BER 8-JUN-71 8:35 7244

Current Tasks for Roger

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   You may want to discuss the estimated dates with the task's buyer and/or the other workers and/or if its a software task the Software Personnel Coordinator (me -- Bruce) as you make them. 1a1

2. Update or note any erroneous or incomplete information you see. 1b

3. Let me know about any tasks that aren't in here or have been completed. 1c

To do this, you should mark this hardcopy with the above information and return it to me - by Tuesday 6/7? -- I will take care of getting all the updating into the file itself. (by the way the file is now (MSR, Basedata,) and no longer Baserec) Feel free to come and talk with me about any of the information or process. 2

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6:2 = 2nd week June -- June 12th 4a

6/12 = June 12th -- last day in second week of June 4b

Some correspondences follow: 4c

   wks by mo/day: 6/5 6/12 6/19 6/26 7/3 7/10 7/17 7/24 7/31 8/7 4c1

   wks by mo/week: 6:1 6:2 6:3 6:4 7:1 7:2 7:3 7:4 7:5 8:1 4c2

Current Tasks for Roger

Service'Developement!	6
Hardware'Documentation> --- ??? <Martin Roger Beau?	6a
Hardware'Training> ??? ??? <Ed Martin Roger Beau Fred Jake	6b
Hardware'Doc'Standards> 5/1 5/1 <Ed Martin Roger Beau Fred	6c
TENEX!	7
Performance'Measure> ??? ??? <Don Roger Ken WHP	7a
Bryant'Diagnostics> ??? ??? <Dave Roger	7b
Remote'Printer'Study> ??? ??? <Roger	7c
Drum'Compare> 4/1 ??? <Don Ken Ed WHP Roger Dave John?	7d
Disk'Diagnostics> ??? ??? <Ken Roger? Beau?	7e
NIC!	8
NLS!	9
Dialogue'Support!	10
Management'Systems!	11
Documentation!	12
ARPA'Proposal> 5/3 6/5 <Doug Dirk Jim Dick Don Roger WHP ???	12a
RINS!	13
Software'Engineer'Augmentation!	14
Hardware'Upgrade!	15
Graphic'Hardcopy'Study> ??? ??? <Roger Walter? Bruce?	15a
Oiled'Paper'Tape> ??? ??? <Roger? Harvey?	15b
Install'Bryant> 4/4 5/2 <Ed Roger Bryant-people	15c
Remote'Terminal'Lines> ??? ??? <Roger	15d
Datatype'Study> ??? ??? <Roger	15e
More'File'Space> 7/1 12/1 <Roger	15f

Current Tasks for Roger

Collaboration!	16
Miscellaneous!	17
Programming'Course> ??? ??? <Bruce? Ed? Martin? Roger? Beau?	17a
Service'System'Operations!	18
Hardware'Maintenance> --- --- <Ed Martin Fred Jake Beau Roger	18a
New'Hardware'Surveillance> --- --- <Roger	18b
['!] OR % gets headings %	18c
(Done'Tasks)	19
	20

Current Tasks for Roger

Service'Developement! 21

Hardware'Documentation> --- ??? <Martin Roger Beau?
0 * 1 2 21a

Information: 21a1

Bring documentation on all our hardware up to date and make it complete. Martin and Beau will do documentation that serves hardware trouble-shooters. Roger will do documentation that serves programmers. 21a1a

Hardware'Training> ??? ??? <Ed Martin Roger Beau Fred Jake
1? 21b

Information: 21b1

Train Fred on Tasker and work station input devices, Martin on digital equipment, Jake on the TV equipment, Roger on Cybernex stuff and the paging box, and Beau. 21b1a

Hardware'Doc'Standards> 5/1 5/1 <Ed Martin Roger Beau Fred
Jake
2? 21c

Information: 21c1

Decide on standards of hardware documentation. The standards would be applied both to documentation done by ARC people and future contractors. 21c1a

TENEX! 22

Performance'Measure> ??? ??? <Don Roger Ken WHP
software NIC 0 # 22a

Information: 22a1

Develop tools for measuring response time and capacity as a function of the number of users, what kind of users, which drums are on, etc. 22a1a

