general use. 1c3c2c2

1c3c3 People Support Services 1c3c3

1c3c3a We are still learning about the amount and nature of people support services that a successful Workshop Utility needs, particularly in the direct client support category. The levels specified in this proposal seem to us to be minimal. Charges for such service will be made as delivered to each client. 1c3c3a

1c3c3b Overhead Services 1c3c3b

1c3c3b1 The entire operation, including the interface between the Utility and the clients, needs competent administration. 1c3c3b1

1c3c3b2 Documentation of the basic user features of the system and of their application techniques needs to be complete and will have various special versions tailored for particular types of users. 1c3c3b2

1c3c3b3 The version of NLS that runs on the Utility needs maintenance and quality assurance. A systematic means is being provided for features found useful in the development version of the system to be integrated into the version running on the Utility. This includes the handling of user feedback, a significant effort on the part of ARC Utility staff, providing service to users and important input to system builders. 1c3c3b3

1c3c3b4 Clerical support of various types is needed. 1c3c3b4

1c3c3c Direct Client Support Services 1c3c3c

1c3c3c1 Our clients' users must be trained to varying levels of competence, depending upon the nature of their jobs and the tasks they perform. New procedures and methods will have to be developed and learned to allow effective use of the system in their working environments. Specifying these procedures will require help in analyzing the group's needs and present operations. 1c3c3c1

1c3c3c2 Therefore the following types of necessary services will be provided. 1c3c3c2

1c3c3c2a Assistance in training Utility clients to make special use of the system for applications that are peculiar to their user environments. 1c3c3c2a

1c3c3c2b Assistance to Utility clients in developing related documentation, procedures, records, and methods as needed locally to support their special use of the system. 1c3c3c2b

1c3c3c2c Assistance to Utility clients in the selection, acquisition, and maintenance of hardware that is used principally for the Utility service. 1c3c3c2c

1c3c3c3 Help for the above areas will come in several forms: 1c3c3c3

1c3c3c3a Sessions at SRI for training and application-system design. 1c3c3c3a

1c3c3c3b Temporary residency of SRI personnel at client sites to offer analytic or design help and training. 1c3c3c3b

1c3c3c3c "Circuit riders" who periodically visit client sites to discuss problems, receive feedback on how to improve the service, and offer training or analytic help. 1c3c3c3c

1d IV SELECTED REFERENCES 1d

1d1 1 ARC 3906, D. C. Engelbart, "Augmenting Human Intellect: A Conceptual Framework," Summary Report, Contract AF 49(638)-1024, SRI Project 3578, Stanford Research Institute, Menlo Park, California, AD 289 565, October 1962. 1d1

1d2 2 ARC 12445, D. C. Engelbart, "Coordinated Information Services for Discipline- and Mission-Oriented Communities," Stanford Research Institute, Augmentation Research Center, 12 December 1972.
Also published in "Time Sharing: Past, Present, Future," Proceedings of the Second Annual Computer Communications Conference at California State University, San Jose, California, January 24-25 1973, pp 2.1-2.4. 1d2

1d3 3 ARC 14724, D. C. Engelbart, R. W. Watson, J. C. Norton, "The Augmented Knowledge Workshop," AFIPS Proceedings National Computer Conference, June 1973. 1d3

SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

1s

10-JUN-75
SRI-ARC 25901

1t SRI Proposal No. ISU 75-116

1u NLS Workshop Support for OSHA

1v Part TWo---Contractual Provisions

1w Prepared for:

Occupational Safety and Health Administration
200 Constitution Ave.
Washington, DC 20010

Attn: Dr. Dan Boyd

SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

1e I ESTIMATED TIME AND CHARGES 1e

1e1 It is proposed that the work outlined herein be performed during a period of six months commencing 18 July 1975 or as soon as appropriate computer facilities can be made available. 1e1

1e1a If a delay in contract start date occurs, then the completion date of 17 January 1976 would remain in effect, but the contract period would be shortened. 1e1a

1e2 The proposed project will result in Workshop Utility service being made available to offices selected by OSHA. 1e2

1e2a The costs of the total Workshop Utility service will be accounted for separately by the Institute, with the amount charged to OSHA under this contract being determined as a proportion of the total common cost of the Workshop Utility operation based on its availability for OSHA-directed use together with direct charges for people services as incurred. 1e2a

1e2b We propose to provide guaranteed access to one user "jobslot" 20 hours per day, 7 days per week, from the contract start date through 17 January 1976. 1e2b

1e3 Pursuant to the provisions of ASPR 16-206.2, attached is a cost estimate and support schedules in lieu of the DD Form 633-4. 1e3

1e3a The estimated costs shown in the cost attachment are for the total Workshop Utility service operation. Costs expected to be borne by OSHA over six months are estimated to be about $20,261 as shown in the attached cost estimate. If the service period commences after 18 July, then the costs would be reduced accordingly. 1e3a

1f II UTILITY COMPUTER SUPPORT SUBCONTRACT 1f

1f1 Tymshare, Inc. in Cupertino, California was selected by the Institute as the Computer Support subcontractor for the first year of service. Service through this second year is also being provided by Tymshare. 1f1

1g III REPORTS 1g

1g1 Because of the support nature of the efforts proposed herein, there will be no technical reports produced under this contract. Rather, documentation will be provided along the lines outlined below. 1g1

1g1a The technical documentation will include: 1g1a

1g1a1 TNLS and Deferred Execution User Guides and updates 1g1a1

1g1a2 DNLS User Guide and updates 1g1a2

1h IV CONTRACT FORM 1h

1h1 Because of the nature of the work proposed, it is requested that any contract resulting from this proposal be awarded on a cost-plus-fixed-fee basis as a government contract. 1h1

1i V ACCEPTANCE PERIOD 1i

1i1 This proposal will remain in effect until 17 July 1975. If consideration of the proposal requires a longer period, the Institute will be glad to consider a request for an extension of time. 1i1

SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

1j
1j1
1j1a
1j1a1 COST ESTIMATE FOR SECOND YEAR WORKSHOP UTILITY SERVICE
(based on the total OFFICE-1 facility)
1j1a2 Personnel Costs
1j1a2a
1j1a2a1 Supervision 985 hrs.
1j1a2a2 Professional 6750 hrs.
1j1a2a3 Technical 2940 hrs.
1j1a2a4 Clerical 985 hrs.
1j1a2b Total Direct Labor $
84,353
1j1a2c Payroll Burden @ 29.0 %
24,462
1j1a2d Total Labor and Burden
108,815
1j1a2e Overhead @ 110.0 %
119,697
1j1a2f Total Personnel Costs
228,512
1j1a2g
1j1a3 Direct Costs

1j1a3a Travel
16,051
1j1a3a1 27 trips East @ $368 = $ 9,936
1j1a3a2 122 Days Subsistence @ $42.50= 5,185
1j1a3a3 Auto Rental 62 days @ $15 = 930
1j1a3b Utility Online Support Subcontract
710,280
1j1a3b1 [256k core, 3 drums, 20hrs/7days
1j1a3b2 12 mo @ $ 59,190 = $ 710,280]
1j1a3c Materials and Supplies (tape, paper)
2,400
1j1a3d Communications
3,600
1j1a3e Documentation Costs
3,945
1j1a3f Total Direct Costs
736,276

1j1a4 Total Estimated Cost 964,788
1j1a5 Fixed Fee 48,239
1j1a6 Total Estimated Cost Plus Fixed Fee $1,013,027
1j1a7 Estimated six month cost 506,513
1j1a8

1j1a9 OSHA CONTRACT SHARE: 1 slot for 6 months = $ 20,261

1j1a10 See following Schedules.

1j2
1j2a
1j2a1
1k
1k1 SCHEDULE A
1k1a DIRECT LABOR
1k1a1
1k1a2 Direct labor charges are based on the actual salaries for the staff members contemplated for the project work plus a judgmental factor applied to base salary for merit increases during the contract period of performance. Frequency of salary reviews and level of merit increases are in accordance with the Institute's Salary and Wage Payment Policy as published in Topic No. 505 of the SRI Administration Manual and as approved by the Defense Contract Administration Services Region.
1k1b
1k2 SCHEDULE B
1k2a OVERHEAD AND PAYROLL BURDEN

1k2a1 These rates are based upon our 1975 budget plan, and have been submitted to the Cognizant Agency of the Department of Defense for approval as bidding and billing rates for the year 1975. We request that these rates not be specifically included in the contract, but rather that the contract provide for reimbursement at billing rates acceptable to the Contracting Officer, subject to retroactive adjustment to fixed rates negotiated on the basis of historical cost data. Included in payroll burden are such costs as vacation, holiday and sick leave pay, social security taxes, and contributions to employee benefit plans.
1k2b
1k3 SCHEDULE C
1k3a TRAVEL COSTS
1k3a1
1k3a2 Air fares and car rental rates are established in the current Official Airline Guide.
1k3a3 Domestic subsistence rates and travel by private auto are established standards based on cost data submitted to DCAA.
1k3b

1k4 SCHEDULE D

1k4a

1k4b DOCUMENTATION COSTS

1k4b1

1k4b2 Report costs are estimated on the basis of the number of pages of text and illustrations and the number of copies of reports to be produced, in accordance with the following rates per page:

1k4b2a Editing	$ 2.55	
1k4b2b Composition	2.50	
1k4b2c Coordination	.74	
1k4b2d Proofreading	.77	
1k4b2e Illustration	21.96	
1k4b2f Press and Bindery	.022	per impression

1k4b3 The following is a breakdown of the estimated cost of report production:

1k4b3a Text preparation, 439 pages at $ 6.56 per page (including editing, composition, report coordination and proofreading)	$ 2,880
1k4b3b Illustration, 40 pages at $ 21.96 per illustration	878
1k4b3c Press, binding, and photography for 8,500 printed pages at $ .022 per printed page	187
1k4b3d Total Estimated Documentation Costs	$ 3,945

1k4b4

1k4b5

1k5 SCHEDULE E

1k5a

1k5b UTILITY COMPUTER SUPPORT SUBCONTRACT COSTS

1k5b1 As per SRI/Tymshare quotaton dated 11 December 1974.

1k5b1a Basic system:	$ 54,790	per month
1k5b1b RM-10B's x 2	$ 4,400	per month
1k5b1c Total	$ 59,190	per month

11

SRI Proposal No. ISU 75-116
NLS Workshop Support for OSHA

(J25901) 30-JUN-75 19:07;;;; Title: Author(s): James C. Norton/JCN; Distribution: /ARC-APP([INFO-ONLY]) RWW([INFO-ONLY]) JBP([INFO-ONLY]) ; Sub-Collections: NIC ARC-APP; Clerk: RLL;

1 25901 Distribution

1a Laura J. Metzger, Priscilla A. Wold, Pamela K. Allen, Joan Hamilton, Rene C. Ochoa, Jeffrey C. Peters, Marcia L. Keeney, Jeanne M. Beck, Geoffrey S. Goodfellow, Rodney A. Bondurant, Douglas C. Engelbart, Jeanne M. Leavitt, Susan Gail Roetter, Raymond R. Panko, Adrian C. McGinnis, James C. Norton, J. D. Hopper, Elizabeth J. Feinler, James H. Bair, Robert N. Lieberman, N. Dean Meyer, Sandy L. Johnson, Martin E. Hardy, Richard W. Watson, Jonathan B. Postel,

JCN 30-JUN-75 19:13 25902

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

This the proposal sent to AFDSDC in June 1975.

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

10-JUN-75
SRI-ARC 25902

1m SRI Proposal No. ISU 75-117

1n NLS Workshop Support for AFDSDC

1o Part One---Technical Proposal

1p Prepared for:

Air Force Data Systems Design Center
Simulation and Analysis Branch
Gunter AFS, Alabama 36114

Attn: Lawrence A. Crain

1q Prepared by:

James C. Norton, Assistant Director
Augmentation Research Center

1r Approved:

Douglas C. Engelbart, Director
Augmentation Research Center

Bonnar Cox, Executive Director
Information Science and Engineering Division
Stanford Research Institute

1a

I INTRODUCTION

1a

1a1 A. Brief Scope Statement 1a1

1a1a The purpose of this proposal is to request additional support for the use of knowledge workshop technology developed at the Augmentation Research Center (ARC) of SRI by the Air Force Data Systems Design Center (AFDSDC). The service would be used by those AFDSDC-selected people who are willing to undertake exploratory use of knowledge workshop techniques through the use of the online system (NLS) and participate in a knowledge workshop community. 1a1a

1a1b The support is required for two activities: computer services and technical services. 1a1b

1a1b1 The computer services are being supplied through the ARPANET and other communication means to geographically distributed user groups from computer facilities maintained and operated by subcontractors under ARC. As prime contractor, ARC handles all service subcontracts. 1a1b1

1a1b1a Presently, Tymshare, Inc. is providing computer services to the Workshop Community. 1a1b1a

1a1b2 The technical services provided by ARC personnel have the following objectives: 1a1b2

1a1b2a Maintain and update the workshop community ("utility") version of our application software (NLS). 1a1b2a

1a1b2b Support the user groups in learning how to use these tools. 1a1b2b

1a1c Descriptions of the applications being suggested for exploratory use are given in a paper by Engelbart, Watson, and Norton [3] and in an earlier paper by Engelbart [2]. Copies of these documents are included with this proposal as Attachments A and B. 1a1c

1a2 B. Organization of this Proposal 1a2

1a2a This proposal is divided into two parts, each of which is broken down into several sections. 1a2a

1a2a1 Part One is the Technical Proposal, covering the proposed work and its background and context. 1a2a1

1a2a1a Section I is the introduction. 1a2a1a

1a2a1b Section II is a summary outline of proposed project activity. 1a2a1b

1a2a1c Section III is an extended discussion of proposed project activity. 1a2a1c

1a2a1d Section IV is a list of selected references. 1a2a1d

1a2a2 Part Two contains the Contractual Provisions, with sections covering such topics as estimated time and charges, reports, contract form, acceptance period, and a cost estimate with supporting schedules. 1a2a2

1a2b The Attachments contain additional supporting material. 1a2b

1a3 C. ARC's "Community Plan" 1a3

1a3a Introduction 1a3a

1a3a1 ARC is a one-organization community of researchers and system developers, supported by several different contracts. The research and development activities of ARC are aimed at exploring the possibilities for augmenting individuals and groups in the performance of knowledge work with the help of computer aids. These aids range from offline batch to online real-time facilities. Exploratory development and operation of augmentation systems have been our substantive work. 1a3a1

1a3b ARC's Research and Development Strategy 1a3b

1a3b1 An expanding stage of applications has been established with the advent of the second year of Workshop Utility service. We are involving a wider group of system users so that we can begin to transfer the results of our past work to others, and so that we can obtain feedback needed for further evolution from wider application than is possible in our Center alone. We have been providing Workshop support service to selected groups who are willing to take extra trouble to be exploratory, but who: 1a3b1

1a3b1a 1) are not necessarily oriented to being workshop system developers (they have their own work to do), 1a3b1a

1a3b1b 2) can see enough benefit from the system's application and from the experience of trying it so that they can justify the extra risk and expense of being "early users," and 1a3b1b

1a3b1c 3) can accept our assurance that reliability, system stability, and technical application help will be available to meet their conditions for risk and cost. 1a3b1c

1a3c Establishment of a Workshop Utility and promotion of the type of service work proposed herein are part of ARC's long-term commitment to pursue the continued development of augmented knowledge workshops in a pragmatic, evolutionary manner. Note that our last few years of work have concentrated on the means for delivering support to a distributed community, for providing teleconferencing and other basic processes of collaborative dialogue, etc.--consciously aiming toward having experience and capabilities especially applicable to support remote and distributed groups of exploratory users. 1a3c

1b II SUMMARY OF PROPOSED PROJECT ACTIVITY 1b

1b1 The proposed project work will include: 1b1

1b1a Providing training to AFDSDC-selected users as appropriate in the use of Display NLS (DNLS), Typewriter NLS (TNLS), and Deferred Execution (DEX) software subsystems. 1b1a

1b1b Providing technical assistance to an AFDSDC-selected "workshop architect" in the formulation, development, and implementation of augmented knowledge work procedures within user groups. 1b1b

1b1c Providing appropriate terminal equipment for AFDSDC use as mutually found to be necessary. 1b1c

1b2 The technical assistance will include help in the development of NLS use strategies suitable to the client's environment and procedures within its organization for implementing these strategies. 1b2

1b3 The service will also include the availability 20 hours a day, 7 days a week of Workshop Utility service via the ARPANET or specially arranged communication lines from a PDP 10 TENEX system operated by commercial facility management. 1b3

1c III EXTENDED DISCUSSION OF PROPOSED PROJECT ACTIVITY 1c

1c1 A. Objective 1c1

1c1a The objective of this effort is to work with AFDSDC personnel in the mutual development and use of procedures, methodology, software features, and other online tools; and in the training of users in NLS that will allow their exploratory use of our Workshop system. This objective has the following key components: 1c1a

1c1a1 1) Building an AFDSDC user group whose members will find real value in applying the service, and whose participation will contribute to AFDSDC organizational goals both directly (by making the users' AFDSDC-related activities more effective) and indirectly (by accelerating the maturation and acceptance of augmented knowledge workshop techniques). 1c1a1

1c1a2 2) Using and extending ARC's know-how and capability for integrating innovation with new-development transfer. 1c1a2

1c2 B. Background 1c2

1c2a The Augmentation Research Center has developed, over a period of years under government sponsorship, a general-purpose interactive augmentation system centering about what we now call an "Augmented Knowledge Workshop," abbreviated below as "Workshop." The goal of ARC's work has been to evolve a prototype Workshop system that will significantly improve the performance of individuals and teams engaged in knowledge-work activities, where the Workshop "system" involves daily use of coordinated tools, procedures, methodologies, and languages. 1c2a

1c2b For further background discussion, see [2] and [3], and the references in Section IV. 1c2b

1c2c While the discussion in Attachment B is oriented toward communities of discipline or mission oriented users, the same types of services and knowledge workshop orientation apply to individuals and groups of workers in a local environment. 1c2c

1c3 C. Scope of Proposed Work 1c3

1c3a Introduction 1c3a

1c3a1 The types of workshop services that we are beginning to support at varying levels of capability are described in [3] under the headings: 1c3a1

- 1c3a1a Collaborative Dialogue 1c3a1a
- 1c3a1b Document Development, Production, And Control 1c3a1b
- 1c3a1c Research Intelligence 1c3a1c
- 1c3a1d Community Handbook Development 1c3a1d
- 1c3a1e Computer-Based Instruction 1c3a1e
- 1c3a1f Meetings And Conferences 1c3a1f
- 1c3a1g Community Management And Organization 1c3a1g
- 1c3a1h Special Knowledge Work By Individuals And Teams 1c3a1h

1c3a2 Our present capabilities in the above areas are briefly indicated in [2] and [3]. For each area, there is an immediate applicability of the basic NLS provisions for composing, modifying, studying, publishing, and collaborating, and we have additional special provisions specifically supporting almost every area. 1c3a2