Bryant'Diagnostics> ??? ??? <Dave Roger
software 0 22b

Information: 22b1

Diagnostics for the Bryant drum. Modify Univac diagnostics to provide a time-shared diagnostic for the Bryant. 22b1a

Current Tasks for Roger

Man-time: 22b2

1 man-week [Dave] 22b2a

Remote'Printer'Study> ??? ??? <Roger
NIC * 22c

Information: 22c1

Look at how to get files formatted here and printed at a remote site's printer. 22c1a

Drum'Compare> 4/1 ??? <Don Ken Ed WHP Roger Dave John?
software 1? 22d

Information: 22d1

Decide relative merits of Univac, Bryant, and both drums and decide which to keep. 22d1a

Milestones: 22d2

before 6/2: drum statistics collector so can run tests 22d2a

no decision will be reached before 9/1 to allow statistic gathering and to assure that the heads are not going to crash 22d2b

Disk'Diagnostics> ??? ??? <Ken Roger? Beau?
software 22e

Information: 22e1

Adding some bells and whistles to the present diagnostics for the Bryant disk. 22e1a

NIC! 23

NLS! 24

Dialogue'Support! 25

Management'Systems! 26

Documentation! 27

ARPA'Proposal> 5/3 6/5 <Doug Dirk Jim Dick Don Roger WHP ???
NIC * 27a

Information: 27a1

Current Tasks for Roger

Yhis is our proposal for the money that pays most of the bills. DCE must do most of the writing and general organization. When he has thought through the organization futher he may be able to assign subtasks to other members of the group, particuarlly describng specific, short term plans and relevant background. Dirk wrote the outline and subtasks that appear below and they are tentative. 27a1a

Buyer(s): 27a2

ARC general Operations 27a2a

Requirements: 27a3

A document that will show ARPA goals and specific plans that they are willing to endorse with money and that will not constrain ARC's future course. 27a3a

Design: 27a4

Proposal outline 27a4a

I. Introduction 27a4b

A. General 27a4b1

B. ARC 27a4b2

C. Summary of Proposed Work 27a4b3

II. Background 27a4c

III.Directions for ARC 27a4d

IV. Proposed Project Activities 27a4e

V. Cost (separate volume) 27a4f

Dates: 27a5

Writing 5/3 6/2 27a5a

Review by DCE JCN DvN 6/1 6/3 27a5b

SRI approval and review 6/4 27a5c

Costs: 27a6

in manhours (estimated by Dirk) 27a6a

Current Tasks for Roger

Doug: 90 27a6b

Dirk: 60 27a6c

Jim: 30 27a6d

typing: 20 27a6e

others: 40 27a6f

Subtasks: 27a7

Capacity'Figures> ??? ??? <Doug Dick Don Roger WHP NIC * 27a7a

Information: 27a7a1

We need $ figures for proposals to increase our capacity. 27a7a1a

Doug and Dick are to project user needs (how many people we want to support when) and Don, Roger, and Bill are to figure out what hardware additions are needed to support those users and how much it will cost to acquire them. 27a7a1b

Organization> 5/3 5/4 <Doug
* 27a7b

Introduction> 6/2 <Dirk
* 27a7c

Directions'for'ARC> 5/3 6/2 <Doug
* 27a7d

Proposed'Project'Activities> 5/3 6/2 <Doug ???
* 27a7e

Background> 5/3 6/1 <Doug ???
* 27a7f

Cost> 5/3 6/1 <Jim
* 27a7g

Review> 6/1 6/3 <Doug Jim Dirk
* 27a7h

RINS! 28

Software'Engineer'Augmentation! 29

Current Tasks for Roger

Hardware'Upgrade! 30

Graphic'Hardcopy'Study> ??? ??? <Roger Walter? Bruce?
NIC O 30a

Information: 30a1

Look at developing an in-house facility for producing text/graphic hardcopy output. 30a1a

Oiled'Paper'Tape> ??? ??? <Roger? Harvey?
NIC O 30b

Information: 30b1

The TEN's paper tape reader only likes unoiled paper tape. Our 33's only like oiled paper tape. 30b1a

Install'Bryant> h/h 5/2 <Ed Roger Bryant-people
O 30c

Information: 30c1

Connect Bryant and check out hardware. 30c1a

Sub-Contracts: 30c2

(,Bryant'System), and (,Bryant'Diagnostics) 30c2a

Remote'Terminal'Lines> ??? ??? <Roger
O 30d

Information: 30d1

Study lines, datasets, and line scanner for high speed remote terminals. 30d1a

Datatype'Study> ??? ??? <Roger
O 30e

Information: 30e1

Study the Datatype machine for possible use in a transcription service -- primarily for NIC. 30e1a

Man-time: 30e2

2 man-weeks (Roger) 30e2a

Current Tasks for Roger

More'File'Space> 7/1 12/1 <Roger
NIC 30f

Information: 30f1

Aquire access to much more file space. Possibilities include disk packs and Santa Barbara. 30f1a

Collaboration! 31

Miscellaneous! 32

Programming'Course> ??? ??? <Bruce? Ed? Martin? Roger? Beau? Fred? Jake? 32a

Information: 32a1

Give a course on how to program. 32a1a

Service'System'Operations! 33

HardWare'Maintenance> --- --- <Ed Martin Fred Jake Beau Roger
0 * 1 2 33a

Information: 33a1

Trouble-shooting, tweaking, and preventive hardware maintenance. 33a1a

Subtasks: 33a2

Bryant'Disk'Mods> ??? ??? <Roger 33a2a

Information: 33a2a1

Modifications to the Bryant disk controller to clean it up. 33a2a1a

Priority: 33a2a2

Low. It hasn't caused any problems yet. 33a2a2a

Costs: 33a2a3

1 man-week (Roger) 33a2a3a

Printer-Imlac'Interference> ??? ??? <Ed
33a2b

Information: 33a2b1

Current Tasks for Roger

Fix it so when the printer is down Duvall's Imlac isn't screwed. 33a2b1a

New'Hardware'Surveillance> --- --- <Roger
0 * 1 2 33b

Information: 33b1

Keeping an eye on new developements in hardware with an eye to their being used here. This includes such things as: display systems, shift storage, graphic hardcopy, memories, terminals. 33b1a

['!] OR % gets headings % 33c

(Done'Tasks) 34

BER 8-JUN-71 8:35 7244

Current Tasks for Roger

<JOURNAL>7244.NLS;2, 8-JUN-71 10:44 HGL ; (Expedite) Title: Author(s):
Bruce L. Parsley/BLP; Distribution: Roger D. Bates/RDB; Keywords: ;
Clerk: BER;
Origin: <MSR>JROGER.NLS;3, 8-JUN-71 8:06 BER ;

HGL 8-JUN-71 10:04 7245

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Current Tasks for Doug

Service'Developement! 6

TENEX! 7

NIC! 8

Syntax'In'Citations> ??? ??? <Dick Doug 8a

NLS! 9

Deferred'Execution> 4/2 ??? <Harvey Doug 9a

Dialogue'Support! 10

Management'Systems! 11

Roles'Developement> --- ??? <Jim Doug Ed Bruce Charles WHP 11a

List'Goals> ??? ??? <Doug Jim? Bruce? ARC 11b

Documentation! 12

ONR'Report> ??? 5/2 <Dirk Doug Jim Marilyn 12a

ARPA'Proposal> 5/3 6/5 <Doug Dirk Jim Dick Don Roger WHP ??? 12b

Rome'Report> --- 6/5 <Dirk Doug Jim Walter Don WSD Cindy 12c

RINS! 13

Software'Engineer'Augmentation! 14

Hardware'Upgrade! 15

Collaboration! 16

Miscellaneous! 17

Service'System'Operations! 18

['!] OR % gets headings % 18a

(Done'Tasks) 19

20

Current Tasks for Doug

Service'Developement! 21

TENEX! 22

NIC! 23

Syntax'In'Citations> ??? ??? <Dick Doug
NIC 2 23a

Information: 23a1

Need standard way for citations to be written so that online documents can be accessed 23a1a