1c3b Technology Transfer 1c3b

1c3b1 We have started to transfer technology from our local group of experienced users to a wider group of inexperienced, geographically separate users. This technology consists of online software capabilities; a coordinated repertoire of online-assistance tools; associated concept and language additions dealing with the tools and with the information organization and task processes associated with their use; new aspects to intragroup organization and working methodology. Training a group in these new matters is necessary to the transfer; and to help others learn to train people in the new technology requires a transfer of the additional technology used to support the training. 1c3b1

1c3b2 The process of technology transfer is not a simple process, judged by our and others' experiences. We base our "Community Plan" strategy upon our experience that there are at least two main requirements for successful transfer process that proceeds at a reasonable speed and cost: 1c3b2

1c3b2a 1) The group originating the technology and having the experience, enthusiasm, and initial commitment

to its value must follow through with training and application support of the end user groups until a critical mass of equivalently experienced and enthusiastic end users has developed. 1c3b2a

1c3b2b 2) The end user groups must each have at least one properly placed, active supporter of the transfer process. We have been using the term "local workshop architect" for this role. 1c3b2b

1c3b2b1 We find this concept is highly relevant both for the successful transfer of our technology and for keeping the cost of this transfer at a reasonable level. 1c3b2b1

1c3b3 We like to give particular emphasis to this second requirement -- that each coherent group planning to integrate the proposed services into its working life should have at least one member serving as a "workshop architect" or "group coordinator." The function of this person is to be familiar in detail with both the needs of his organization and the capabilities we are proposing. This person, knowing his group's needs and our capabilities, would help introduce a workshop system meeting these needs into his organization in the appropriate evolutionary stages. ARC personnel would work closely with the workshop architect -- in training him, in initially giving him significant help in his role, and in continuing exchange of technical information. 1c3b3

1c3b3a The labor-funding levels in this proposal are based on the assumption that when a client group is allocated a portion of the Utility Online Services, the corresponding allocation of direct technical support will go primarily to its workshop architect. We assume that much of the responsibility for integrating the workshop service into his organization or community will be handled by this person. If a workshop architect is not available within a client group, or if extra people need our direct technical support, then additional funding will have to be provided. 1c3b3a

1c3b4 For any group of users we expect evolutionary growth of their Workshop service application, in both quantity and range. This growth will take guidance and support of the sort that in the commercial computer world would be offered by the applications specialists and "systems engineers." 1c3b4

1c3c Services Offered 1c3c

1c3c1 The proposed Workshop Utility service consists of two components: computer support and people support. We discuss these components in detail below. 1c3c1

1c3c2 Computer Services 1c3c2

1c3c2a The Underlying Computer Service Support 1c3c2a

1c3c2a1 We are offering a Workshop Utility version of ARC's online system (NLS), accessed over the ARPANET or specially arranged communication circuits, at least 20 hours a day, seven days a week. NLS features are described in the documents listed in Section IV. 1c3c2a1

1c3c2a2 This service is provided by a computer system operated and managed by a subcontracted timesharing utility company, rather than from a system directly operated by ARC. There are two important reasons for this arrangement: 1c3c2a2

1c3c2a2a 1) A commercial firm has the experience, facilities, leverage on vendors, and redundant equipment that make possible more reliable service than can be produced in a research and development environment. 1c3c2a2a

1c3c2a2b 2) It will be possible to expand the service in a more flexible manner in increments of whole or partial machines as usage grows. 1c3c2a2b

1c3c2b Service Partitioning 1c3c2b

1c3c2b1 We are now using a "group allocation" scheme for partitioning online access and service among groups of users. This guarantees each group its fair share of access to system resources while preserving both adequate responsiveness and independence for each group to plan its own usage loading. During this coming year, we plan to further develop the resource allocation system, working toward allocation of central processing unit (CPU) time, rather than login access. 1c3c2b1

1c3c2c File Privacy 1c3c2c

1c3c2c1 The Workshop Utility provides the necessary

standard TENEX software and facility operating procedures to ensure some privacy of file access. In addition, user-controlled NLS privacy features allow useful dialogue attended with flexible privacy restrictions. However, it is important to note that the visibility and availability of planning information and other recorded dialogue in ARC's currently open Journal System provide some of the more significant potential of our Workshop system. 1c3c2c1

1c3c2c2 We assume that ARC online-service personnel may occasionally have to access clients' user files (at a client's request only) as required from an operational standpoint; however, other users of the Workshop Utility Service will be denied read, write and list access to a client's files, unless he specifically releases files for general use. 1c3c2c2

1c3c3 People Support Services 1c3c3

1c3c3a We are still learning about the amount and nature of people support services that a successful Workshop Utility needs, particularly in the direct client support category. The levels specified in this proposal seem to us to be minimal. Charges for such service will be made as delivered to each client. 1c3c3a

1c3c3b Overhead Services 1c3c3b

1c3c3b1 The entire operation, including the interface between the Utility and the clients, needs competent administration. 1c3c3b1

1c3c3b2 Documentation of the basic user features of the system and of their application techniques needs to be complete and will have various special versions tailored for particular types of users. 1c3c3b2

1c3c3b3 The version of NLS that runs on the Utility needs maintenance and quality assurance. A systematic means is being provided for features found useful in the development version of the system to be integrated into the version running on the Utility. This includes the handling of user feedback, a significant effort on the part of ARC Utility staff, providing service to users and important input to system builders. 1c3c3b3

1c3c3b4 Clerical support of various types is needed. 1c3c3b4

1c3c3c Direct Client Support Services 1c3c3c

1c3c3c1 Our clients' users must be trained to varying levels of competence, depending upon the nature of their jobs and the tasks they perform. New procedures and methods will have to be developed and learned to allow effective use of the system in their working environments. Specifying these procedures will require help in analyzing the group's needs and present operations. 1c3c3c1

1c3c3c2 Therefore the following types of necessary services will be provided. 1c3c3c2

1c3c3c2a Assistance in training Utility clients to make special use of the system for applications that are peculiar to their user environments. 1c3c3c2a

1c3c3c2b Assistance to Utility clients in developing related documentation, procedures, records, and methods as needed locally to support their special use of the system. 1c3c3c2b

1c3c3c2c Assistance to Utility clients in the selection, acquisition, and maintenance of hardware that is used principally for the Utility service. 1c3c3c2c

1c3c3c3 Help for the above areas will come in several forms: 1c3c3c3

1c3c3c3a Sessions at SRI for training and application-system design. 1c3c3c3a

1c3c3c3b Temporary residency of SRI personnel at client sites to offer analytic or design help and training. 1c3c3c3b

1c3c3c3c "Circuit riders" who periodically visit client sites to discuss problems, receive feedback on how to improve the service, and offer training or analytic help. 1c3c3c3c

1d

IV SELECTED REFERENCES

1d

1d1 1 ARC 3906, D. C. Engelbart, "Augmenting Human Intellect: A Conceptual Framework," Summary Report, Contract AF 49(638)-1024, SRI Project 3578, Stanford Research Institute, Menlo Park, California, AD 289 565, October 1962. 1d1

1d2 2 ARC 12445, D. C. Engelbart, "Coordinated Information Services for Discipline- and Mission-Oriented Communities," Stanford Research Institute, Augmentation Research Center, 12 December 1972.
Also published in "Time Sharing: Past, Present, Future," Proceedings of the Second Annual Computer Communications Conference at California State University, San Jose, California, January 24-25 1973, pp 2.1-2.4. 1d2

1d3 3 ARC 14724, D. C. Engelbart, R. W. Watson, J. C. Norton, "The Augmented Knowledge Workshop," AFIPS Proceedings National Computer Conference, June 1973. 1d3

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

1s

10-JUN-75
SRI-ARC 25902

1t SRI Proposal No. ISU 75-117

1u NLS Workshop Support for AFDSDC

1v Part Two---Contractual Provisions

1w Prepared for:

Air Force Data Systems Design Center
Simulation and Analysis Branch
Gunter AFS, Alabama 36114

Attn: Lawrence A. Crain

1e I ESTIMATED TIME AND CHARGES 1e

1e1 It is proposed that the work outlined herein be performed during a period of six months commencing 18 July 1975 or as soon as appropriate computer facilities can be made available. 1e1

1e1a If a delay in contract start date occurs, then the completion date of 17 January 1976 would remain in effect, but the contract period would be shortened. 1e1a

1e2 The proposed project will result in Workshop Utility service being made available to offices selected by AFDSDC. 1e2

1e2a The costs of the total Workshop Utility service will be accounted for separately by the Institute, with the amount charged to AFDSDC under this contract being determined as a proportion of the total common cost of the Workshop Utility operation based on its availability for AFDSDC-directed use together with direct charges for people services as incurred. 1e2a

1e2b We propose to provide guaranteed access to three user "jobslots" 20 hours per day, 7 days per week, from the contract start date through 17 January 1976. 1e2b

1e3 Pursuant to the provisions of ASPR 16-206.2, attached is a cost estimate and support schedules in lieu of the DD Form 633-4. 1e3

1e3a The estimated costs shown in the cost attachment are for the total Workshop Utility service operation. Costs expected to be borne by AFDSDC over six months are estimated to be about $60,783 as shown in the attached cost estimate. If the service period commences after 18 July, then the costs would be reduced accordingly. 1e3a

1f II UTILITY COMPUTER SUPPORT SUBCONTRACT 1f

1f1 Tymshare, Inc. in Cupertino, California was selected by the Institute as the Computer Support subcontractor for the first year of service. Service through this second year is also being provided by Tymshare. 1f1

1g III REPORTS 1g

1g1 Because of the support nature of the efforts proposed herein, there will be no technical reports produced under this contract. Rather, documentation will be provided along the lines outlined below. 1g1

1g1a The technical documentation will include: 1g1a

1g1a1 TNLS and Deferred Execution User Guides and updates 1g1a1

1g1a2 DNLS User Guide and updates 1g1a2

1h IV CONTRACT FORM 1h

1h1 Because of the nature of the work proposed, it is requested that any contract resulting from this proposal be awarded on a cost-plus-fixed-fee basis as a government contract. 1h1

1i V ACCEPTANCE PERIOD 1i

1i1 This proposal will remain in effect until 17 July 1975. If consideration of the proposal requires a longer period, the Institute will be glad to consider a request for an extension of time. 1i1

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

1j
1j1
1j1a
1j1a1 COST ESTIMATE FOR SECOND YEAR WORKSHOP UTILITY SERVICE
(based on the total OFFICE-1 facility)
1j1a2 Personnel Costs
1j1a2a
1j1a2a1 Supervision 985 hrs.
1j1a2a2 Professional 6750 hrs.
1j1a2a3 Technical 2940 hrs.
1j1a2a4 Clerical 985 hrs.
1j1a2b Total Direct Labor $
84,353
1j1a2c Payroll Burden @ 29.0 %
24,462
1j1a2d Total Labor and Burden
108,815
1j1a2e Overhead @ 110.0 %
119,697
1j1a2f Total Personnel Costs
228,512
1j1a2g
1j1a3 Direct Costs

1j1a3a Travel
16,051
1j1a3a1 27 trips East @ $368 = $ 9,936
1j1a3a2 122 Days Subsistence @ $42.50= 5,185
1j1a3a3 Auto Rental 62 days @ $15 = 930
1j1a3b Utility Online Support Subcontract
710,280
1j1a3b1 [256K core, 3 drums, 20hrs/7days
1j1a3b2 12 mo @ $ 59,190 = $ 710,280]
1j1a3c Materials and Supplies (tape, paper)
2,400
1j1a3d Communications
3,600
1j1a3e Documentation Costs
3,945
1j1a3f Total Direct Costs
736,276

1j1a4 Total Estimated Cost 964,788
1j1a5 Fixed Fee 48,239
1j1a6 Total Estimated Cost Plus Fixed Fee $1,013,027
1j1a7 Estimated six month cost 506,513
1j1a8

1j1a9 AFDSDC CONTRACT SHARE: 3 slots / 6 months = $ 60,783

1j1a10 See following Schedules.

1j2
1j2a
1j2a1
1k
1k1 SCHEDULE A
1k1a DIRECT LABOR
1k1a1
1k1a2 Direct labor charges are based on the actual salaries for the staff members contemplated for the project work plus a judgmental factor applied to base salary for merit increases during the contract period of performance. Frequency of salary reviews and level of merit increases are in accordance with the Institute's Salary and Wage Payment Policy as published in Topic No. 505 of the SRI Administration Manual and as approved by the Defense Contract Administration Services Region.
1k1b
1k2 SCHEDULE B
1k2a OVERHEAD AND PAYROLL BURDEN

1k2a1 These rates are based upon our 1975 budget plan, and have been submitted to the Cognizant Agency of the Department of Defense for approval as bidding and billing rates for the year 1975. We request that these rates not be specifically included in the contract, but rather that the contract provide for reimbursement at billing rates acceptable to the Contracting Officer, subject to retroactive adjustment to fixed rates negotiated on the basis of historical cost data. Included in payroll burden are such costs as vacation, holiday and sick leave pay, social security taxes, and contributions to employee benefit plans.
1k2b
1k3 SCHEDULE C
1k3a TRAVEL COSTS
1k3a1
1k3a2 Air fares and car rental rates are established in the current Official Airline Guide.
1k3a3 Domestic subsistence rates and travel by private auto are established standards based on cost data submitted to DCAA.
1k3b

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

1k4 SCHEDULE D

1k4a

1k4b DOCUMENTATION COSTS

1k4b1

1k4b2 Report costs are estimated on the basis of the number of pages of text and illustrations and the number of copies of reports to be produced, in accordance with the following rates per page:

1k4b2a Editing	$ 2.55	
1k4b2b Composition	2.50	
1k4b2c Coordination	.74	
1k4b2d Proofreading	.77	
1k4b2e Illustration	21.96	
1k4b2f Press and Bindery	.022	per impression

1k4b3 The following is a breakdown of the estimated cost of report production:

1k4b3a Text preparation, 439 pages at $ 6.56 per page (including editing, composition, report coordination and proofreading)	$ 2,880
1k4b3b Illustration, 40 pages at $ 21.96 per illustration	878
1k4b3c Press, binding, and photography for 8,500 printed pages at $ .022 per printed page	187
1k4b3d Total Estimated Documentation Costs	$ 3,945

1k4b4

1k4b5

1k5 SCHEDULE E

1k5a

1k5b UTILITY COMPUTER SUPPORT SUBCONTRACT COSTS

1k5b1 As per SRI/Tymshare quotaton dated 11 December 1974,

1k5b1a Basic system:	$ 54,790	per month
1k5b1b RM-10B's x 2	$ 4,400	per month
1k5b1c Total	$ 59,190	per month

11

JCN 30-JUN-75 19:13 25902

SRI Proposal No. ISU 75-117
NLS Workshop Support for AFDSDC

(J25902) 30-JUN-75 19:13;;;; Title: Author(s): James C. Norton/JCN; Distribution: /ARC-APP([INFO-ONLY]) RWW([INFO-ONLY]) JBP([INFO-ONLY]) ; Sub-Collections: NIC ARC-APP; Clerk: RLL;

1 25902 Distribution

1a Laura J. Metzger, Priscilla A. Wold, Pamela K. Allen, Joan Hamilton, Rene C. Ochoa, Jeffrey C. Peters, Marcia L. Keeney, Jeanne M. Beck, Geoffrey S. Goodfellow, Rodney A. Bondurant, Douglas C. Engelbart, Jeanne M. Leavitt, Susan Gail Roetter, Raymond R. Panko, Adrian C. McGinnis, James C. Norton, J. D. Hopper, Elizabeth J. Feinler, James H. Bair, Robert N. Lieberman, N. Dean Meyer, Sandy L. Johnson, Martin E. Hardy, Richard W. Watson, Jonathan B. Postel,

SRI Proposal No. ISU 75-114
NLS Workshop Support for RADC

This is the proposal sent to RADC in June 1975.

SRI Proposal No. ISU 75-114
NLS Workshop Support for RADC

10-JUN-75
SRI-ARC 25903

1m SRI Proposal No. ISU 75-114

1n NLS Workshop Support for RADC

1o Part One---Technical Proposal

1p Prepared for:

Rome Air Development Center
(ISIM)
Griffiss Air Force Base
Rome, New York 13441

Attn: Duane Stone

1q Prepared by:

James C. Norton, Assistant Director
Augmentation Research Center

1r Approved:

Douglas C. Engelbart, Director
Augmentation Research Center

Bonnar Cox, Executive Director
Information Science and Engineering Division
Stanford Research Institute

1a

I INTRODUCTION

1a

1a1 A. Brief Scope Statement 1a1

1a1a The purpose of this proposal is to request additional support for the use of knowledge workshop technology developed at the Augmentation Research Center (ARC) of SRI by the Rome Air Development Center (RADC). The service would be used by those RADC-selected people who are willing to undertake exploratory use of knowledge workshop techniques through the use of the online system (NLS) and participate in a knowledge workshop community. 1a1a

1a1b The support is required for two activities: computer services and technical services. 1a1b

1a1b1 The computer services are being supplied through the ARPANET and other communication means to geographically distributed user groups from computer facilities maintained and operated by subcontractors under ARC. As prime contractor, ARC handles all service subcontracts. 1a1b1

1a1b1a Presently, Tymshare, Inc. is providing computer services to the Workshop Community. 1a1b1a

1a1b2 The technical services provided by ARC personnel have the following objectives: 1a1b2

1a1b2a Maintain and update the workshop community ("utility") version of our application software (NLS). 1a1b2a

1a1b2b Support the user groups in learning how to use these tools. 1a1b2b

1a1c Descriptions of the applications being suggested for exploratory use are given in a paper by Engelbart, Watson, and Norton [3] and in an earlier paper by Engelbart [2]. Copies of these documents are included with this proposal as Attachments A and B. 1a1c

1a2 B. Organization of this Proposal 1a2

1a2a This proposal is divided into two parts, each of which is broken down into several sections. 1a2a

1a2a1 Part One is the Technical Proposal, covering the proposed work and its background and context. 1a2a1

1a2a1a Section I is the introduction. 1a2a1a

1a2a1b Section II is a summary outline of proposed project activity. 1a2a1b

1a2a1c Section III is an extended discussion of proposed project activity. 1a2a1c

1a2a1d Section IV is a list of selected references. 1a2a1d

1a2a2 Part Two contains the Contractual Provisions, with sections covering such topics as estimated time and charges, reports, contract form, acceptance period, and a cost estimate with supporting schedules. 1a2a2

1a2b The Attachments contain additional supporting material. 1a2b

1a3 C. ARC's "Community Plan" 1a3

1a3a Introduction 1a3a

1a3a1 ARC is a one-organization community of researchers and system developers, supported by several different contracts. The research and development activities of ARC are aimed at exploring the possibilities for augmenting individuals and groups in the performance of knowledge work with the help of computer aids. These aids range from offline batch to online real-time facilities. Exploratory development and operation of augmentation systems have been our substantive work. 1a3a1

1a3b ARC's Research and Development Strategy 1a3b

1a3b1 An expanding stage of applications has been established with the advent of the second year of Workshop Utility service. We are involving a wider group of system users so that we can begin to transfer the results of our past work to others, and so that we can obtain feedback needed for further evolution from wider application than is possible in our Center alone. We have been providing Workshop support Service to selected groups who are willing to take extra trouble to be exploratory, but who: 1a3b1

1a3b1a 1) are not necessarily oriented to being workshop system developers (they have their own work to do), 1a3b1a

1a3b1b 2) can see enough benefit from the system's application and from the experience of trying it so that they can justify the extra risk and expense of being "early users," and 1a3b1b

1a3b1c 3) can accept our assurance that reliability, system stability, and technical application help will be available to meet their conditions for risk and cost. 1a3b1c

1a3c Establishment of a Workshop Utility and promotion of the type of service work proposed herein are part of ARC's long-term commitment to pursue the continued development of augmented knowledge workshops in a pragmatic, evolutionary manner. Note that our last few years of work have concentrated on the means for delivering support to a distributed community, for providing teleconferencing and other basic processes of collaborative dialogue, etc.--consciously aiming toward having experience and capabilities especially applicable to support remote and distributed groups of exploratory users. 1a3c

1b II SUMMARY OF PROPOSED PROJECT ACTIVITY 1b

1b1 The proposed project work will include: 1b1

1b1a Providing training to RADC-selected users as appropriate in the use of Display NLS (DNLS), Typewriter NLS (TNLS), and Deferred Execution (DEX) software subsystems. 1b1a

1b1b Providing technical assistance to one RADC-selected "workshop architect" in the formulation, development, and implementation of augmented knowledge work procedures within user groups. 1b1b

1b1c Providing appropriate terminal equipment for RADC use as mutually found to be necessary. 1b1c

1b2 The technical assistance will include help in the development of NLS use strategies suitable to the client's environment and procedures within its organization for implementing these strategies. 1b2

1b3 The service will also include the availability 20 hours a day, 7 days a week of Workshop Utility service via the ARPANET or specially arranged communication lines from a PDP 10 TENEX system operated by commercial facility management. 1b3

1c III EXTENDED DISCUSSION OF PROPOSED PROJECT ACTIVITY 1c

1c1 A. Objective 1c1

1c1a The objective of this effort is to work with RADC personnel in the mutual development and use of procedures, methodology, software features, and other online tools; and in the training of users in NLS that will allow their exploratory use of our Workshop system. This objective has the following key components: 1c1a

1c1a1 1) Building RADC user group whose members will find real value in applying the service, and whose participation will contribute to RADC organizational goals both directly (by making the users' RADC-related activities more effective) and indirectly (by accelerating the maturation and acceptance of augmented knowledge workshop techniques), 1c1a1

1c1a2 2) Using and extending ARC's know-how and capability for integrating innovation with new-development transfer. 1c1a2

1c2 B. Background 1c2

1c2a The Augmentation Research Center has developed, over a period of years under government sponsorship, a general-purpose interactive augmentation system centering about what we now call an "Augmented Knowledge Workshop," abbreviated below as "Workshop." The goal of ARC's work has been to evolve a prototype Workshop system that will significantly improve the performance of individuals and teams engaged in knowledge-work activities, where the Workshop "system" involves daily use of coordinated tools, procedures, methodologies, and languages. 1c2a

1c2b For further background discussion, see [2] and [3], and the references in Section IV. 1c2b

1c2c While the discussion in Attachment B is oriented toward communities of discipline or mission oriented users, the same types of services and knowledge workshop orientation apply to individuals and groups of workers in a local environment. 1c2c

1c3 C. Scope of Proposed Work 1c3

1c3a Introduction 1c3a

1c3a1 The types of workshop services that we are beginning to support at varying levels of capability are described in [3] under the headings: 1c3a1

- 1c3a1a Collaborative Dialogue 1c3a1a
- 1c3a1b Document Development, Production, And Control 1c3a1b
- 1c3a1c Research Intelligence 1c3a1c
- 1c3a1d Community Handbook Development 1c3a1d
- 1c3a1e Computer-Based Instruction 1c3a1e
- 1c3a1f Meetings And Conferences 1c3a1f
- 1c3a1g Community Management And Organization 1c3a1g
- 1c3a1h Special Knowledge Work By Individuals And Teams 1c3a1h

1c3a2 Our present capabilities in the above areas are briefly indicated in [2] and [3]. For each area, there is an immediate applicability of the basic NLS provisions for composing, modifying, studying, publishing, and collaborating, and we have additional special provisions specifically supporting almost every area. 1c3a2

1c3b Technology Transfer 1c3b

1c3b1 We have started to transfer technology from our local group of experienced users to a wider group of inexperienced, geographically separate users. This technology consists of online software capabilities; a coordinated repertoire of online-assistance tools; associated concept and language additions dealing with the tools and with the information organization and task processes associated with their use; new aspects to intragroup organization and working methodology. Training a group in these new matters is necessary to the transfer; and to help others learn to train people in the new technology requires a transfer of the additional technology used to support the training. 1c3b1

1c3b2 The process of technology transfer is not a simple process, judged by our and others' experiences. We base our "Community Plan" strategy upon our experience that there are at least two main requirements for successful transfer process that proceeds at a reasonable speed and cost: 1c3b2

1c3b2a 1) The group originating the technology and having the experience, enthusiasm, and initial commitment

to its value must follow through with training and application support of the end user groups until a critical mass of equivalently experienced and enthusiastic end users has developed. 1c3b2a

1c3b2b 2) The end user groups must each have at least one properly placed, active supporter of the transfer process. We have been using the term "local workshop architect" for this role. 1c3b2b

1c3b2b1 We find this concept is highly relevant both for the successful transfer of our technology and for keeping the cost of this transfer at a reasonable level. 1c3b2b1

1c3b3 We like to give particular emphasis to this second requirement -- that each coherent group planning to integrate the proposed services into its working life should have at least one member serving as a "workshop architect" or "group coordinator." The function of this person is to be familiar in detail with both the needs of his organization and the capabilities we are proposing. This person, knowing his group's needs and our capabilities, would help introduce a workshop system meeting these needs into his organization in the appropriate evolutionary stages. ARC personnel would work closely with the workshop architect -- in training him, in initially giving him significant help in his role, and in continuing exchange of technical information. 1c3b3

1c3b3a The labor-funding levels in this proposal are based on the assumption that when a client group is allocated a portion of the Utility Online Services, the corresponding allocation of direct technical support will go primarily to its workshop architect. We assume that much of the responsibility for integrating the workshop service into his organization or community will be handled by this person. If a workshop architect is not available within a client group, or if extra people need our direct technical support, then additional funding will have to be provided. 1c3b3a

1c3b4 For any group of users we expect evolutionary growth of their workshop service application, in both quantity and range. This growth will take guidance and support of the sort that in the commercial computer world would be offered by the applications specialists and "systems engineers." 1c3b4

1c3c Services Offered 1c3c

1c3c1 The proposed Workshop Utility service consists of two components: computer support and people support. We discuss these components in detail below. 1c3c1

1c3c2 Computer Services 1c3c2

1c3c2a The Underlying Computer Service Support 1c3c2a

1c3c2a1 We are offering a Workshop Utility version of ARC's online system (NLS), accessed over the ARPANET or specially arranged communication circuits, at least 20 hours a day, seven days a week. NLS features are described in the documents listed in Section IV. 1c3c2a1

1c3c2a2 This service is provided by a computer system operated and managed by a subcontracted timesharing utility company, rather than from a system directly operated by ARC. There are two important reasons for this arrangement: 1c3c2a2

1c3c2a2a 1) A commercial firm has the experience, facilities, leverage on vendors, and redundant equipment that make possible more reliable service than can be produced in a research and development environment. 1c3c2a2a

1c3c2a2b 2) It will be possible to expand the service in a more flexible manner in increments of whole or partial machines as usage grows. 1c3c2a2b

1c3c2b Service Partitioning 1c3c2b

1c3c2b1 We are now using a "group allocation" scheme for partitioning online access and service among groups of users. This guarantees each group its fair share of access to system resources while preserving both adequate responsiveness and independence for each group to plan its own usage loading. During this coming year, we plan to further develop the resource allocation system, working toward allocation of central processing unit (CPU) time, rather than login access. 1c3c2b1

1c3c2c File Privacy 1c3c2c

1c3c2c1 The Workshop Utility provides the necessary

standard TENEX software and facility operating procedures to ensure some privacy of file access. In addition, user-controlled NLS privacy features allow useful dialogue attended with flexible privacy restrictions. However, it is important to note that the visibility and availability of planning information and other recorded dialogue in ARC's currently open Journal System provide some of the more significant potential of our Workshop system. 1c3c2c1

1c3c2c2 We assume that ARC online-service personnel may occasionally have to access clients' user files (at a client's request only) as required from an operational standpoint; however, other users of the Workshop Utility Service will be denied read, write and list access to a client's files, unless he specifically releases files for general use. 1c3c2c2

1c3c3 People Support Services 1c3c3

1c3c3a We are still learning about the amount and nature of people support services that a successful Workshop Utility needs, particularly in the direct client support category. The levels specified in this proposal seem to us to be minimal. Charges for such service will be made as delivered to each client. 1c3c3a

1c3c3b Overhead Services 1c3c3b

1c3c3b1 The entire operation, including the interface between the Utility and the clients, needs competent administration. 1c3c3b1

1c3c3b2 Documentation of the basic user features of the system and of their application techniques needs to be complete and will have various special versions tailored for particular types of users. 1c3c3b2

1c3c3b3 The version of NLS that runs on the Utility needs maintenance and quality assurance. A systematic means is being provided for features found useful in the development version of the system to be integrated into the version running on the Utility. This includes the handling of user feedback, a significant effort on the part of ARC Utility staff, providing service to users and important input to system builders. 1c3c3b3

1c3c3b4 Clerical support of various types is needed. 1c3c3b4

1c3c3c Direct Client Support Services 1c3c3c

1c3c3c1 Our clients' users must be trained to varying levels of competence, depending upon the nature of their jobs and the tasks they perform. New procedures and methods will have to be developed and learned to allow effective use of the system in their working environments. Specifying these procedures will require help in analyzing the group's needs and present operations. 1c3c3c1

1c3c3c2 Therefore the following types of necessary services will be provided. 1c3c3c2

1c3c3c2a Assistance in training Utility clients to make special use of the system for applications that are peculiar to their user environments. 1c3c3c2a

1c3c3c2b Assistance to Utility clients in developing related documentation, procedures, records, and methods as needed locally to support their special use of the system. 1c3c3c2b

1c3c3c2c Assistance to Utility clients in the selection, acquisition, and maintenance of hardware that is used principally for the Utility service. 1c3c3c2c

1c3c3c3 Help for the above areas will come in several forms: 1c3c3c3

1c3c3c3a Sessions at SRI for training and application-system design. 1c3c3c3a

1c3c3c3b Temporary residency of SRI personnel at client sites to offer analytic or design help and training. 1c3c3c3b

1c3c3c3c "Circuit riders" who periodically visit client sites to discuss problems, receive feedback on how to improve the service, and offer training or analytic help. 1c3c3c3c

1d IV SELECTED REFERENCES 1d

1d1 1 ARC 3906, D. C. Engelbart, "Augmenting Human Intellect: A Conceptual Framework," Summary Report, Contract AF 49(638)-1024, SRI Project 3578, Stanford Research Institute, Menlo Park, California, AD 289 565, October 1962. 1d1

1d2 2 ARC 12445, D. C. Engelbart, "Coordinated Information Services for Discipline- and Mission-Oriented Communities," Stanford Research Institute, Augmentation Research Center, 12 December 1972.
Also published in "Time Sharing: Past, Present, Future," Proceedings of the Second Annual Computer Communications Conference at California State University, San Jose, California, January 24-25 1973, pp 2.1-2.4. 1d2

1d3 3 ARC 14724, D. C. Engelbart, R. W. Watson, J. C. Norton, "The Augmented Knowledge Workshop," AFIPS Proceedings National Computer Conference, June 1973. 1d3

SRI Proposal No. ISU 75-114
NLS Workshop Support for RADC

1s

10-JUN-75
SRI-ARC 25903

1t SRI Proposal No, ISU 75-114

1u NLS Workshop Support for RADC

1v Part Two---Contractual Provisions

1w Prepared for:

Rome Air Development Center
(ISIM)
Griffiss Air Force Base
Rome, New York 13441

Attn: Duane Stone

1e I ESTIMATED TIME AND CHARGES

1e

1e1 It is proposed that the work outlined herein be performed during a period of six months commencing 18 July 1975 or as soon as appropriate computer facilities can be made available. 1e1

1e1a If a delay in contract start date occurs, then the completion date of 17 January 1976 would remain in effect, but the contract period would be shortened. 1e1a

1e2 The proposed project will result in Workshop Utility service being made available to offices selected by RADC. 1e2

1e2a The costs of the total Workshop Utility service will be accounted for separately by the Institute, with the amount charged to RADC under this contract being determined as a proportion of the total common cost of the Workshop Utility operation based on its availability for RADC-directed use together with direct charges for people services as incurred. 1e2a

1e2b We propose to provide guaranteed access to five user "jobslots" 20 hours per day, 7 days per week, from the contract start date through 17 January 1976. 1e2b

1e3 Pursuant to the provisions of ASPR 16-206.2, attached is a cost estimate and support schedules in lieu of the DD Form 633-4. 1e3

1e3a The estimated costs shown in the cost attachment are for the total Workshop Utility service operation. Costs expected to be borne by RADC over six months are estimated to be about $101,305 as shown in the attached cost estimate. If the service period commences after 18 July, then the costs would be reduced accordingly. 1e3a

1f II UTILITY COMPUTER SUPPORT SUBCONTRACT 1f

1f1 Tymshare, Inc. in Cupertino, California was selected by the Institute as the Computer Support subcontractor for the first year of service. Service through this second year is also being provided by Tymshare. 1f1

1g III REPORTS 1g

1g1 Because of the support nature of the efforts proposed herein, there will be no technical reports produced under this contract. Rather, documentation will be provided along the lines outlined below. 1g1

1g1a The technical documentation will include: 1g1a

1g1a1 TNLS and Deferred Execution User Guides and updates 1g1a1

1g1a2 DNLS User Guide and updates 1g1a2

1h IV CONTRACT FORM 1h

1h1 Because of the nature of the work proposed, it is requested that any contract resulting from this proposal be awarded on a cost-plus-fixed-fee basis as a government contract. 1h1

1i V ACCEPTANCE PERIOD 1i

1i1 This proposal will remain in effect until 17 July 1975. If consideration of the proposal requires a longer period, the Institute will be glad to consider a request for an extension of time. 1i1

SRI Proposal No. ISU 75-114
NLS Workshop Support for RADC

1j
1j1
1j1a
1j1a1 COST ESTIMATE FOR SECOND YEAR WORKSHOP UTILITY SERVICE
(based on the total OFFICE-1 facility)
1j1a2 Personnel Costs
1j1a2a
1j1a2a1 Supervision 985 hrs.
1j1a2a2 Professional 6750 hrs.
1j1a2a3 Technical 2940 hrs.
1j1a2a4 Clerical 985 hrs.
1j1a2b Total Direct Labor $
84,353
1j1a2c Payroll Burden @ 29.0 %
24,462
1j1a2d Total Labor and Burden
108,815
1j1a2e Overhead @ 110.0 %
119,697
1j1a2f Total Personnel Costs
228,512
1j1a2g
1j1a3 Direct Costs

1j1a3a Travel
16,051
1j1a3a1 27 trips East @ $368 = $ 9,936
1j1a3a2 122 Days Subsistence @ $42.50= 5,185
1j1a3a3 Auto Rental 62 days @ $15 = 930
1j1a3b Utility Online Support Subcontract
710,280
1j1a3b1 [256K core, 3 drums, 20hrs/7days
1j1a3b2 12 mo @ $ 59,190 = $ 710,280]
1j1a3c Materials and Supplies (tape, paper)
2,400
1j1a3d Communications
3,600
1j1a3e Documentation Costs
3,945
1j1a3f Total Direct Costs
736,276

1j1a4 Total Estimated Cost 964,788
1j1a5 Fixed Fee 48,239
1j1a6 Total Estimated Cost Plus Fixed Fee $1,013,027
1j1a7 Estimated six month cost 506,513
1j1a8

1j1a9 RADC CONTRACT SHARE: 5 slots for 6 months = $ 101,305

1j1a10 See following Schedules.

1j2
1j2a
1j2a1
1k
1k1 SCHEDULE A
1k1a DIRECT LABOR
1k1a1
1k1a2 Direct labor charges are based on the actual salaries for the staff members contemplated for the project work plus a judgmental factor applied to base salary for merit increases during the contract period of performance. Frequency of salary reviews and level of merit increases are in accordance with the Institute's Salary and Wage Payment Policy as published in Topic No. 505 of the SRI Administration Manual and as approved by the Defense Contract Administration Services Region.
1k1b
1k2 SCHEDULE B
1k2a OVERHEAD AND PAYROLL BURDEN

1k2a1 These rates are based upon our 1975 budget plan, and have been submitted to the Cognizant Agency of the Department of Defense for approval as bidding and billing rates for the year 1975. We request that these rates not be specifically included in the contract, but rather that the contract provide for reimbursement at billing rates acceptable to the Contracting Officer, subject to retroactive adjustment to fixed rates negotiated on the basis of historical cost data. Included in payroll burden are such costs as vacation, holiday and sick leave pay, social security taxes, and contributions to employee benefit plans.
1k2b
1k3 SCHEDULE C
1k3a TRAVEL COSTS
1k3a1
1k3a2 Air fares and car rental rates are established in the current Official Airline Guide.
1k3a3 Domestic subsistence rates and travel by private auto are established standards based on cost data submitted to DCAA.
1k3b

1k4 SCHEDULE D

1k4a

1k4b DOCUMENTATION COSTS

1k4b1

1k4b2 Report costs are estimated on the basis of the number of pages of text and illustrations and the number of copies of reports to be produced, in accordance with the following rates per page:

1k4b2a Editing	$ 2.55	
1k4b2b Composition	2.50	
1k4b2c Coordination	.74	
1k4b2d Proofreading	.77	
1k4b2e Illustration	21.96	
1k4b2f Press and Bindery	.022	per impression

1k4b3 The following is a breakdown of the estimated cost of report production:

1k4b3a Text preparation, 439 pages at $ 6.56 per page (including editing, composition, report coordination and proofreading)	$ 2,880
1k4b3b Illustration, 40 pages at $ 21.96 per illustration	878
1k4b3c Press, binding, and photography for 8,500 printed pages at $ .022 per printed page	187
1k4b3d Total Estimated Documentation Costs	$ 3,945

1k4b4

1k4b5

1k5 SCHEDULE E

1k5a

1k5b UTILITY COMPUTER SUPPORT SUBCONTRACT COSTS

1k5b1 As per SRI/Tymshare quotaton dated 11 December 1974,

1k5b1a Basic system:	$ 54,790	per month
1k5b1b RM-10B's x 2	$ 4,400	per month
1k5b1c Total	$ 59,190	per month

11

JCN 30-JUN-75 18:46 25903

SRI Proposal No. ISU 75-114
NLS Workshop Support for RADC

(J25903) 30-JUN-75 18:46;;;; Title: Author(s): James C. Norton/JCN; Distribution: /ARC-APP([INFO-ONLY]) RWW([INFO-ONLY]) JBP([INFO-ONLY]) ; Sub-Collections: NIC ARC-APP; Clerk: RLL;

1 25903 Distribution

1a Laura J. Metzger, Priscilla A. Wold, Pamela K. Allen, Joan Hamilton, Rene C. Ochoa, Jeffrey C. Peters, Marcia L. Keeney, Jeanne M. Beck, Geoffrey S. Goodfellow, Rodney A. Bondurant, Douglas C. Engelbart, Jeanne M. Leavitt, Susan Gail Roetter, Raymond R. Panko, Adrian C. McGinnis, James C. Norton, J. D. Hopper, Elizabeth J. Feinler, James H. Bair, Robert N. Lieberman, N. Dean Meyer, Sandy L. Johnson, Martin E. Hardy, Richard W. Watson, Jonathan B. Postel,

sample message

Is the cafeteria a good place to eat lunch? 1

LLG 21-MAY-75 15:06 25905

sample message

(J25905) 21-MAY-75 15:06;;;; Title: Author(s): Larry L. Garlick/LLG; Distribution: /RH([ACTION]) RH([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: LLG;

junkmail

introduction
to junk 1

nls or online system the name of the computer system you will be jusing, Online means you receive immediatee feedback about what you have just typed at your terminal. 2

this follows insert 3

here is an insert after 2 4

NLS has facilities to let ou do almost everutihing uou need with text: 5

compost it; edit it; send it to (and receive it from) other persons; file it in one or more categories; 6

this primer deomonstrates the cmand 7

this primer deomonstrates the cmand 8

junkmail

(J25906) 21-MAY-75 15:09;;; Title: Author(s): Larry L. Garlick/LLG;
Distribution: /RH([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk:
LLG; Origin: < GARLICK, JUNK.NLS;2, >, 21-MAY-75 14:29 LLG
;;;;####;

BEv 21-MAY-75 19:44 25907

Sample Session Format--A Decision Made?