Buyer(s): 23a2

ARC goal 23a2a

NLS! 24

Deferred'Execution> 4/2 ??? <Harvey Doug
software NIC 24a

Information: 24a1

Allow user to specify many commands before any of them are executed. Would be primarily used from off-line. 24a1a

Requirements: 24a2

(Journal,6936,) 24a2a

Buyer(s): 24a3

(,NIC'Stage'2) 24a3a

Dialogue'Support! 25

Management'Systems! 26

Roles'Developement> --- ??? <Jim Doug Ed Bruce Charles WHP
ARC
1 26a

Information: 26a1

Developing the internal organization of ARC and defining what kinds of roles there are to play. The idea is to design an organization and then implement it, considering the whole thing as an experiment. 26a1a

Current Tasks for Doug

Subtasks: 26a2

Describe'All'Roles> ??? ??? <Jim Doug Ed Bruce Charles WHP ???
1 26a2a

Subtasks: 26a2a1

Software'Coord> ??? ??? <Jim Bruce Charles WHP Doug ???
* 26a2a1a

Pusher'Buyer> ??? ??? <Jim Doug ???
* 26a2a1b

Assign'All'Roles> ??? ??? <Jim Doug Ed
1 26a2b

List'Goals> ??? ??? <Doug Jim? Bruce? ARC
* 26b

Information: 26b1

Try to get a complete list of ARC's goals and/or top level Buyers. 26b1a

Buyer(s): 26b2

(,Enter'BR'Buyers) 26b2a

Documentation! 27

ONR'Report> ??? 5/2 <Dirk Doug Jim Marilyn
O 27a

Information: 27a1

Final report to the Office of Naval Research. 27a1a

ARPA'Proposal> 5/3 6/5 <Doug Dirk Jim Dick Don Roger WHP ???
NIC * 27b

Information: 27b1

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IV. Proposed Project Activities 27b4e

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Introduction> 6/2 <Dirk * 27b7c

Directions'for'ARC> 5/3 6/2 <Doug * 27b7d

Proposed'Project'Activities> 5/3 6/2 <Doug ??? * 27b7e

Background> 5/3 6/1 <Doug ??? * 27b7f

Cost> 5/3 6/1 <Jim * 27b7g

Review> 6/1 6/3 <Doug Jim Dirk * 27b7h

Rome'Report> --- 6/5 <Dirk Doug Jim Walter Don WSD Cindy 27c

Information: 27c1

The report to Rome Air Development Center required by the contract that pays us. This report is for work in 1970. It was originally due in February but has been delayed indefinitely. Doug gave a guideline for writing: that we should try primarilly to produce a

document that will be useful to us as an archive of 1970. 27c1a

Buyer(s): 27c2

The report to Rome is named as a buyer in Doug's scheme of buyers (Journal,6934,2d2). 27c2a

Requirements: 27c3

The requirements are spelled out in the contract with Rome; Mil has it on file. 27c3a

Design: 27c4

The design is the outline of the document (vannouhuys,rrr,:xb) 27c4a

Dates: 27c5

Due in Rome 7/1/71 27c5a

Cost: 27c6

(in hours estimated by Dirk 5/10) 27c6a

Doug:20 27c6b

Dirk: 60 27c6c

Jim:12 27c6d

Walter:8 27c6e

WSD:4 27c6f

Don:12 27c6g

Cindy :20 27c6h

Barbara:8 27c6i

Subtasks: 27c7

Norton'Work> --- 6/2 <Jim Dirk 27c7a

Information: 27c7a1

Jim Norton needs to rework parts of the report dealing with NIC (vannouhuys,rrr,5a) ,with Desing

Team Planning (vannouhuys,rrr,7e) and with the Journal (vannouhuys,rrr.7f). 27c7a1a

Higher'Level'Processes> --- 6/2 <Walt 27c7b

Information: 27c7b1

WSB needs to complete the section on higher level processes (vannouhuys,rrr,7d). 27c7b1a

Remote'Life> --- 6/2 <WSD Dirk 27c7c

Information: 27c7c1

Dirk and WSD need to do further polishing on the account of his remote life (vannouhuys,rrr,7g). 27c7c1a