One other thing I'm not sure was finally decided at today's meeting... Was a decision reached to adopt the format in the "Help Services Sample Session" as the standard format for all sample seessions? If so, does this also mean the introductory paragraphs are somewht standard (i.e., introduction to what the ss teaches, note to be at typewriter terminal, explanation of "keys that do not print, info on four control keys, and what <CR> is)? And if we did not decide to adopt format, what changes would you like to see incorporated? Thanks--Bev 1

Sample Session Format--A Decision Made?

(J25907) 21-MAY-75 19:44;;;; Title: Author(s): Beverly Boli/BEV;
Distribution: /DVN([ACTION]) KIRK([ACTION]) POOH([ACTION]) ;
Sub-Collections: SRI-ARC; Clerk: BEV;

changes in roles in Development

It has become increasingly clear that I can not do everything I should be doing as Asst. Dir in the way of planning getting new areas of business going etc. and do everything needed in coordination and dealing with the outside world as NSW Project Leader as well. Therefore I am pleased to announce that Jon Postel will be taking over the NSW Project Leader role. He will begin working with me in a transition period on our internal ARC tasks during the remainder of this contract and will assume responsibilities externally starting on July 18 as well. At that time I will send out a note to our outside clients and collaborators. Until that time I would appreciate it if this information be considered for ARC only and that Jon be given the full cooperation that I have been given while he takes on a challenging task.

Jon, will continue working in the protocol area as well. Jim White will be Protocol area project leader and Jon will be responsible to Jim when working in that role..

Bev Boli will take over responsiblity for Development documentation from Dirk in July while Dirk takes on new responsibilities helping launch a DPCS community. There will be other changes in time as we get our talents and roles more lined up with our increasing responsibilities with more Development clients and strengthen our ties with the Applications side of the house.

1

RWW 21-MAY-75 19:55 25908

changes in roles in Development

(J25908) 21-MAY-75 19:55;;;; Title: Author(s): Richard W. Watson/RWW; Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: RWW;

RWW 21-MAY-75 20:07 25909

New Face in Development

We are pleased to let everybody know if you don't already that Larry jGarlick has joined ARC and will be working in the Protocol area with Jimand Jon. He has been using DCEs office this week while we try to find a more permanent home for him. 1

RWW 21-MAY-75 20:07 25909

New Face in Development

(J25909) 21-MAY-75 20:07;;;; Title: Author(s): Richard W. Watson/RWW; Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: RWW;

COM Tapes to DDSI

These files were sent on Monday to ISI and DDSI picked them up. The one for Bell Canada has been mailed to them, and the other proofs are on their way to us.

COM Tapes to DDSI

Tape number, date tape was ready for DDSI, and person who sent tape 1

FILENAMES and person responsible for each file 1a

Tape 0005 19_may_75 POOH 2

business (pooh) 2a

summary (pooh) 2b

edit-scenario (bev) 2c

sendmail (bev) 2d

wfs (DVN for Bell Canada) 2e

POOH 22-MAY-75 11:22 25910

COM Tapes to DDSI

(J25910) 22-MAY-75 11:22;;; Title: Author(s): Ann Weinberg/POOH;
Distribution: /DMB([ACTION] dirt notebook please) DVN([INFO-ONLY]
) BEV([INFO-ONLY]) KIRK([INFO-ONLY]) JHB([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk: POOH;

DVN 22-MAY-75 11:37 25911

Standard Sample Session Format [Respons to (25907,)]

This item refers to (25891,) and (25907,). One thing I forgot in the meeting was to remind one and all that items like thes e two and 25898 etc. should go to the dirt subcollection and notebook.

DVN 22-MAY-75 11:37 25911

Standard Sample Session Format [Respons to (25907,)]

I see the Help Services Sample Session as a standard for format and a model for order of presentation and for paragraphs that are likely to appear in most sample sessions. 1

DVN 22-MAY-75 11:37 25911

Standard Sample Session Format [Respons to (25907,)]

(J25911) 22-MAY-75 11:37;;;; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /BEV([ACTION]) KIRK([ACTION]) POOH([ACTION]) DMB([ACTION] dirt notebook please) DIRT([INFO-ONLY]) ; Sub-Collections: SRI-ARC DIRT; Clerk: DVN;

POOH 22-MAY-75 13:03 25912

COM Tapes to DDSI

Just for the records: these are the tapes that have been sent to DDSI in the past few months.

COM Tapes to DDSI

Listed below is information about tapes sent to DDSI. For each tape sent, the following information will be included: 1

Tape number, date tape was ready for DDSI, and person who sent tape 2

FILENAMES and Person responsible for each file 2a

Tape 0005 19_may_75 POOH 3

business (pooh) 3a

summary (pooh) 3b

edit-scenario (bev) 3c

sendmail (bev) 3d

wfs (DVN for Bell Canada) 3e

Tape 123 8-MAY-75 04:47 KIRK 4

commands-com (pooh) 4a

bcards (pooh) 4b

testglo (kirk) 4c

Tape 121 4-april-75 KIRK 5

<arcdocumentation,gtest> KIRK 5a

Tape 0005 4-april-75 POOH 6

<userguides,commands-com,nls;> POOH 6a

Tape 0001 26-march-75 POOH 7

<userguides,commands-com,nls;10> POOH 7a

<office-1,meyer,formats,nls;1> (run with format 2) NDM 7b

POOH 22-MAY-75 13:03 25912

COM Tapes to DDSI

(J25912) 22-MAY-75 13:03;;; Title: Author(s): Ann Weinberg/POOH;
Distribution: /DMB([ACTION] dpcs notebook please) &DPCS([INFO-ONLY
]) ; Sub-Collections: SRI-ARC DPCS; Clerk: POOH; Origin: <
COM, TAPES.NLS;6, >, 19-MAY-75 18:29 POOH ;;;; ####;

testimg

nls or online system the name of the computer system you will be jusing. online means you receive immediatee feedback about what you have just typed at your terminal. 1

introduction
to junk 2

this follows insert 3

here is an insert after 2 4

NLS has facilities to let ou do almost everutihing uou need with text: 5

compost it; edit it; send it to (and receive it from) other persons; file it in one or more categories; 6

this primer deomonstrates the cmand 7

testimg

(J25913) 22-MAY-75 14:22;;; Title: Author(s): Larry L. Garlick/LLG;
Distribution: /RH([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk:
LLG; Origin: < GARLICK, JUNK.NLS;4, >, 22-MAY-75 14:04 LLG
;;;;####;

CHI 22-MAY-75 21:19 25914

Update to CML-PCP-CML data conversion Memo

Change limited to CML BLOCK and POINT selection -- probably of interest only to NLS people.

CML DATA TYPES 1

Data elements are fully typed in CML. The following describes the conversion of these data types into PCP format for passing arguments to tool/WM procedures. 1a

CML Integer -> PCP INTEGER 1a1

CML TRUE -> PCP BOOLEAN: TRUE 1a2

CML FALSE -> PCP BOOLEAN: FALSE 1a3

CML NULL -> PCP EMPTY 1a4

CML Command Word, user typein string, or #"..." literal -> PCP 1a5

LIST(%type% INTEGER, %selection% CHARSTR) 1a5a

%type will be the integer specified in the DECLARE COMMAND WORD declaration or zero if not declared (e.g. in #"any string")% 1a5a1

CML address selection -> PCP 1a6

LIST(%arg type% INDEX [=1], %entity type% INTEGER, %address% CHARSTR, ...) 1a6a

where ... denotes zero or more repetitions of the last element. 1a6a1

CML point selection -> PCP 1a7

LIST(%arg type% INDEX[=2], %entity type% INTEGER, *POINT, ...) 1a7a

Where *POINT is shorthand for 1a7b

LIST(%windowid% INTEGER, %stringid% INTEGER, %character-count% INTEGER) / CHARSTR 1a7b1

CML BLOCK (for use by tool-specific selection and parse functions) -> PCP 1a8

BITSTR 1a8a

where the length of the BITSTR will be an integral multiple of the wordsize of whatever machine the CLI is running on. 1a8a1

CML list -> PCP 1a9

LIST (*ELEM, *ELEM, ...) 1a9a

Where *ELEM is shorthand for any of the PCP data structures described above. 1a9b

When results are returned to the CLI, the following conversions will take place: 1b

PCP INTEGER or INDEX -> CML integer 1b1

PCP BOOLEAN: TRUE -> CML TRUE 1b2

PCP BOOLEAN: FALSE -> CML FALSE 1b3

PCP EMPTY -> CML NULL 1b4

PCP CHARSTR -> CML typein string (type = 0) 1b5

PCP BITSTR -> CML BLOCK 1b6

where the last word of the CML data element will be zero filled, if necessary. 1b6a

PCP LIST of above -> CML list 1b7

Any other PCP data structure will be considered illegal and ignored (with a warning message to the user). 1b8

Update to CML-PCP-CML data conversion Memo

(J25914) 22-MAY-75 21:19;;; Title: Author(s): Charles H. Irby/CHI;
Distribution: /NPG([INFO-ONLY]) KS([INFO-ONLY]) ;
Sub-Collections: SRI-ARC NPG; Clerk: CHI; Origin: <
NSW-SOURCES, CML-PCP-MEMO.NLS;2, >, 19-MAY-75 18:25 CHI ;;;;####;

DVN 22-MAY-75 22:37 25915

You don't need to rely on expert users.

Re < 32584,1e1 > ask help about "set content to" or "set content". 1

DVN 22-MAY-75 22:37 25915

You don't need to rely on expert users.

(J25915) 22-MAY-75 22:37;;;; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /JHB([ACTION]) SGR([ACTION]) DMB([ACTION] dirt notebook please) &DIRT([INFO-ONLY]) KIRK([INFO-ONLY]) POOH([INFO-ONLY]) BEV([INFO-ONLY]) ; Sub-Collections: SRI-ARC DIRT; Clerk: DVN;

JAKE 23-MAY-75 02:47 25916

Interest statement for BRL write-up

Stan, hate to publish this without an Interest statement. If you care to supply one, I need it in the next day or so. Thanks, Jake

JAKE 23-MAY-75 02:47 25916

Interest statement for BRL write-up

--USER-- 1

$$BELVOIR$ 2

##U. S. ARMY MOBILITY EQUIPMENT R & D CENTER#
##FORT BELVOIR, VIRGINIA# 3

&&FUNCTION& 3a

PDP-11->
USER COMPUTER: CDC 6600 HOST ADDR. 27 IMP 27/HOST 0 3a1

&&ADDRESS& 3b

U. S. Army Mobility Equipment R & D Center
Commanding Officer/USAMERCD
STSFB-BC
Fort Belvoir, Virginia 22060 3b1

&&PERSONNEL& 3c

LIAISON
Norman R. Kyle (703) 664-5511 or 664-5444 3c1

&&OPERATING SYSTEM& 3d

ANTS (Will probably have ELF later with SCOPE on the CDC-6600) 3d1

&&INTERESTS& Not given 3e

&&DOCUMENTATION& Not given 3f

Elizabeth J. Feinler
Stanford Research Institute
Network Information Center
333 Ravenswood Avenue
Menlo Park, California 94025

To:
Access Copy

25916

Interest statement for BRL write-up

(J25916) 23-MAY-75 02:47;;; Title: Author(s): Elizabeth J. Feinler/JAKE; Distribution: /SMT([ACTION]) ; Sub-Collections: SRI-ARC; Clerk: JAKE; Origin: < PI, BELVOIR.NLS;5, >, 23-MAY-75 02:18 JAKE ;;;;<NETINFO>BELVOIR.NLS;4, 6-JUN-74 21:17 JAKE ;####;

JAKE 23-MAY-75 02:52 25917

BRL Write-up for the Resource Handbook

Whoops, ignore last message I sent the wrong file by mistake. Need an interest statement and any other additions you care to make - but do need back in a couple of days. Regards, Jake

JAKE 23-MAY-75 02:52 25917

BRL Write-up for the Resource Handbook

--USER- 1

$$BRL$ 2

##BALLISTIC RESEARCH LABORATORIES# 3

&&FUNCTION& 3a

USER COMPUTER: PDP-11/40 HOST ADDR. 29 IMP 29/HOST 0 3a1

&&ADDRESS& 3b

Ballistics Research Laboratories 3b1

Attn: ANX BR-XA 3b2

Aberdeen Proving Ground, Maryland 21005 3b3

&&PERSONNEL& 3c

PRINCIPAL INVESTIGATOR
Stan M. Taylor (TAYLOR@OFFICE-1) (301) 278-4149 3c1

LIAISON
Donald F. Taylor (DTAYLOR@OFFICE-1) (301) 278-5871 3c2

&&OPERATING SYSTEM& 3d

ANTS 3d1

&&INTERESTS& Not given 3e

&&DOCUMENTATION& Not given 3f

25918 Distribution
Jerry Pipes,

BRL Write-up for the Resource Handbook

(J25917) 23-MAY-75 02:52;;; Title: Author(s): Elizabeth J. Feinler/JAKE; Distribution: /SMI([ACTION]) ; Sub-Collections: SRI-ARC; Clerk: JAKE; Origin: < PI, BRL.NLS;4, >, 23-MAY-75 02:49 JAKE ;;;;<NETINFO>BRL.NLS;7, 5-AUG-74 03:36 JAKE ; ####;

KIRK 23-MAY-75 05:12 25918

Mistake

25898 sent to you by mistake. 1

KIRK 23-MAY-75 05:12 25918

Mistake

(J25918) 23-MAY-75 05:12;;;; Title: Author(s): Kirk E. Kelley/KIRK; Distribution: /JP([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: KIRK;

JBP 23-MAY-75 14:21 25919

Bill Carlson visit.

Bill Carlson will be visting us the week of June 9 - 13. For Monday and Tuesday we want to set up some demonstrations and discussions. Wednesday and Thursday (and possibly Friday) Bill will be parcipating in a meeting on the NSW protocols. 1

We want to have demonstrations of the following: 1a

Graphics 1a1

Debugging L10 programs 1a2

Help 1a3

We want to schedule periods for discussion of: 1b

Protocols
Documentation 1b1

please make suggestions for additional demonstrations or discussion topics. 1c

JBP 23-MAY-75 14:21 25919

Bill Carlson visit.

(J25919) 23-MAY-75 14:21;;; Title: Author(s): Jonathan B. Postel/JBP; Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: JBP;

BEV 23-MAY-75 19:36 25920

Final Final Review of Help Services Sample Session

I am going to be sending the "final" version of the Help Services Sample Session around one more time for a quick review. I felt a little uncomfortable with some of the ambiguity in it resulting from the change to "help services." I would appreciate it if you all would look it over paying particular attention to this issue. Thank you. Bev 1

Final Final Review of Help Services Sample Session

(J25920) 23-MAY-75 19:36;;;; Title: Author(s): Beverly Boli/BEV;
Distribution: /DVN([ACTION]) KIRK([ACTION]) POOH([ACTION]) ;
Sub-Collections: SRI-ARC; Clerk: BEV;

TLH PWO DVN 17-JUL-75 11:43 25921

Version One of the Editorial Processing Center Proposal

As of July 1975 two versions of SRI' proposal to the National Science Foundation for a Editorial Processing Center had been prepared. This is the first, s]submitted in Marcn. The proposal was prepared on the Machine Aided Editing (MAE) system. The translation processes that brings MAE files to NLS do not yet create an orderly hierarchy in the NLS files and has some problems with hyphenation and the like. I (DvN) have delayed journalizing this file for some months intending to get the structure in order by hand, but it is apparent that it is no longer worth the effort so I am journalizing it as is for historical purposses. The second version is avialble as (journal, 25922,). The appedicies which, contain proprietary information, are journalized as (journal,25923,) with restricted access.

4 I ABSTRACT 4

4a SRI proposes to develop and operate an experimental computer-aided Editorial processing Center (EPC) that would be suitable for use in the publication of scientific and technical journals, in response to Category 8 of RFP NSF-74-38. The objectives of the proposed project are (1) to identify and resolve problems inherent in the computer-aided publication of scientific and technical text, and in putting actual production work through a computer-aided EPC; (2) to explore and develop the capabilities inherent in computer-aided publication for access to and dissemination of information derived from the documents produced; (3) to evaluate the economics, the reductions in time-to-publication, and the advantages offered by EPC operations. 4a

4b The approach proposed is to assemble hardware and software, inte- grate them into a system, and use the production of actual documents, with real deadlines, to guide the modifications and refinements. The emphasis of the approach will be on solving the problems inherent in the publication of any scientific and

technical text so that the resulting EPC will be applicable to a wide range of journals and to other publishers. 4b

4c SRI proposed to purchase a unit of NLS Workshop Utility Service,* and connect to that service CRT editing and page formatting terminals, input devices (including an optical character reader), and output de- vices (proof printers such as Diablo or Qume). Phototypesetting using third-generation equipment is available as a service, but a CRT type- setter may be added to the system later. 4c

4c1 * The NLS System is an advanced computer-based information system providing powerful communication, editing, and other tools. It was developed by SRI's Augmentation Research Center under ARPA sponsorship. 4c1

4d Successful operation of a prototype EPC for scientific and tech- nical documents will provide the possibility of a new mode of operation for technical and learned journals, and other publishers, along with new informmtion assembly and dissemination possibilities. 4d

5 II NARRATIVE 5

5a A. Introduction 5a

5a1 The thrust of this operational experiment is broadly to investigate and evaluate channels for more effectively disseminating scientific and technical information. The functional channel directly addressed by this proposal is the application of computer technology to solve the economic problems that have beset the scientific journal publication industry. The proposed mechanism is the establishment of a prototype Editorial Processing Center and the evaluation of this center for meeting the needs of the industry in an economically justified manner. However, the potential scope of the envisioned experiment transcends the immediate needs and goals of the publishing industry. It really focuses on the need to review and rationalize the justification for traditional channels and methods of communication. 5a1

5a2 A detailed study of existing document preparation and publication processes at SRI has recently been completed (see Appendices A-C). The study considered how these processes might be improved by the adoption of computer aids. It proposed a conceptual design for a computer-aided editorial processing system that could be used for most current SRI publications (e.g., proposals, reports, papers for technical journals), in a variety of scientific and technical

disciplines. The study brought together experience gained from over 12 years of work with computer aids for text production, both at SRI and for outside government and commer- cial clients. The conceptual design proposed for the SRI system closely resembled what has been described elsewhere as an Editorial Processing Center (or EPC) (see "Editorial Processing Centers--A Study to Determine Economic and Technical Feasibility," by Westat, Incorporated, for NSF, July 1974, PB-234 959). 5a2

5a3 Much of the software that is needed for an Editorial Processing Center has already been developed or acquired by SRI, particularly in the Augmentation Research Center. What really remains to be developed for a production system for scientific and technical text are procedures that will permit economical use of computer aids in ways that recognize the needs of authors, and that support effective interaction by authors, volunteer journal editors, and reviewers. Experimental operation of an Editorial Processing Center of the kind proposed here will permit the real-world problems posed by computer aids to be addressed, as well as allow study of the potential advantages of having a machine-readable version of each document available for secondary applications. 5a3

5a4 A number of real-world problems can be encountered with such an Editorial Processing Center: 5a4

5a4a . In text with complicated formats, extended character sets, display equations, or multiple typefaces and sizes, it is necessary to imbed formatting information within the text itself. In some cases, it is necessary to specify the typography directly, for example to specify an extended character set or a display equation. In such cases, a character string such as ".BLD=14"; together with a font specification might be used to indicate 14-point bold-faced type (the system proposed by Westat). In other cases, it is better to describe composition information indirectly in terms of function. For example, the character string ".H1"; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition. 5a4a

5a4a1 Such indirect specifications allow composition in a variety of formats without having to alter directives imbedded in the text, and are preferable to direct specifications. It may be possible to extend indirect specification to some simple kinds of display equations. Whether direct or indirect, the set of formatting directives must be logically consistent and open ended to

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

support the computer composition software and later enhancements and extensions. Because format specifications must either be captured with the text or inserted later, and then proofread, human factors are particularly important in designing directives and establishing conventions for their use. 5a4a1

5a4b . The formatting of complex tables is a formidable task, especially when the initial proof copy bears little typographic relation to the final, photocomposed version. 5a4b

5a4c . In spite of the assurances of equipment salesmen and engineers that any good typist can learn to operate a word-processing system or text-handling system in a short time, experience with existing systems indicates that this is only partly true. Even a good system makes new demands on production typists. For simple material, essentially "transparent" capture procedures, virtually identical to normal typing procedures, can be used, and learning is rapid. The computer can identify entities such as headings and paragraphs from context, and only limited use of imbedded format directives is needed during text capture. However, as complexity increases, so does the need for additional format directives. For input of complex material and for entering revisions, the typist needs skills beyond those required for normal manual typing. A new kind of typist may be needed (who may command more than the $3 per hour envisioned in the Westat report to NSF). 5a4c

5a4d . It appears that, although the ability to retain correct text in various editing passes cuts down on proofreading needs, the requirement for imbedded formatting commands may introduce new problems for proofreading. For example, some way must be provided for a proofer to check, before he sees the final page proof, that 14-point bold has been asked for (or should have been) and has been set. Frequent occurrences of directives imbedded in the text make it difficult for the proofreader, as directives must be proofed character by character. A possible approach is to produce proof copy using a device such as an electrostatic line printer that can represent different type- faces and sizes directly. Several different mechanisms for representing computer-held text are needed: a clean printout of text content only for use by authors, editors, and reviewers; a printout showing all imbedded format directives so they may be verified, modified, or added to; proof copy on which the direc- tives are invisible but the consequences

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

of all directives are clearly indicated; and so forth. The different formats needed to best support the various persons acting on the document add to system complexity, but are an important human factors consideration in system design. 5a4d

5a4e . It appears that there will be a strong need to control the number of revision passes (and versions) and to update text following approval. Some positive control system will need to be devised. 5a4e

5a4f . Experience suggests that all of the features of conventional publishing cannot be implemented with equal ease in a computer-aided system. Experimentation appears to be the best way to determine which compromises will provide the best quality of published text, and the best communication of scientific and technical information at costs acceptable to all parties. Refusal not to compromise on some points may raise costs to unacceptable levels, and other unavoidable compromises dictated by hardware and software considerationsmay be found unacceptable. Trade-offs need to be assessed in terms of dollar costs as well as procedures imposed on authors and editors. 5a4f

5a5 These problems and numerous others are pertinent to the production of scientific and technical text, whether it is in the form of a pro- posal, a report, or a journal publication. The assurances of computer professionals and conventional publishers alike cannot substitute for the experience of actual use of such a system. A computer-aided text- handling system can lower the cost and improve the quality of existing communication mechanisms. But it can also permit and encourage funda- mental changes in the way documents are created, structured, manipu- lated, and accessed, and it can support additional graphics communica- tion mechanisms. These changes can better serve the essential objective of effective information transfer. The unconventional practices of delivering information to clients (or libraries) on machine-readable media or microfilm, of selectively retrieving and disseminating information from computer files, and of on-line interactive telecon- ferencing in order to present and refine document contents, are examples of additional communication mmchanisms made possible by a computer-aided system. 5a5

5a5a 1. System Objectives 5a5a

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5a5a1 Any EPC system must satisfy five essential objectives: 5a5a1

5a5a2 (1) Significant and demonstrable cost savings in the production of the majority of publications processed. 5a5a2

5a5a3 (2) Significant and demonstrable time savings for the majority of the documents processed. 5a5a3

5a5a4 (3) Improved document quality encompassing document content, appearance, organization, style, grammar, spelling, and conformity to format and production standards. 5a5a4

5a5a5 (4) Improved management and control, so that the system facilitates, simplifies, and improves the administrative and production control over the publication and its component parts. 5a5a5

5a5a6 (5) Acceptance -- Any new system, whether computer-aided or not, should be installed with minimal disruption to existing operations and should quickly gain acceptance from users and personnel whose activities it affects. A positive attitude on the part of the affected personnel is the single most important factor in successful system installation. This is achieved only by a thoughtful design that meets real user requirments, and by careful planning and training for installation. 5a5a6

5a5b 2. System Scope 5a5b

5a6 The diversity of text processing activities at SRI is very great. The study of SRI's text processing considered publication production processes and all closely related activities for the bulk of the SRI text processing workload. This study served as the foundation upon which to produce a proposed conceptual design for a computer-aided text handling system to satisfy the requirements of most of the reports and proposals currently produced at SRI, as well as journals, brochures, other types of publications. The wide scope of SRI's effort avoids the risk of designing an EPC for a particular journal or set of journals and finding later that it cannot be easily applied to other journals. 5a6

5a7 SRI is an ideal development site and proving ground for an EPC because: 5a7

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5a7a (1) SRI has many years of experience with the design and development of a number of text-handling systems. (2) SRI has facilities, software, and personnel to support and provide building blocks for the EPC system. 5a7a

5a7b (3) SRI's document processing facilities meet all the require- ments of a model or prototype EPC -- diverse document format requirements, heavy and unpredictable document volume, large centralized editorial staff, and processing procedures that vary as significantly between divisions as they might between journals in different disciplines. The more typical current document production process at SRI is given in the flowchart in Figure 1. 5a7b

5a8 Most of SRI now uses manual methods of text production, but within the Information Science and Engineering Division, two areas make extensive use of computer aids: the Augmentation Research Center (ARC) and the Information Science Laboratory. The ARC has a large multi- terminal time-sharing system that includes extensive text handling capabilities but goes well beyond text handling per se. The system is intended to support and augment researchers and managers in all of their day-to-day work with textual information--collection, organization, collaboration, conferring, publication, and dissemination. The Information Science Laboratory uses the Machine-Aided Editor (MAE) system, implemented on a minicomputer and dedicated to development of computer aids for document preparation in production applications and environments. Both the ARC and the MAE systems are used extensively for document preparation and publication in their respective organizations, and they have evolved to their present form over a period of more than 12 years. The technology, methodology, and experience of these two organizations are the basis for the proposed EPC. SRI represents an ideal testbed for studying the consequences of introducing a computer- aided EPC into real production environments on a large scale. 5a8

5b B. Study Plan 5b

5b1 The proposed development work and experimental EPC operation would address the problems common to all editorial processing of scientific and technical text. Such problems can be well represented by the SRI project reports produced for the several NSF-sponsored projects conducted at SRI. These reports share with technical and scientific journals such common problems as formatting complex tables, solving page make-up problems (e.g., widows, rivers of white), varying publication

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

formats, and composition aids for mathematical and scientific notation. Because many of these reports are in fact submitted to technical and scientific journals, any system that supports their preparation must directly address the problems specific to journal publication. 5b1

5b1a Figure 1 5b1a

5b1b Flow of Existing Report/Proposal Production Process 5b1b

5b2 SRI has a centralized report production organization that supports the full complement of document production requirements emanating from SRI's eight research divisions. It is in the framework of this existing system that a proposed computer-aided publication process flow is pre- sented in Appendix D. The proposed system results from the study of the current system as it is described in Appendices A through C. The flow- chart shown in Figure 2 is an outline of the proposed production pro- cess. The proposed process flow is intended to address existing problems and to avoid pitfalls associated with a computer-aided approach to an EPC. It establishes requirements for computer aids and the associated data base, but does not presuppose any specific computer system or data base design. 5b2

5b3 This study plan establishes a framework for discussing specific com- puter hardware and software configurations. The features that must be present in a basic initial system are identified, and additional fea- tures and system enhancements are grouped and arranged in order of priority according to anticipated cost, value, and difficulty of imple- mentation or acquisition. A time-phased approach to implementation and installation is described that would result in an early return on invest- ment by early introduction of basic system capabilities. Subsequent sys- tem enhancements that can be made in an orderly fashion to satisfy a broader range of document production requirements are also described. The requisite data base support is described, with the steps necessary to developing the data base. Finally a detailed implementation plan is supplied. 5b3

5b3a 2. Priorities for the Study 5b3a

5b4 The following items and facilities are suggested for development of the EPC, listed in descending order of priority: 5b4

5b4a (1) A basic system intended to eliminate as many

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

manual typing steps as possible and to satisfy functional requirements of (although not necessarily support production capacity for) documents in a wide range of disciplines. Such a basic system must: 5b4a

5b4a1 . Provide for text capture to a computer file 5b4a1

5b4a2 . Support editing and modifications of the captured text 5b4a2

5b4a3 . Provide for composition and output to a small but adequate set of hard-copy devices, including at least line printers, computer-driven typewriters, and a phototypesetter. 5b4a3

5b4a4 . Be based on a thorough rationalization and systematization of all related document creation and production steps, management and control procedures, and functions. 5b4a4

5b4a4a Figure 2. 5b4a4a

5b4b (2) A supporting data base of text information whose subsequent repeated retyping can be eliminated. The initial data should include at least the following (with journal equivalents in parentheses): 5b4b

5b4b1 . Staff biographies (reviewer biographies and experience for journals) 5b4b1

5b4b2 . Project summary descriptions (abstracts of prior journal articles) 5b4b2

5b4b3 . Descriptions of the Institute, its various organizational entities, facilities, program areas, and activities (no journal equivalents) 5b4b3

5b4b4 . Other selected "boilerplate" material and commonly used contractual and legal matter (journal subscription, submission, and review policies, staff listings, and the like, published in each issue) 5b4b4

5b4b5 . Frameworks to support the writing of technical publications in the most commonly used formats and organizations (number of columns, type sizes, indents, and other for- matting information for each of the journals using the EPC) 5b4b5

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5b4b6 . Abstracts and a bibliography of previous SRI reports, proposals, related documents, and staff publications. (for journals, this kind of machine-readable data base would offer benefits that need to be explored). 5b4b6

5b4c (3) Facilities for computer entry of all (or at least selected) management and control information, and development of a basic management information system (MIS) that makes use of the collective body of this information (including reviewer experience and selection, journal page charges, control of review time and draft location). 5b4c

5b4d (4) Inclusion in, or expansion of, the EPC to support remote preparation, review and production of documents--e.g., in the SRI Washington, D.C. office (or at a remote journal office). 5b4d

5b4e (5) Gradual introduction of automated proofreading aids, extended as justified to provide editor and author support. 5b4e

5b4f (6) Study and introduction, as justified and feasible, of computer aids to support generation of more complicated scientific and mathematical notations in the body of documents (rather than treating display equations as artwork). 5b4f

5b4g (7) Study and introduction, as justified and feasible, of computer aids to illustration rendering.
These priorities reflect an emphasis on actual document production, cost- benefit justification, early return on investment, and exploitation of available technology. 5b4g

5b4h 3. EPC Development Plan 5b4h

5b5 This section is intended to serve two functions. First, it describes the EPC system implementation plan and a hardware configura- tion for basic system development. Second, it explores ways in which implementation of an EPC system can maximize use of available capabilities. 5b5

5b6 The proposed development plan for the basic SRI computer-based EPC system has four phases: 5b6

5b6a (1) Detailed system design covering procedures, forms, system hardware and software, the data base, and plans for

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

user training and system installation and operation. This activity leads to the placing of orders for selected system hardware components. 5b6a

5b6b (2) Implementation activities while awaiting system hardware delivery. 5b6b

5b6c (3) System integration and checkout following delivery and acceptance of hardware. 5b6c

5b6d (4) User training, system installation in user environments, initial system operation in a production mode, and evaluation. 5b6d

5b7 Task statements within each of these plases are delineated in Section C where schedules and manpower requirements are given. 5b7

5b8 We will set the stage for discussion of the proposed EPC by describing our counterpart to the Westat Report's maximum configuration. We will then detail a minimum scale (in terms of hardware) configuration we believe to be suitable for system testing and evaluation. Much of the equipment described in this section is discussed in detail in Appendix E to which the reader is referred. 5b8

5b9 The envisioned full-scale hardware configuration of the EPC is based on the concept of distributed processing. One central processor is employed for specialized functions, such as access to the principal data bases; control of phototypesetting and optical character recog- nition equipment; control of high speed line printers, magnetic tape input/output, centralized management and control processing, full-page format CRT editing stations; and so forth. The centralized facilities allow higher-code items to be shared by all system users. 5b9

5b10 Connected to the central processor are a number of editing station controllers. There may, in fact, be a large number of these. Typically, each editing station controller would be a minicomputer which would provide local editing and capture capabilities via a cluster of, say, four to eight CRT terminals. Also, the controller would provide for local storage of active document test, for input/output on a medium such as magnetic type cartridges, for hard copy output through a high- speed printer, such as Diablos, and so forth. 5b10

5b11 Individual configurations could differ considerably

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

without markedly different software. For example, a terminal cluster for pro- duction editing might consist of four CRT terminals of moderate complex- ity, perhaps two supporting full page formatting, but no local hard copy output. Hard copy would then be obtained from the central processor when needed. A cluster serving the needs of text capture and perfecting consist of eight simple editing terminals, a number of small on-line capture terminals, and several hard copy output devices. Some clusters might require only two or at most three of the simple terminals. Each such configuration could be tailored to local needs as well as to total system requirements. Individual editing terminals could be located at some distance from the editing cluster ccntroller to which they belong. The clusters of terminals could be replicated to provide increments of system expansion and widespread access to the system. 5b11

5b12 The central processor would have access to sufficient on-line storage to accommodate a full data base as well as all management and control files, data required to support composition and formatting, files to support OCR input, and about one month's total document produc- tion. It is emphasized that the principal function of the central procesor is to access the data. The data itself can actually reside elsewhere--e.g., some of it on a computer with a suitable data base management system, some of it off-line in archived form, and so forth. It is pointed out that data file backup is in the system. 5b12

5b13 Having described the general outline of the desirable system configuration for a full-scale EPC, we will now describe a systems approach that offers the most flexibility and the least new development work for the EPC as we envision it. 5b13

5b14 The large multi-user text-oriented system developed by the Augmentation Research Center at SRI already contains most facilities needed to support EPC operations, and many that extend well beyond the scope of the proposed experimental EPC operation. This system, called NLS, is described in the Institute Resources Section of this proposal. The system was developed under the auspices of the Advanced Research Projects Agency (ARPA) and other government sponsors, and has until recently been available only to members of the ARPA community through the ARPA Network. 5b14

5b15 ARC now makes NLS available to general users through a commer- cial time-sharing service (Tymshare). The service is

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

provided to users through "slots." One slot gives guaranteed single user access to NLS during a 16-hour operational period six days a week. The contract per- iod for a slot is one year. The slot also provides on-line storage for up to 3,000 pages of data, each page consisting of 512 words of 36-bits or the equivalent of a full typewritten page. There is access to magne- tic tape for archiving, and to text stored on host computers on the ARPA network, to which this utility version of NLS is connected. Finally, a utility slot provides microfilming and photocomposition services. 5b15

5b16 A slot can support more than a single device at the user end. Currently, ARC is developing a minicomputer-based front-end PDP-11 pro- cessor that will support an even broader hardware configuration on a single slot. This development is scheduled for operational use at about the end of the second quarter of 1975. All text data processing will be done by NLS in the central time-shared PDP-10 computer. Later, subsets of text editing commands will be provided locally in the PDP-11 front- end. NLS will then be used for access to central, shared resources such as the large data base and photocomposition services, and for the more computationally demanding functions such as composition. 5b16

5b16a Implementation Plan 5b16a

5b17 SRI's proposed approach to the implementation of an EPC is based on the use of the NLS utility in conjunction with a PDP-11 front-end pro- cessor which provides support to a group (cluster) of terminals. The configuration that results is remarkably similar in concept to the configuration described in the foregoing subsection and to parts of the intermediate and advanced systems described in the Westat report. 5b17

5b18 SRI would gain access to the NLS utility by purchasing a utility slot. Using the slot would significantly reduce implementation cost as well as speed development of the EPC and permit more experimental opera- tion of it. Initially, most processing services would be obtained from the NLS utility. The utility slot and the EPC development does not re- quire a front-end processor. Subsequently, some of the services would be implemented on the front-end processor. After local service has been established with the PDP-11, the NLS utility can continue to serve data base management and other centralized functions. The hardware required for initial service through an NLS utility is applicable to full-scale systems using front ends, and the software development can proceed as necessary

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

without the front-end processor which is currently being implemented. 5b18

5b19 Perhaps the strongest merit of this approach is that it will accelerate the upgrading of the document editing features available through NLS. NLS currently supports a full complement of text mani- pulating, editing, and formatting functions. However, only recently has NLS begun to address direcly the specific requirements of the publishing industry, and the specific NLS capabilities need further development to satisfy these needs. These functions include tab setting and tab con- trol versatility, with provision for editorial intervention, automatic hyphenation, right and left text justification, the ability to shift from two columns to one and back, support of a broader set of fonts, table generation, full-page formatting and CRT display, full in-page footnote capability, and the ability to select from prestablished document formats (with headings and footings) to obviate the need to repeatedly specify format control commands. 5b19