Transferring'Compiler> --- 6/2 <Don Dirk 27c7d

Information: 27c7d1

Don Andrews needs to take his section on transfer the compiler from the 940 too the 10 from rough draft to final form (vannouhuys,rrr,6b). 27c7d1a

Future'Plans> --- 6/3 <Doug Dirk 27c7e

Information: 27c7e1

Doug needs to write a section on Future plans for the summary (vannouhuys,rrr,2c) and a similar section standing alone (vannouhuys,rrr,8). 27c7e1a

References> --- 6/3? <Cindy Dirk 27c7f

Information: 27c7f1

We need to assemble them when Jim and Doug are though writing their sections 27c7f1a

Glossary> --- 6/3 <Dirk 27c7g

Information: 27c7g1

We need more and better words and to prune out old words 27c7g1a

Editing> --- 6/5 <Dirk 27c7h

Information: 27c7h1

Dirk needs to pat down the prose more, refine printing directives, and shepard through SRI review and printing. 27c7h1a

Review> --- 6/4 <Doug 27c7i

Information: 27c7i1

Doug has to read and affirm that all this is consonant with his thinking. 27c7i1a

RINS! 28

Software'Engineer'Augmentation! 29

Hardware'Upgrade! 30

Collaboration! 31

Miscellaneous! 32

Service'System'Operations! 33

['!] OR % gets headings % 33a

(Done'Tasks) 34

HGL 8-JUN-71 10:04 7245

Current Tasks for Doug

<JOURNAL>7245.NLS;2, 8-JUN-71 10:49 HGL ; (Expedite) Title: Author(s): Bruce L. Parsley/BLP; Distribution: Douglas C. Engelbart/DCE; Keywords: Baseline Record; Clerk: HGL;
Origin: <MSR>JDOUG.NLS;4, 8-JUN-71 8:44 BER ;

.PEL; .PGN=PGN-1; .GCR;

BER 10-JUN-71 15:49 7261
Comment: We are interested in ARC reaction to this Schedule and would appreciate your comments. ARC PDP-10 Normal Service Schedule
11 JUN 71 1:17PM

We are interested in ARC reaction to this schedule and would appreciate your comments.

BER 10-JUN-71 15:49 7261
Comment: We are interested in ARC reaction to this Schedule and would appreciate your comments. ARC PDP-10 Normal Service Schedule
11 JUN 71 1:17PM

Over the past several months, ARC's system service has evolved a general pattern of availability for users in general and for service system maintenance and other operations. 1

It now appears that the normal schedule of system availability should be made more explicit for the convenience of all users in planning their own use of the system. 2

The current schedule for ARC is: 3

Weekdays (Monday 00:00 to Friday 24:00) 4

00:00 - 05:00 Service System has entire system for programing 4a

05:00 - 08:00 Hardware Maintenance has 6 of 12 displays
Rest of the system is available for general use
(exception:Tuesdays DEC has system for maintenance) 4b

08:00 - 22:00 System is available for general use 4c

22:00 - 24:00 Service System has entire system for disk dump 4d

Weekends (Saturday 00:00 to Sunday 24:00) 5

System normally available for use but with higher likelihood of not being available and with slower response to calls for help. 5a

One weekend a month there will be a Disc PM which sometimes causes poor performance for some period after the system is back up. 5b

The current schedule for the Network Users is: (Pacific Coast Time) 5c

08:00 - 18:00 (weekdays) 5c1

May try weekends and other times and take your chances. 5c2

One weekend every six weeks there will be a PM on the Bryant Drum which will probably take up most of one day of the weekend. 5d

Comment: We are interested in ARC reaction to this Schedule and would appreciate your comments. ARC PDP-10 Normal Service Schedule
11 JUN 71 1:17PM

Any change from the above schedule will be regarded as an abnormal situation and will be posted on the ARC TSS/NLS chalk board and as the NIC Status Message with the NIC answering service (321-4412). 6

Users wishing to use the system during hours when it is normally unavailable may call the ARC computer room (327-4990) or the console area (327-4562) to see if they may use the system concurrently. 7

Should the system crash during such "out-of-hours" use, those at work at ARC may be called upon to restore service at their convenience, however, service system people should not be called to restart the system if they are not at ARC during "out-of-hours" periods. These are taken to be: 00:00-08:00 weekdays or 20:00--08:00 weekends. 7a

The above normal schedule and service system "coverage" should be considered to be in effect until changes are published and distributed through the Journal. 7b

BER 10-JUN-71 15:49 7261

Comment: We are interested in ARC reaction to this Schedule and would appreciate your comments. ARC PDP-10 Normal Service Schedule
11 JUN 71 1:17PM

<JOURNAL>7261.NLS;2, 11-JUN-71 9:56 HGL ; (Expedite) Title: Author(s): Ed K. Van De Riet/EKV; Distribution: Richard W. Watson, John T. Melvin, William H. Paxton, Charles H. Irby, James C. Norton, Douglas C. Engelbart/RWW JTM WHP CHI JCN DCE; Keywords: ; Clerk: BER; Origin: <VANDERIET>SCHEDULE.NLS;6, 10-JUN-71 14:29 BER ;

TNLS Course-- June 16-17

TNLS Course-- June 16-17

Arrangements 1

John will call sites on Wed. June 9 to get list of people who are coming. Mil will then make motel reservations for the people and send them a telegram giving the name of the motel. 2

Marilyn will get out the TNLS manual. 3

John and Mil will make reservations for lunch at the SRI buffet for Wed and Thurs. 4

Dirk will check to see that all the identification stuff for the journal is in and see that new NIC journal stuff works. WSD is to sen journal entry describing the new stuff. 5

Dirk will check with ED to see that the conference room is set up. 6

John will see that everyones id is in system. 7

John will ask them to bring an example short document to work on. 8

Jim will be asked to give a DNLS demo Wed at around 4:00. 9

Friday Dirk Dick and John will get together again. 10

Marilyn will be at the course to help with questions and to see the type of problems which may need modifications to the TNLS manual. 11

OUTLINE FOR THE COURSE (Draft) 12

WEDNESDAY 12a

<Dick> Introduction to ARC, NLS, NIC 12a1

<Dick> Insert, Delete, Print C. 12a2

Have them work examples 12a2a

<Dick> File Structure - Statements, Branches, Groups, Plexes 12a3

Origin Statement 12a3a

<Dick> Addressing by Statement Numbers, Structurals, Control Marker 12a4

<John> Tenex Exec 12a5

<Dick> Journal 12c5

Lunch SRI Buffet 12d

<Dirk> Output Processor Directives 12d1

Extended Practice Session 12d2

At the en of the practice session they will enter the doc they have been working on into the Journal. 12d3

Demonstration using various kinds of terminals and connection over the Net. These examples should show effect of using 10 15 30 char/sec deevices. We may also want to demonstrate use of content analyzer to prepare NIC catalog etc. 12d4

TNLS Course-- June 16-17

<JOURNAL>7262.NLS;1, 11-JUN-71 9:57 HGL ; (Expedite) Title: Author(s): Richard W. Watson/RWW; Distribution: John T. Melvin, Dirk H. van Nouhuys, Marilyn F. Auerbach, Charles H. Irby, James C. Norton, Douglas C. Engelbart, Ed K. Van De Riet/JTM DVN MFA CHI JCN DCE EKV; Keywords: ;
Clerk: HGL;
Origin: <NIC>COURSE.NLS;3, 9-JUN-71 11:50 RWW ;

Catalog Requirements

Introduction 1

This document describes the NIC catalog production process presently in use, outlines problems which need solution, and an approach to their solution. This document can be used in many ways, but its prime function is to define a set of requirements for a set of tasks for which NIC is the buyer. One particular task, for automating the catalog production process, has been agreed as the place to start with Walter being the contractor. The catalog production process makes heavy use of the collector-sorter and therefore in the absence of a users guide a brief introduction to its use is given. 1a

The present tools for producing the catalog are marginal at best. It took 6 weeks to produce the last catalog. We have been working 2 weeks so far on the new one and are several days from finishing it. 2