5b20 The system available through NLS to a single user and, through the front end, to multiple users would include most needed text-processing capabilities. In addition, the NLS utility provides access to a powerful data base management system and large amounts of on-line storage. The proposed approach optimizes use of previously developed and available hardware, software, and services. It has the additional advantage that the developers of NLS, namely ARC staff, will actively participate in the proposed project. Implementation steps associated with the develop- ment of new software and its refinement can take place independent of the delivery of the system hardware. 5b20

5b21 Thus, we propose the purchase of a slot on the NLS utility to which we attach the following peripheral devices: 5b21

5b21a 2 hard-copy printers (e.g., Qume or Diablo)
2 single-line display terminals
1 CRT editing terminal with four 3M cartridge drives
1 full-page CRT formatting terminal
1 optical character reader (off line)
1 electrostatic printer to support full-format proof copy output. 5b21a

5b22 This selection of hardware allows complete checkout and user accep- tance testing of all of the desired peripheral devices for a full-scale EPC serving several large technical

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

journals as well as evaluation of photocompostion services and equipment (see Figure 3 for the described configuration). 5b22

5b23 By reducing the amount of hardware to be integrated and the re- quired software development, greater effort can be devoted to procedural and operational studies, accumulation of user experience, and identifi- cation of the problems associated with introducing computer-aided EPCs into formerly manual environments. Thus, the unique aspect of this project will be not the development of viable hardware or even software, but the application of the EPC realization to actual production work, with the associated deadlines, complications, and proofreading problems that would be entailed in journal productions. 5b23

5b23a Figure 3.
The Data Base Facility 5b23a

5b24 The Westat report places the data base that we envision for the EPC at a later stage of EPC development. However, a data base that supports EPC operation is considered an integral and necessary part of SRI's total system concept. The degree to which such a data base would support journal publication is not known. However, it is possible that the existence of a computer-accessible data base with detached cataloguing may enable an EPC for a group of related journals to take on a new information-brokerage function not now performed. Whether this is possible or desirable is beyond the scope of the proposed project to establish; however, SRI staff members who work on journals, whether as reviewers or editors, will be asked to comment. The data base will include the following: 5b24

5b24a (1) Full text of documents--The full text of all documents and publications prepared in the EPC will be stored for further use. Text does not need to reside in on-line computer storage; it can be archived on magnetic tape and on micro- film. When the likelihood that the text will be reused in a different form has diminished because of the passage of time, the magnetic tape can be erased and a microfilm (or microfiche) version retained for reprinting as needed. 5b24a

5b24b (2) Document indexes--When a group of journals share an EPC, then a union index of all documents prepared at that EPC begins to take on a new and different value, at least if the journals are somewhat related in discipline (e.g., histology, cytology, cyto-chemistry, neurochemistry). One

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

possible use for such a union index might be as resource for the preparation of overview articles assessing a year's work. Another possible use might be in the preparation of special sets of reprints (the custom-tailored journal) to meet requests that cover information in more than one field. 5b24b

5b24c (3) Bibliography--A collection of bibliographic citations offers the possibility of setting common references (and proofing them) very rapidly. There are certain seminal references in a field that will be cited in a wide range of journal articles over a long period of time. In addition, the compilation of a collective bibliography from a group of related journals could provide a valuable resource for researchers. 5b24c

5b24d (4) Document abstracts--A computer-accessible collection of abstracts has utility for a journal in that it permits sending to a reviewer, along with a draft to be reviewed, a selection of abstracts of other journal articles on the same or similar subjects that have been published in the recent past. 5b24d

5b24e (5) Project summaries--A collection of project summaries has no obvious manual predecessor in the journal publication industry. Yet for journal publication these could facilitate subject-oriented review compendiums that would include some text describing an overview of technical accomplishments during the year, and links to various articles published on that subject. Project summaries of NSF projects on the system at SRI may well have a value to NSF that is independent of any possible value to scientific and technical journals. On a broader scale, such a computer-based source of summaries is of paramount importance to enhanced scientific and technical communication among scientists or researchers in the future. 5b24e

5b24f (6) Indices to illustrations--A collection of indices to illustrations would have possible utility for journal publication in assist in locating and retrieving stored artwork useful in other journal articles. 5b24f

5b24g (7) Standardized document frameworks--A collection of standardized journal frameworks, with column width, type size for headings, and the like would permit an EPC to map drafts rapidly into the format of the journal. A structure skeleton for certain parts of articles (e.g., abstract, bibliography) would permit more rapid composition and

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

typesetting. Standard frameworks could be of special value in an EPC serving several journals, and at SRI serving a multitude of clients, SRI divisions many of which require different formats. 5b24g

5b24h (8) Supporting data files --A number of other data files might be included in the data base that would be of utility to journal publishing. The most obvious of these is a record of each reviewer's background and experience, as well as the manage- ment and control file that shows when he received and re- sponded to review requests and what manuscripts he has previously processed. (An analogue for SRI is a Capabilities File that contains biographies of SRI researchers, along with a list of projects they have worked on.) Another data file that might be of use in journal publication would be a legal and contractual file that would include releases obtained, standard wording for releases, requests from other journals for releases and the disposition of those releases, and the like. Although initially, as these data bases are amassed and entered, access to them might be awkward for untrained personnel, the aim would be not only to amass the contents of the data bases, but to develop a method by which untrained personnel could, with the aid of tutorial helps built into the system, access the files with a minimum of effort. Existing data base management will be controlled in different ways: some information will be accessed in several ways (e.g., abstracts will be accessible by date, by subject, by author), and some in only one way (the union index will be accessible by subject).

Statement of Work 5b24h

5b24h1 SRI proposes the following four tasks: 5b24h1

5b25 Task 1--Detailed System Design--This task covers the detailed design of the system, including specification of system hardware, soft- ware, data base, procedural requirements, and plans for user training and system installation and operation. Task 1 will also include the placing of orders for selected system hardware components, and the purchase of the NLS slot. 5b25

5b26 Task 2--Implementation of the System Design--This task entails necessary modifications and additions to existing NLS software to make it usable and efficient for production work. 5b26

5b27 Task 3--Installation and Checkout--This task includes both

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

installation and checkout of the system after the hardware has been delivered, and training of production personnel in the use of the system. 5b27

5b28 Task 4--Experimental EPC Operation--This task will include the use of the EPC in actual production of reports on NSF projects (if that is indeed desired by NSF) or other projects. During this task, the system will be refined as problems are revealed. The reports prepared at the EPC will show the progress being made in the development of a usable, economical EPC. 5b28

5b29 The following elaborates on these tasks and indicates the estimated time requirements for each task. 5b29

5b30 1. General Background 5b30

5c C. Organization and Management Plan 5c

5c1 Here the phases and tasks required to develop the basic computer- aided editorial processing system are described for the purposes of establishing total levels of effort, personnel requirements, and elapsed times. Project leadership and coordination is broken out separately and requires approximately one professional half-time throughout the project. 5c1

5c2 A detailed personnel breakdown and chronological event charts summarizing the following discussion is given in Table 1. 5c2

5c2a Task 1 -- Detailed System Design 5c2a

5c3 The detailed design tasks have the objective of producing a complete, integrated detailed design for the proposed system, including all procedures, firm system hardware and software selection, and the data base. 5c3

5c3a Table 1 5c3a

5c3b ESTIMATED PERSON-MONTHS FOR EPC DEVELOPMENT BY TASK AREAS 5c3b

5c3b1 Months 1-2 3-4 5-7 8-9 10-12 Total 5c3b1

5c3c Project leadership/coordination 1 1 1 1 1 5 5c3c

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5c3d Detailed design
Procedures design 3 2
5 Software and hardware 4 --
4 Data base design 2 --
2 5c3d

5c3e Implementation
--------- Procedures and training
-- 5 -- -- 5 Software implementation
4 5 1 1 11 Accounting procedures/data base assembly 2 1 -- --
3 5c3e

5c4 Installation and testing
--------- Hardware installation and checkout
2 2 Software integration/testing
4 4 Procedures and training
4 5c4

5c5 Operation
Test operation/demonstration 7
7 Software maintenance 1
1 Evaluation 3
3 --- --- --- --- --- --- 5c5

5c5a Totals (person-months) 10 9 12 12 13
56 5c5a

5c6 Modifications to the proposed system flow will be made as appro- priate and necessary to further reduce document production time and cost, to further improve product quality, to simplify and smooth system installation and user training, and to reduce required implementation effort and hardware cost. 5c6

5c7 The refined procedural design will serve as the basis for computer software design, computer hardware configuration and selection, individual document and total system management, accounting and control procedures and mechanisms. 5c7

5c8 There will be two important products from this detailed design, in addition to the basic system designs, themselves. The evaluations of these products will constitute important checkpoints in the development: 5c8

5c8a (1) A selection of specific hardware components and vendors, allowing orders to be placed. 5c8a

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5c8b (2) A refined plan for the remainder of the development effort, showing detailed implementation and installation schedules and personnel requirements. 5c8b

5c9 The detailed design effort will require an elapsed time of four months. All tasks except completion of detailed procedural designs and job descriptions must be completed by the end of the second month, so that hardware can be ordered as soon as possible and implementation can proceed. 5c9

5c10 It is recommended that the detailed EPC design activity be staffed by the equivalent of five full-time professionals. A tentative breakdown of tasks with suggested levels of effort for the first two months of detailed design activities is as follows: 5c10

5c10a Project leadership and coordination -- 1 person-month Detailed procedural design -- 1 person-month Design of management and control procedures -- 1 person-month Design of an accounting policy and procedure -- 1 person-month Specification of location and organization -- 1 person-month Detailed software design -- 1 person-month Detailed data base design -- 2 person-months Hardware configuration and selection -- 1 person-month 5c10a

5c11 Detailed design activities will continue in the procedural area for an additional two months to detail procedures, generate work descriptions, and produce plans for system installation, conversion, and user training. These activities will require 11 person-months. 5c11

5c12 It is clear from the above description that a variety of skills and experience drawn from throughout SRI are required. Needed are: computer hardware, computer software, and data base specialists with text processing backgrounds; management science personnel with organizational and procedural analysis skills; persons intimately familiar with Report Services functions and organization; and others. 5c12

5c12a Task 2 -- Implementation of the System Design 5c12a

5c13 The implementation tasks are dedicated to the implementation of the detailed designs. The elapsed time allocated to this task area is months. The allocation is based

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

on the time required for hardware delivery after orders have been placed. That is, scheduling is such that basic implementation efforts are staffed for completion by the time the required hardware is first available for integration. It is desired to make the system available for experimental use at the earliest possible date, and the critical path seems to be hardware selection, vendor negotiations, contracting and placing firm orders, and hardware delivery times. Effort is divided into three separate task areas: procedures, software development, and accounting policy and data base preparation. 5c13

5c14 The procedures area is staffed at a level equivalent to two full-time professionals. The first two months are devoted to completion of the detailed procedure design, and to prepration for system installation. This involves readying locations for system hardware and personnel, establishing the required organizations, preparation for user training and initial training of key operational personnel, preparation of user manuals, and so forth. The system can be used on a test bases as soon as the hardware and the utility slot is available. The next three months are a continuation of the previous activities but hopefully with early hardware availability and early system use on a limited basis. 5c14

5c15 The software area is expected to require the equivalent of 2.5 full- time professionals. Individual assignments are planned as follows: 5c15

5c15a Text capture and editing -- 1/2 professional Text composition and formatting -- 1/2 professional Tables and other special support packages -- 1/2 professional The data base system -- 1/2 professional Management and control and system -- 1/2 professional integration 5c15a

5c16 This assignment is perhaps ambitious. Success requires thorough planning in the detailed design stage and use of skilled and productive programmers with appropriate experience. This effort must be directed and staffed by individuals who have been responsible for implementations of the ARC utility and MAE text processing systems. 5c16

5c17 The data base assembly and capture activity requires the equivalent of one-third of a full-time individual: staff members with editorial backgrounds are required to cull sources, assemble material, ensure conformance to standards,

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

and so forth; and a typist to capture assembled material is also required part-time. 5c17

5c17a At the end of this phase the first NSF review should take place. 5c17a

5c17b Task 3 -- System Installation and Testing 5c17b

5c18 This is perhaps the most critical stage of development. At its completion, the system should be operational and ready for a short period of pilot operation, after which it will be made available for broader testing and evaluation. 5c18

5c19 This activity is scheduled to take place within two months elapsed time. The activity areas are the same as for the implementation tasks, but the nature of the work changes somewhat. 5c19

5c20 The procedures area shifts markedly into the system installation and conversion tasks. The tasks would be staffed by the full complement of personnel who will become responsible for subsequent system opera- tion. It would consist at least of a supervisor and one person for management and control activities within the system. In addition, at least one professional would be assigned to training through the installation and conversion period. 5c20

5c21 The 2.5 professional staff members assigned to software development will be required for two months for testing and integration. In the final month, staffing can be reduced to one professional for final system adjustment, software refinement, and completion of remaining software implementation tasks. An additional professional would be assigned to supervise and assist in the integration of the various hardware components as they are delivered, installed, and accepted. 5c21

5c22 Data base acquisition and organization continues during the entire two months at the same staffing level as before. 5c22

5c23 During the final month of this activity, selected test users of the system would make use of the entire system on a pilot basis. This should help identify most remaining problems, smooth out procedures, identify inadequacies in training and indoctrination procedures, and so forth. 5c23

5c23a Task 4 -- Experimental EPC Operation 5c23a

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5c24 At the completion of EPC development, the basic system is opera- tional and documents will be processed on a production basis. The system operational staff will be responsible for refinements to procedures, management and control activities, and system charging mechanisms. The experimental operation of the system as a whole, on production of actual reports, including those resulting from NSF projects and the reports for the EPC project itself, will demonstrate the success of the system, and give guidance to efforts to refine it. 5c24

5c25 It is during this task that a demonstration will be conducted for NSF, interested members of the publishing industry, and other interested groups. 5c25

5c26 Meanwhile, system design personnel continue to observe production work on the EPC, not only to monitor progress and correct defects that a heavy production load uncoveres, but also to design new procedures for the production personnel so that they can attain the level of productiv- ity the EPC promises. This effort is not a training effort, but a collaborative refinement and improovement of the system. 5c26

5c27 Present systems designed for production personnel by others are often difficult to use, inconvenient, or require levels of understanding common among the design personel but uncommon among typists, editors, redactors, proofers, and authors from fields that have not made use of computer-aides in text production. Thus, the EPC is not completed when the hardware is installed and working properly, the software is completed when the production personnel have been trained to use the system as it was designed; the EPC is completed when it turns out professionally acceptable documents, when it is sufficiently easy to use that authors and production personnel alike accept it, and when the promised economies and savings of time have been realized. 5c27

5c27a Tentative System Hardware Configurations 5c27a

5c28 In configuring hardware for the EPC, there have been five basic objectives: 5c28

5c28a (1) The hardware configuration must satisfy all performance requirements of the basic system without inordinate reserves of capacity. That is, the configuration should be minimum, feasible, and realistic. 5c28a

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5c28b (2) The hardware configuration should be expandable in modest increments. 5c28b

5c28c (3) The hardware configuration should be representative, rather than the lowest-cost configuration, because it should establish budgets for hardware without constrain- ing specific hardware selection options during detailed design. Costs should be realistic and conservative estimates of what will be required to do the job. 5c28c

5c28d (4) The hardware configuration should support use of existing Institute resources for development where possible. 5c28d

5c28e (5) The hardware should be configured to ultimately offer the most flexible and broadest access to the editorial processing system. 5c28e

5c29 In selecting the hardware, the hardware and systems configurations that have been used in the existing SRI text processing systems--MAE and the ARC NLS system--have been considered. The approaches of these systems and the hardware they have chosen represent the best that is available. We propose starting with the powerful software base that has evolved from many years of testing, refining, and expanding the capabilities of these systems. The testing continues to make use of typists, secre- taries, andspecially trained control and editing personnel for further immrovement of these computer-based systems. Moreover, selection of similar hardware makes possible use of already development software. 5c29

5d D. Dissemination of Results 5d

5d1 Several ways of disseminating the results of this experiment are envisioned. First, the success of the operational center might best be demonstrated by using the EPC to produce reports for NSF. SRI currently has twelve NSF projects in-house that have completion dates in fiscal 1975. A list of these projects appears in Table 2. If we used the reports of these projects (and others that might become active during the course of the experiment) which require publication during the test and evaluation period of the project as the prime test documents, then the format handling generation, quality of product, type of font, hyphenation results, handling of footnotes, features requiring com- promise, time to generate the document, and other factors would be very visible to OSIS and to the other portions of NSF sponsoring projects at SRI.

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

In addition, we propose o report to NSF on our progress at the completion of each of the tasks during the course of the project, and in a final report. These documents will also be generated on the system when it has been implemented and is operating. 5d1

5d2 Second, after six months of EPC operation, a day-long demonstration will be conducteed at SRI, primarily focusing on the Report Services test EPC facility and how documents are produced from initial capture, through editing, to preparation of camera-ready copy. Inerested parties from OSIS, other NSF groups, journal editors, the publishing industry, and other organizations will be welcome. In addition, during the course of operation intersted parties will be welcome to visit and observe the progress of the experiment. 5d2

5d3 Third, expanding the editorial, text manipulating, and copy format- ting and output command repertoire in NLS will enhance the command base immediately available to the community of NLS users. These include members of ARPA, RADC researchers, ARC staff, and a broader set of SRI researchers. 5d3

5d4 A design documentwill be assembled from this internal development that could be redily transformed into a working description of the system, the priorities of its development, and the design rationales. Problems confronted, pitfalls encountered and suggested improvements will be detailed. A detailed phased expansion plan will also be developed.

Table 2. 5d4
NATIONAL SCIENCE FOUNDATION

5d5 TITLE END NO.	DATE	SRI DATE	START	5d5
5d6 A Study of Interconnec- 10/31/75	tion Structures for a Large Scale Microprocessor Array, Grant GJ-42696	ISU-3403	5/1/74	5d6
5d7 Hazard Priority Ranking 4/30/75	on Manufactured Organic Chemicals, P41 1151 000	ECU 3386	5/1/74	5d7
5d8 Survey of Soviet 7/31/75	Programming, GJ 41741	ISU 3226	2/15/74	5d8
5d9 Radiative and Thermal		ERU 3217	2/15/74	

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

7/31/75 Effects of Aerosol Layers, Grant GA 41787 5d9

5d10 Collaboration Research in ERU 3061 12/1/73
5/31/75 Lidar Studies of the Urban Atmosphere in the Polar Regions, Grant GV 41040 5d10

5d11 Remote Measurement of Air ERU 2687 5/1/72
10/31/75 Pollutants, Grant GI 38986 5d11

5d12 Electromagnetic Sounder ERU 2663 5/1/73
10/31/75 for Underground Archeological Exploration, Grant GF 38767 5d12

5d13 Radar Location of the ERU 8627 5/15/70
3/21/75 Auroral Belt from the Northern Magnetic Pole, GA 16269 5d13

5d14 Operation and Coordi- ERU 2251 10/15/72
3/31/75 nation of the Chatanika Incoherent Scatter Radar, Grant GA 36095 5d14

5d15 Digital System Improve- ERU 3458 6/1/74
11/30/75 ments for theChatanika Radar Facility, GA 43190 5d15

5d16 Jason Study of Micro- ERU 2517 6/19/74
8/1/75 Electronics Technology, NSF C 943
SRI PROPRIETARY 5d16

5e E. Institutional Resources and Related Programs 5e

5e1 1. Related Experience 5e1

5e1a Commercial Projects 5e1a

5e1a1 SRI has had many years of experience in the design and develop- ment of document production systems both in-house and for outside clients. One notable project for an outside client that has particular relevance here is no longer client restricted. This was the design of a complete editorial production system for Encyclopedia

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

Britannica for which the project leader was Thomas Humphrey (who will lead the EPC project). SRI documented the entire editorial process for the Encylo- pedia Brittannica, prepared a preliminary system design for an EDP aided editorial system and performed an economic comparison of the proposed EDP system versus the manual system. SRI delivered a final system design that included software, detailed hardware and software specifica- tions, personnel requirements, schedules, and milestones. SRI also assisted with the initial system implementation phase. 5e1a1

5e1a2 NLS 5e1a2

5e1a2a For more than a decade the Augmentation Research Center (ARC) at SRI has been developing computer based tools and techniques designed to "augment individuals and groups in the performance of knowledge work." Under government sponsorship, this activity has grown into what is now called the "Augmented Knowledge Workshop". Extensive documenta- tion is available which describes this effort in detail. A principal component of the workshop is an online computer system (NLS). This system provides many services for the ARC and its user community. It includes a comprehensive set of text processing capabilities but is more than just a computer text handling system. For this survey only the text processing capabilities are described. 5e1a2a

5e1a2b NLS is made up of a number of subsystems, each serving a different function within the total NLS context. The Deferred Execution (DEX) subsystem provides capabilities for preparing text offline for entry into NLS. ARC currently is using Texas Instruments TI 733 ASR terminals for capture of DEX text on cassettes. This keyboard has a different response than an office typewriter, but a trained operator can key text at relatively high rates (requiring from one half to four days training). Text may be captured on any standard teletype terminal and recorded on paper tape, or on a keyboard device interfaced to a digital cassette recorder for recording on a Philips type cassette. Some pre- entry preparation of rough draft text supports DEX capture for subse- quent NLS processing. NLS text can be highly structured in tree or outline form, and

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

representation of structure should be captured with the text. Also, NLS commands may be embedded in text during entry. DEX provided conventions for fully extended editing, operations such as deleting characters, deleting words, deleting lines, and capitalizing SRI PROPRIETARY 5e1a2b

5e1a2c text. NLS command directives are recorded during capture and performed during subsequent computer processing. 5e1a2c

5e1a2d Text may also be captured online using either display NLS (DNLS) or typewriter NLS (TNLS). Both subsystems provide interactive NLS capabilities. Online capture of text tends to be more costly than offline capture but allows the user to manipulate the material as it is captured. DEX processing, on the other hand, can take place during periods of low system usage, providing for better utilization of the system computer. 5e1a2d

5e1a2e DNLS and TNLS both offer the user an extensive set of text editing capabilities. DNLS employs a CRT display console and TNLS a typewriter terminal such as the TI-700. Both operate on-line. The command repertoires and facilities are as nearly identical as possible considering the different device characteristics. DNLS provides rather more effective user feedback, and certain operations--such as selecting a character or word in the text--are simpler than with TNLS. The following discussion addresses the DNLS subsystem, but virtually all of the features described are also provided in TNLS. 5e1a2e

5e1a2f With DNLS, a comprehensive set of text manipulating commands are provided: the user can delete, replace or insert. Activities take place on naturally defined units such as characters and words as well as NLS-structured units such as statements and groups. Macro-editing com- mands include move, copy, transpose, and set case. Several techniques exist for format control. The way in which text is represented on the display (margins, character sizes, etc.) may be defined by the user. The way in which statements are numbered provides some formatting con- trol. The structuring of tables, however, has presented problems to NLS users and appears to be a time-consuming

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

activity. Tab setting conven- tions, for instance, are nearly nonexistent. Training time estimates range from two to three days for a user with previous exposure to computer aids, to several weeks for persons who have great difficulty adjusting to a man/machine environment. (Training time would not include training on the more sophisticated NLS facilities.)

5e1a2f

5e1a2g One of the strongest features of DNLS is its development of display techniques. Several display devices have been used successfully by ARC, both ARC's own designs and commercially available units such as IMLAC or Hazeltine displays. A display station consists of the display, a line-processor control unit, a mouse (a cursor device for positioning and input of some control commands), and a five-finger keyset (for one- handed character input). Both the mouse and the keyset were developed at SRI for interactive processing. The mouse is especially significant. It allows the user to "point" to any character on the display much more naturally than the typical four-directional, character-step cursor control provided with commercial units. The user defines "viewspecs" that control the way material is presented on the display. For example, SRI

5e1a2g

5e1a2h he may split his viewing screen into as many as eight subscreens, each presenting a different portion of text that can be operated upon independently. The user also has a variety of methods with which to move through the text he is addressing. An author may link his document to several others: a single command will "take" a reader to any of the cited references; another command will return.

5e1a2h

5e1a2i Hard copy of an NLS file may be produced on an upper/lower case line printer or directed to the Output Processor. The Output Processor is an NLS program which formats an NLS file according to instructions (directives) embedded within the text. A total of 186 directives are recognized by the Output Processor including font size, style definition, and page numbering. The Output Processor can direct output to hard copy devices such as the line printer or even to a microfilm phototypesetter, where either

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

Xerox proof copy or high-quality camera-ready masters can be generated. Although complex phototype- setting can be produced in this manner, proofing and editing the embedded Output Processor directives becomes increasingly time-consuming as the output directives become more complex. 5e1a2i

5e1a2j The Output Processor possesses great depth and flexibility within a somewhat limited range of capabilities. It is intended for use with NLS structured files and NLS formats, and for these it is extremely powerful. When some other format is required, use of the Output Proces- sor is less natural. It cannot, for example, accommodate footnotes or tables in a generalized manner. 5e1a2j

5e1a2k The archiving and retrieval activities of NLS are extensive. Once captured text has been structured into an NLS file, the system main- tains storage control. While the file is active, it is stored online on disk. Inactive files are archived on magnetic tape and may be re-entered into the system upon request. Whenever an NLS file is modified by the user, a partial copy file is created by the system. This file will reflect all subsequent changes until the user directs the changes to be finalized. As an NLS file is revised, the system automatically assigns a version number to the new file. Files may be created in such a way as to be accessible to all NLS users, to be accessible on a read-only basis to other users, or to be totally private to a specific user. 5e1a2k

5e1a2l A utility version of NLS has evolved to support expansion of the NLS user community. This utility has been made available to a limited community for exploratory application as a multi-user, time- shared service administered by ARC. It runs on a Digital Equipment Corporation PDP-10 operating through the TENEX timesharing system, connected via an Interface Message Processor to the ARPANET. A sub- scriber to this service currently pays $40,000 yearly for a utility "slot" guaranteeing single-user access to the system sixteen hours a day, six days a week. In addition a subscriber is provided technical assistance by ARC personnel through training, documentation and

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5e1a2m consultation. The hardware and operating system is maintained and operated under contract by Tymshare, Inc. 5e1a2m

5e1a2n NLS provides a powerful and comprehensive computer-aided text processing capability, especially in its display-oriented DNLS sub- system. The emphasis on display applications by NLS developers has made this its strongest feature, but uses of hard copy are less highly developed. Page-oriented editing and tabular composition capabilities are rather limited. However, the information exchange features and additional capabilities of the ARC utility make it a powerful tool for the environment for which it is intended. It is an evolving system for a developmental environment of intellectual workers. It must be recog- nized that the ARC system is not just a text processing system. It is far more than that. The impressive repertoire of text editing commands are in fact building blocks that make possible the higher level features supporting the knowledge worker. 5e1a2n

5e1a3 Chemical Information Services (CIS) began development of their computer publishing system in 1970. The publications currently being produced with computer aids are highly technical--dealing with chemicals and the chemical industry. The content of each is unique stylistically and structurally. To date there has been no attempt by CIS to consoli- date their computer-aided text processing into a single, integrated system.
SRI PROPRIETARY 5e1a3

5e1a3a Most of their text capturing for subsequent computer proces- sing is done on Facit-Ohdner key-to-tape units. They consist of a Facit typewriter interfaced to a seven-track digital magnetic tape recorder. All keystrokes, including shifts, are recorded on the tape. These units have provided CIS with fairly poor mechanical performance, requiring frequent servicing; the six-bit character coding has also proved to have disadvantages. The recording unit seems to be sensitive enough to cause problems when more than one operator is using the same unit. The unit requires two to three weeks use before an operator becomes proficient at text capture. 5e1a3a

5e1a3b The bulk of CIS computer text processing takes

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

place on the Institute's CDC 6400. Typically, line-oriented editing directives (change, delete or add lines, change a code on line n, etc.) are captured on magnetic tape at the Facit-Odhner for input to a series of 6400 programs. The directives are programmatically scanned for errors, usually requiring corrections to the directives, and then the directives together with the publication file are processed by a batch updating pro- gram. The result of this activity is either a revised publication or a supplemental publication which reflects the changes caused by the edit- ing directives. Proof copy is normally generated in single case on the CDC 6400's line printer. Some copy (proof and final) has been printed at Optimum Systems, Inc., a commercial computing services firm in Palo Alto, using an extended character set print train originally developed at SRI. A line printer with this train is now available in-house. 5e1a3b

5e1a3c Two CIS publications are phototypeset by a commercial firm from formatted magnetic tape produced on the 6400. Another uses the line printer with the extended character set print train; output is photo-reduced and printed by SRI Report Services. Because of the good quality of the print train type face and the techniques used, the re- sulting publication is of suitable quality for commercial distribution. 5e1a3c

5e1a3d Recently the editing activity for the Chemical Economics Handbook Index was transferred to the Information Science Laboratory's MAE system. This is a move to evaluate the use of a generalized, interactive text handling system on the type of technical material published by CIS. Thus far the operation has proved to be successful, and reactions from CIS personnel have been very positive. 5e1a3d

5e1a3e The publications annually produced by CIS using computer aids include: the Directory of Chemical Producers (1350 pages) and its sup- plements; four world Hydrocarbon Reports (9 volumes of 200 pages each) and their quarterly supplements; the Chemical Economics Handbook Index (88 pages) and its monthly supplements; and the Chemical Economics Handbook Companies Index (87 pages, for internal distribution

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

only). CIS is also maintaining its client list for promotional reference and mailing on the CDC 6400 (7400 references). This currently amounts to an SRI PROPRIETARY 5e1a3e

5e1a3f annual production of approximately 4200 pages, and represents a sub- stantial committment by CIS to computer-aided text handling techniques. 5e1a3f

5e1a3g The non-generalized ("specific problem/specific solution") approach used in developing the CIS programs to date has enabled them to make a relatively rapid and productive entry into computer-aided publishing. Developmental costs for new programs using this approach will remain substantial; whereas the use of more general techniques in the future could decrease the additional cost increment necessary to expand the number of publications produced. The experience and expertise accumulated by CIS personnel during the development of their programs make them an excellent source of information concerning computerized publishing, especially when considering real-time production problems. 5e1a3g

5e1a4 Journal Editorial Consultation 5e1a4

5e1a5 As described below, SRI staff serves a broad interdisciplinary resource and talent reservoir. In the context of an Editorial Proces- sing Center as an effective channel for the efficient dissemination of scientific and technical information, SRI has a large number of staff members in every division, representing many diverse research disci- plines, who participate in a number of capacities on the editorial staffs of scientific and technical journals. 5e1a5

5e1a6 It is anticipated that these staff members would contribute to all phases of the EPC experiemtn in particular representing the special- ized interest, viewpoints and problems of the journals for which they provide editorial or review services. In this way we would be assured of avoiding loss of vision and scope pertaining to the journal publica- tion world. 5e1a6

5e1b Machine-Aided Editing (MAE) 5e1b

5e1b1 MAE is a minicomputer-based (PDP 11/20) text

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

editing system developed in the Information Science Laboratory. Its primary function is to provide an environment for the development of production-oriented text handling techniques and to demonstrate the application of these techniques to potential clients. A growing portion of MAE activity has been devoted to report preparation by SRI staff. For example, most reports generated by the Information Systems Group are processed through MAE, and other groups such as Chemical Information Services are working with ISG personnel to utilize MAE for production text handling. 5e1b1

5e1b2 Draft material is usually captured offline on a special typewriter-recorder. This is a standard IBM Selectric typewriter, fitted with a Tycom baseplate interface and ICP Termicette digital cassette recorder. From 50,000 to 75,000 characters (20 to 30 pages) can be recorded on a standard Philips-type cassette. The design goal has been to provide transparent text capture during conventional secretarial activity. Additional activities necessary to operate the cassette recorder are minimal. The standard keyboard response has not been altered, allowing capture at the typist's normal speed without operator accommodation. This station is intended only for text capture (and ultimately text output); all editing (other than backspace) is deferred until subsequent online activity. There is no special preparation or marking of the rough draft before capture. Only minimal training (one day or less) is required to operate the unit efficiently, and it is portable. 5e1b2

5e1b3 Text may be also initially captured online using the inter- active facilities of MAE. Although this allows the user all the editing capabilities of MAE to format or organize the text during input, it is slower and generally more costly than offline capture. In addition to SRI PROPRIETARY 5e1b3

5e1b4 these two capture mechanisms, MAE accepts input through any of its I/O media (see below) if formatting and character coding are compatible. 5e1b4

5e1b5 Several storage media are available to the user. The most commonly used medium is a removable disk cartridge holding over 2 million characters (about 1000 pages). Other options include cassette, 9-track magnetic tape, DECtape, paper tape, and cards. The current

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

hardware configuration allows access by only one user at a time. However, a multi-user, time-shared environment would be possible through only minor system modifications. 5e1b5

5e1b6 The main component of the online environment of MAE is a high performance Vector General CRT display. It is a full graphics display with a frame capacity of 6,000 to 7,000 characters, allowing the user to view an entire page (typically an 8-1/2 by 11 single-spaced typewritten page) of text. The keyboard includes a standard ASCII character set as well as a repertoire of control keys. As with most display keyboards, response differs markedly from a standard typewriter keyboard. Also provided are a mouse and a five-finger keyset as described in the NLS discussion. 5e1b6

5e1b7 MAE is designed to be highly tutorial in operation. The display always gives a clear indication of what the next user activity should be during any sequence of operations. (The new version of NLS also provides extensive tutorial aids.) A command "menu" or table may be displayed, allowing the user to select any command by pointing to it with the mouse (cursor) or keyboarding the desired command mnemonic. The selected command is then intensified on the menu for the duration of that operation. Additional graphic techniques are used to reflect mouse, keyboard, and cursor activities, all providing explicit feedback to the user. These features aid the novice and casual user. 5e1b7

5e1b8 MAE offers a variety of commands to perform micro-editing or text manipulating. One may insert, replace, or delete any user-denoted string of characters, as well as change the case of text. Macro-editing of the text is accomplished through the use of move and copy commands. The user may view any portion of his text by moving through the MAE file with page jump commands (forward and backward page, jump to first or last page, or jump to a specific page). MAE also allows the user to search the body of his text for defined strings or to automatically page through his text at specified rates. 5e1b8

5e1b9 Structural editing is possible in MAE through the use of tabs and page size definitions. The user may set the page width (in number of characters) and page size (in number of lines), as well as define tab stops for the

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

entire document. Structuring many tables or resetting margins within a document may require some ingenuity, however. 5e1b9

5e1b10 All editing activities during a session take place on a working copy of the user's text. When explicitly directed to do so, MAE SRI PROPRIETARY 5e1b10

5e1b11 creates a permanent copy of this temporary file and transfers the original file to a backup status. The user is expected to name each file and is responsible for his own text archiving. File naming con- ventions and I/O directives are derived from the PDP-11 file handling utility, making them slightly stylized. Text file sizes as large as one million characters (about 500 single spaced typewritten pages) can be processed effectively by MAE. 5e1b11

5e1b12 Several output options enable the user to produce hard copy for proofreading. For example, one format is identical to final copy, but the text is double-spaced on double length pages. This provides space on the copy for mark-up but still allows true structure and page editing together with content review. When proofing material on-line at the display, the user may view otherwise transparent control char- acters (spaces, tab stops, form feeds, etc.) by setting a console switch. 5e1b12

5e1b13 MAE has the capability of directing text to a variety of hard copy output devices. Text may be transferred to a cassette for playback at the IBM Selectric station using any of a selection of type spheres. Output may be produced on a medium-speed 96-character (upper/lower case) line printer. Output from MAE on magnetic tape can be directed to a commercial photocomposer to produce high-quality, camera ready masters. A MAE text file can be output on a medium acceptable to another external device for hard copy production (e.g., to cassette for transferral to the ARC utility for transmission over the ARPANET). 5e1b13

5e1b14 MAE is a fairly powerful page-oriented text editing system. The approach has been to create an easy-to-learn machine-aided environment for processing. The offline text capture activity is designed to enable secretarial personnel to enter text effectively with minimal training and without transitional difficulties.

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

The tutorial approach used in the online portion of MAE allows the novice user to accomplish his editorial goals with relative ease. But MAE is a developmental system for the exploration of a specific set of text production problems; it is not intended to be either general purpose or used directly in a production environment in its current implementation. It might be best characterized as a prototype of a production system, one that addresses specific application areas for which there are demonstrated needs but no current commercial offerings. 5e1b14

5e1b14a CIS Computer Publishing System 5e1b14a

5e2 2. General Capabilities of SRI 5e2

5e2a Stanford Research Institute (SRI) is an independent, nonprofit corporation performing a broad spectrum of research, consultation and other professional services under contract to business, industry, and government. Most of SRI's work is directed toward problem solving rather than research in the abstract. SRI has developed a capability for working with a client organization, understanding its problems, and structuring a responsive program of professional services that provides realistic solutions to those specific problems. Typically, SRI has 800 to 1,000 active projects at any one time that produce a total annual business volume of approximately $70 million. The staff of Stanford Research Institute numbers over 2,900. There are more than 350 Institute staff members who hold Ph.D. degrees, over 450 with Master's degrees, and approximately 800 with Bachelor's degrees. SRI's profes- sional and technical staff includes engineers, physicists, chemists, 5e2a

5e2b biologists, and metallurgists, economists, psychologists, market analysts, educators, and many others representing a variety of pro- fessional and technical skills. 5e2b

5e2c SRI's research facilities include more than 1 million square feet of office and laboratory space and incorporate the most advanced scientific equipment including unique instrumentation developed by the staff. The bulk of these facilities and most of the professional staff are located at the Institute's headquarters at 333 Ravenswood Avenue in Menlo Park, California. 5e2c

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5e2d Facilities at SRI's main offices include extensive data pro- cessing, library and laboratory support. The comprehensive technical libraries are well supplied with literature in the fields of document generation and handling systems analysis, computers, coding, and manage- ment control systems. The libraries have trained personnel to provide support for research activities through literature searches and the acquisition and distribution of technical documents. In addition, SRI professionals have direct access to the libraries of Stanford University and the University of California. Through interlibrary loan arrange- ments, the staff has access to university and technical libraries throughout the United States. In addition to its home offices in Menlo Park, California, SRI maintains a major office in Washington, D.C., as well as in four other major cities of the United States and in five major foreign capitals, including London and Tokyo. SRI also is repre- sented in five other European countries. 5e2d

5e2e There are 17 in-house computer systems at SRI. These include a CDC 6400, a B6700 dual processor system, and two PDP 10s. Each major system contains random access memory units, and several have on line inter active graphic terminals. Job processing can be accomplished in batch mode or on line in time-sharing mode. Besides its own facilities, SRI has ready access to numerous other nearby computer facilities, including various IBM, DCD, and Univac systems. 5e2e

5e2f Research operations at SRI are organized into eight divisions representing major disciplinary fields, as shown in Figure 4. Overall super vision of research is vested in the Office of Research Operations which reports directly to the Office of the President. Both formal and infor mal arrangements of long standing exist to facilitate interdis- ciplinary research and cooperation between the divisions and their subgroups. 5e2f

5e2g Staff members for this study will come primarily from the Information Science and Engineering Division. 5e2g

5e2h Figure 4 Organization of SRI 5e2h

5e3 3. Information Science and Engineering Division 5e3

5e3a The activities of the Information Science and Engineering Division (Figure 5) are carried out in three

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

laboratories and four research centers. Each of the laboratories is composed of a number of groups with complementary interests and skills. The Information Science Laboratory is predominantly oriented toward research and development of techniques of broad applicability, focusing on the design and development of computers, computer programs, and computer systems. The Augmentation Research Center is the core, a continuing development effort toward a broad based computer support system that improves effective utilization of the human intellect in a highly communication oriented society. 5e3a

5e3b Work on the proposed research project for NSF will be concentrated in the Information Science Laboratory of the Information Science and Engineering Division and the Augmentation Research Center. 5e3b

5e3b1 Information Science Laboratory 5e3b1

5e3c The diversified activities of the Information Science Laboratory include both fundamental research and applications of information systems. Research performed by the Computer Science Group is in computer architecture, programming, and other aspects of computer design, primarily for U.S. Government clients. The Information Systems Group undertakes information systems design projects for both government and industrial clients. Applications vary over a wide range of computer- based information systems, including information systems design and evaluation. The Transportation Engineering and Control Group applies advanced engineering techniques to the development of system control and operating policies for both air and ground-based transportation systems. The research and the applications work are complementary; each benefits from the other. In addition, members of the Information Science Labora- tory routinely work with professionals from other parts of SRI on inter- disciplinary research teams composed to best meet specific client needs. 5e3c

5e3c1 Information Systems Group 5e3c1

5e3d The Information Systems Group is engaged in the analysis, design, and evaluation of computer-based information systems. Its research programs have both applied and basic components, being directly concerned with the development of improved analysis, design, and evaluation techniques. The group's work has a strong multidisciplinary

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

character. Detailed knowledge is required of the current and projected state of the art for computer and communications hardware and software. At the same time, considerable skill is required in the application of tools such as computer program specification and generation, system- queuing theory, simulation, evaluation, and optimization methods. 5e3d

5e3d1 SRI PROPRIETARY 5e3d1

5e3d2 Figure 5 Organization of Information Science and Engineering Division 5e3d2

5e3d2a SRI PROPRIETARY 5e3d2a

5e3d2b Information Systems Development 5e3d2b

5e3e The Information Systems Group has pioneered the design of a number of large-scale data processing systems in such diverse areas as banking, transportation, medical services, education, process control, computer-aided design, and military operations. The work has covered a wide spectrum, from the preparation of performance specifications to the actual implementation of systems, including the preparation of all necessary software and procedures. 5e3e

5e3f The design process is composed of three distinct phases. In the first phase, the system goals of the user are translated into a set of realistic economic, technical, and procedural require- ments. Such requirements become the basis for the second phase, overall system design. During the second phase the properties and interconnec- tions of major system components are determined for items such as com- puter programs, input and output devices, data converters, memory de- vices, arithmetic units, communication lines, and display devices. In the third and final phase, the performance of the proposed system is evaluated with respect to such factors as response time, accuracy, reliability, security, cost, and other factors. These three phases-- requirements, design, and evaluation--compose a loop that may be traversed many times, each iteration providing an increasingly refined system design. 5e3f

5e3g The group has an extensive capability in the design of software for digital computing systems and the management and use of such systems. Group personnel have performed

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

overall designs for large and advanced software systems including language compilers, computer operating systems, and file-management systems. A major emphasis is placed on adopting a suitable philosophy for the design at the start of a project and applying it systematically throughout the entire design and imple-mentation effort. Techniques that contribute to correctness of code, the mobility (convertibility) of programs, and documentability of programs are stressed. Techniques used and directions taken in an implementation are chosen according to a software development plan that is consistent with a previously developed overall design. In recent work, particular emphasis has been placed on language characteristics that contribute to program correctness and the correct execution of programs. 5e3g

5e3h The group has demonstrated competence in applying advanced analysis techniques to determine a client's current system performance characteristics and to provide the basis for the design, implementation, and operation of future systems for the client. Applica- tion of these analysis techniques to a particular system problem may yield several results that will benefit the client in understanding and dealing with his problem, such as: 5e3h

5e3h1 SRI PROPRIETARY 5e3h1

5e3h2 . A better understanding of the present system behavior, including critical and sensitive system parts and marginal regions of performance 5e3h2

5e3h3 . A synthesis of an improved system design that will ensure better performance 5e3h3

5e3h4 . A formula for determining the best sequence of decisions at the various decision or control points in the system. 5e3h4

5e3i The Information Systems Group does research on techniques for testing software systems. This work extends from theoretical investigations such as proving correctness of individual algorithms and the development of practical schemes for testing very large systems. The group also develops software performance tests and acceptance tests and analyzes and evaluates the results of such tests. The group frequently serves as an independent monitor, consultant, or advisor on behalf of clients for whom a software development

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

project is being done by another party. The group assists in the management and organization of software development projects. Work in this area includes development of software standards, development of software configurations, management procedures, and recommendations for organization of resources and manpower. 5e3i

5e3i1 Text Processing 5e3i1

5e3j The Information Systems Group is also involved in the design and development of a variety of text-processing and document- production systems. Past efforts have ranged from simple single- terminal systems to complex multiterminal editorial production systems operating within a distributed computer network. These efforts have encompassed a variety of facets of the process, including data capture; processing, editing, and formatting; and document output. 5e3j

5e3k The work of the group ranges from the design and development of such systems (hardware and software) to the implementa- tion of those systems into a client environment, including such consider- ations as staffing levels, training requirements, and scheduling. In conducting text processing developments the group works closely with other groups within the Institute, particularly the Augmentation Research Center within the Information Science and Engineering Division. 5e3k

5e3k1 Augmentation Research Center 5e3k1

5e3l The Augmentation Research Center (ARC) consists of a staff of about 30 researchers dedicated to the concept taht the resources available in man's mind are the most valuable assets to be fully realized in this society. This premise has been the primary motivation for the development and growth of ARC over its 12-year history. Here computer systems and services (collectively called NLS), SRI PROPRIETARY 5e3l

5e3m are designed and implemented for assisting researchers, programmers, etc., in performing, organizing, and communicating through text. They are also effective in balancing man's ability to process thoughts and ideas by providing fast visual feedback of information maintained in a hierarchically structured form in any level of detail and from many different points of view. This organization permits more rapid assimila- tion of concepts on various

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

scales of the rapid transmission of this material to the appropriate level of detail to the desired audience. NLS reduces the time and effort of communication because computers perform the necessary manipulations, reconstructions, and transmissions. 5e3m

5e3n Internally the NLS software is grouped into subsystems that briefly perform the following asks: 5e3n

5e3n1 . Maintains a hierarchically structured file system 5e3n1

5e3n2 . Supports interactive devices (the two-dimensional CRT display, and the teleprinter) 5e3n2

5e3n3 . Passes commands for various subsystems 5e3n3

5e3n4 . Edits and manipulates text and data structures 5e3n4

5e3n5 . Formats, processes, and outputs hard copy or microfilm from a number of text input sources, in particular files. 5e3n5

5e3o The subsystems all support a powerful complement of commands to perform the necessary functions. Examples of specific capabilities are the ability to divide a display screen into up to eight parts to display portions of up to eight files simultaneously, and automatic index generation for a data set such as author, title word, date of publication, sponsoring organization, etc. 5e3o

5e3p Likewise, NLS contains capabilities to edit, modify, cross reference, and cross copy text or larger blocks of information in continuous or hierarchically leveled blocks. It is in the context of these services that ARC has been performing experiments on several fronts. These focus on: 5e3p

5e3p1 . The impact of prolonged, intense human-display terminal and human-typewriter terminal interaction on the ARC community. 5e3p1

5e3p2 . The pursuit of channels for integrating and coordinating individual efforts into a true work team (and work community) through the NLS interface. 5e3p2

5e3p3 . Man's ability to adapt continuously to an

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

increasingly effective use of these services and communication mechanisms via a computer intermedia. 5e3p3

5e3p3a SRI PROPRIETARY 5e3p3a

5e3p4 . The refinement and hierarchical expansion of the system to accommodate an increasingly broader set of services and capabilities. 5e3p4

5e3p5 . Expansion of the user base to a distributed nationwide R&D community linked through a computer network. 5e3p5

5e3p6 . Systematic improvement of the process of creating, publishing, and maintaining offline documents through NLS techniques. 5e3p6

5e3p7 . The ultimate realization of a fundamental framework based on a distributed computer network accessed by researchers, scientists, programmers, managers, engineers, professionals, in any discipline, on a nationwide basis, and providing support for planning, designing, writing, communicating, filing, coordinating, and reporting while maximizing effective software and hardware utilization through network-wide resource sharing. 5e3p7

5e3q A brief description of some of the accomplishments of ARC over the past 12 years will attest to the progress that has been made toward the above goals. 5e3q

5e3q1 1) Early explicit recognition of the potential that online computer and communication technologies have in areas outside of straight numeric or accounting computation in enhancing the effectiveness and efficiency of managers, scientists, engineers, programmers, and their supporting staffs in their daily work. 5e3q1

5e3q2 2) Development of a set of services collectively into the NLS system and participation in the implementation of the ARPANET, a nationwide network connecting over 1500 remote terminals to 35 different computers. 5e3q2

5e3q3 3) Early explicit recognition of the importance to system building of an integrated system of text handling and system building tools. 5e3q3

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5e3q4 4) Publication of over 25 reports and papers on NLS concepts and National Software workshop topics and developments. 5e3q4

5e3q5 5) Demonstration to large professional meetings (FJCC 1968, ASIS 1969, SHARE 1974) to hundreds of visitors, and via film of a working prototype system. The FJCC 1968 conference was the first to show the power of coupled screens, video terminals, SRI PROPRIETARY 5e3q5

5e3q5a multiple display windows and multi-media techniques (computer output, video pictures and a voice link). 5e3q5a

5e3q6 6) Pioneered the two-dimensional text work to be the foundation of an intelligent terminal system and developed many highly interactive tools and concepts for working and browsing in an information space, such as view specifications, interfile links, split screens, cross file editing, integration of text and numeric computation. 5e3q6

5e3q7 7) Pioneered input device and work station design. Early work includes development of: video displays, mouse, keyset, desk, and workspace. More recently ARC which makes it economic for intelligent terminals to support two dimensional NLS display. 5e3q7

5e3q8 8) Pioneered in high quality formatted publication quality hardcopy, through line printers, typewriters, and COM. 5e3q8

5e3q9 9) Pioneered the concept of an integrated coherent workshop of many office tools with a uniform user interface. 5e3q9

5e3q10 10) Early experience in teleconferencing support between remote individuals and groups at coupled screens (possibly video projected). 5e3q10

5e3q11 11) Considerable experience with online information management for an office or project environment, such as memos and correspondence, full text storage and retrieval, indexing, and cross linking. 5e3q11

5e3q12 12) First with a comprehensive system for on-line message control, addressing distribution, delivery,

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

individual and group identification, cross linking, and indexing. 5e3q12

5e3q13 13) A History of quality software engineering and a leader in applying new software engineering tools to aid the system building process. 5e3q13

5e3q14 14) Over one hundred thousand hours of hands on console experience with the use of NLS technology in daily work, both at ARC and at other sites via ARPANET. 5e3q14

5e3q15 15) Recognition of the importance of integrating into the system building process mechanisms for studying and facilitating technology transfer.
a) Early application experience with the Network Information Center. 5e3q15

5e3q15a b) Pioneered the establishment of a solid user service with the NLS Tymshare operated user system. 5e3q15a

5e3q15b c) Establishment of training and other application support services. 5e3q15b

5e3q16 16) A strong early lead in getting collaboration going on TELNET, File Transfer Mail, Graphics, and other ARPANET protocols. 5e3q16

5e3q17 17) Operation of an ARPANET computer facility for several years, providing service to the ARC research efforts as well as to the Network Information Center (NIC) staff and NIC user groups. 5e3q17

5e3q18 18) TENEX development and provision of TENEX service on a temporary basis to another ARPA contractor to ease the service requirements on another Network TENEX machine. 5e3q18

5e3q19 19) Current participation in the National Software Workshop program to fully realize user transparent resource sharing in the ARPA Network. This involves: 5e3q19

5e3q19a a) Development of a minicomputer based front end that will support a powerful command meta language that will be uniform through the network 5e3q19a

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

5e3q19b b) Further enhance the document creation and document production capabilities of NLS as they pertain to various phases of software develop- ment process 5e3q19b

5e3q19c c) Improvement of services that augment software. 5e3q19c

5e3q19d d) Modification for expansion of ARPA protocols to support these developments. 5e3q19d

5e4 4. Report Services 5e4

5e4a SRI maintains a centralized Report Services organization of about 160 persons who serve all eight research divisions. Report services offers complete editorial, composition, proofreading, graphics, photographic, and press services. Within Report Services, Editing and Composition offers a wide range of services: 5e4a

5e4a1 . Technical editing, copy editing, copy marking, editing of tables and graphics. 5e4a1

5e4a2 . Writing, rewriting, abstracting, indexing, preparation of speeches, structured texts for research needs (e.g., questionnaires, experimental texts) 5e4a2

5e4a3 . Typing and proofreading of text and tabular material to prepare camera ready copy for reports, proposals, proceedings, journal papers, brochures. 5e4a3

5e4a4 . Consultation on planning and organizing documents, and managing the production of large, multidisciplineary documents in a rigid time frame. 5e4a4

5e4a5 . Assistance in the setting up and use of machine aided document production systems ranging from simple word processors (e.g., Flexowriter, Redactron) to complex computer based document generation systems e.g., Directory of Chemical Producers). 5e4a5

5e4b Editing and Composition works on more than 2,000 documents per year, or more than 100,000 pages per year. The staff of Editing and Composition consists of 19 editors (plus 9 hourly editors called in for overload or peak load work), 27 typists and 8 proofreaders. Equipment consists solely of electric typewriters and manual editing and proof-

; might be used to indicate a level 1 heading. This directive would cause selection of the proper typeface and formatting during computer composition.

reading equipment, with the exception of two word processors (Redactrons) , and can be expanded to handle almost any load. Personnel from Editing and Composition have worked on computer aided or computer based document production systems in the research areas of SRI. 5e4b

5f F. Personnel 5f

5f1 The project leader will be Thomas Humphrey, of the Information Science and Engineering Division within which final responsibility for the project will reside. Norman R. Nielsen, Manager of the Information Systems Group, will be the Project Supervisor. The key project staff required to support the proposed editorial processing center and its experimental operation will be drawn from several research divisions within SRI and from SRI's Central Support Services. On a project of this scope, such collaboration is crucial to successful implementation and operation. 5f1

5f2 In addition to full time project staff and SRI staff who join the project for short periods as their special expertise is needed, it is proposed to establish an advisory committee for the project. In this way, senior SRI scientists -- including those who maintain an active role in the publication of scientific journals -- and senior SRI administrative personnel can add their experience and judgment to the work without the necessity for an extensive (and costly) commitment of time. The proposed project advisory committee consists of: Douglas Engelbart (Director of the Augmentation Research Center), Bertram Raphael (Director of the Artificial Intelligence Center and Associate Editor and Assistant Director of the Journal of Artificial Intelligence and Ernest E. Lehman (Director of Project Support Services). Their biographies are included with those of the SRI staff members who are proposed as full time project staff, even though no formal commitment of time to the project will be made beyond participation on the advisory committee. Biographies follow. 5f2

TLH PWO DVN 17-JUL-75 11:43 25921
Version One of the Editorial Processing Center Proposal

(J25921) 17-JUL-75 11:43;;;; Title: Author(s): Thomas L. Humphrey, Pat Whiting O'Keefe, Dirk H. Van Nouhuys/TLH PWO DVN; Distribution: /KLM([ACTION] Not for the Docplan notebook) DOCPLAN([INFO-ONLY]) SRI-ARC([INFO-ONLY]) DPCS([INFO-ONLY]) ; Sub-Collections: NIC SRI-ARC DOCPLAN DPCS; Clerk: DVN;

1 25921 Distribution

1a Ann Weinberg, Thomas L. Humphrey, Jeanne M. Leavitt, Kirk E. Kelley, Duane L. Stone, Elizabeth J. Feinler, N. Dean Meyer, Dirk H. Van Nouhuys, Douglas C. Engelbart, James C. Norton, Richard W. Watson, Charles H. Irby,

1b Robert S. Ratner, David S. Maynard, Robert N. Lieberman, Sandy L. Johnson, James H. Bair, Jeanne M. Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Marcia L. Keeney, Elizabeth K. Michael, Jonathan B. Postel, Elizabeth J. Feinler, Kirk E. Kelley, N. Dean Meyer, James E. (Jim) White, Douglas C. Engelbart, Martin E. Hardy, J. D. Hopper, Charles H. Irby, Harvey G. Lehtman, James C. Norton, Jeffrey C. Peters, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor, Richard W. Watson, Don I. Andrews, Delorse M. Brooks, Elizabeth F. Finney, Beverly Boli, Joseph L. Ehardt, James H. Bair, Robert N. Lieberman, Pat Whiting O'Keefe, James H. Bair, Robert Louis Belleville

1c Kathey L. Mabrey, James H. Bair, David R. Brown, Glenn A. Sherwood, N. Dean Meyer, Kathey L. Mabrey, Norman R. Nielsen, Thomas L. Humphrey, Robert Louis Belleville, Elizabeth K. Michael, Richard W. Watson, James C. Norton, Robert N. Lieberman, Pat Whiting O'Keefe, Douglas C. Engelbart, Dirk H. Van Nouhuys, Buddie J. Pine, Andy Poggio, David L. Retz, Laura J. Metzger, Karolyn J. Martin, Jan A. Cornish, Larry L. Garlick, Priscilla A. Wold, Pamela K. Allen, Delorse M. Brooks, Beverly Boli, Rita Hysmith, Log Augmentation, Joseph L. Ehardt, Raymond R. Panko, Susan Gail Roetter, Robert Louis Belleville, Rene C. Ochoa, Ann Weinberg, Joan Hamilton, Adrian C. McGinnis