The problems are many: 3

The system changes and then tools which used to work do not. 3a

The files are large relative to most NLS files and bad disk spots cause several hours of work to be aborted periodically. 3b

The collector-sorter is slow at present by 1 or 2 orders of magnitude for a task like this. . It can format catalog statements at the rate of about 1 1/2 statements a cpu second and sort at the rate of 170 statements a cpu minute plus an equivalent amount of disk time. For example, the recent titleword scan took 6 minutes to format and 18 minutes to sort (cpu minutes that is).There was one other person on the machine with me and the process required about 3 hours. 3c

We are presently choking trying to produce a catalog from 500 citations and its growing at a rate such that within a year we can expect several thousand citations. 3d

The process of deleting trivial titleword statements by hand will soon be unbearable. 3e

What is required: 4

The collector sorter and associated NLS processes need to be speeded up significanly. (a future task for Walter?) 4a

The system needs to change in a more orderly way. (a problem for Charles as architecture coordinator?) 4b

The disk bad spots need to be kept track of in a more timely fashion. (a problem Ken is working on). 4c

A catalog production process or subsystem needs to be created to automate the process in major functional steps and/or completely so that the ARC clerical staff can simply produce the NIC or other catalogs required by ARC. (a task being set up with Walter) 4d

The citation entry process needs to be studied to see how to keep Barbara from drowning in these things and to allow people at remote sites to enter and build their own subcollections. (a task for Jean Dick and Walter?) 4e

We need a program to keep track of the intended use of preassigned numbers.(a task for Bill D.?) 4f

The Approach to a Solution. 5

A meeting was held on June 4 with Walter and Bill Paxton to discuss the above problems. The approach decided on was that Walter will produce a design for the automation process which will be general enough to work with other ARC catalogs as well as NICs. The people who probably want to review the design besides myself are Jean, Jim N., Bill D., Charles, and Bill P.. 5a

After the automation design has been agreed upon implementation will proceed. 5b

Future catalogs using the automated scheme will be produced on weekends or evenings. 5c

When the automatic process is finished, the property list stuff Bll Paxton is working on is expected to be finished. Then we can study the collector-sorter and see how to produce a much faster version which can work with regular NLS statements and ones with property lists. 5d

After the catalog production process has been improved we can then look at the catalog input process. 5e

Collector-Sorter User Guide 6

The commands and characteristics that I know of are the following: 6a

All commands are terminated with CA. 6a1

i-initialize-the collector-sorter is not automatically

initialized and can be left in an unknown state from its last usage. 6a2

f SP-input files-After hitting an f hit a space and then type in the list of file names to be collected and/ or sorted, each separated by a space. 6a3

o-output file name-The max command to be described can result in several files being output each with a digit being appended to the name input. 6a4

l-length- This command is used with numerical sort keys of varying length, it should not be used with varying length alpha keys. 6a5

m-max length of output files in statements. 6a6

s-sort- y/n/CA. 6a7

d-delete keys- y/n/CA. 6a8

e-execute quit- CA. 6a9

g-go- CA. 6a10

v-viewspecs- 6a11

If you are only collecting and not sorting the collector-sorter ends with the message "bad file type CA". Do as told and then go out to the exec and come back into a fresh copy of NLS. Load the output file version 1 and update to version 3 and you will be ok. Its version 2 that is bad. 6b

This bug needs to be fixed before an automated process can be run. Bill D. thinks that the bug is an L IO bug. 6c

The present version of the collector-sorter seems to have a limit on the number of files which can be created before it exceeds the file open capacity of Tenex. 6d

A successful completion of a sort will leave you back in NLS 6e

Catalog Production 7

The steps required to produce the catalog are the following: 8

Check to see that all the new citations are in the master catalog. 8a

Using the program getnic and the collector sorter create a file of NIC citations. The steps are: 8b

load file <nic>prog 8b1

compile the getnic branch 8b2

e x -to get the collector-sorter 8b3

i CA 8b3a

f Sp appropriate file names CA 8b3b

o filename CA 8b3c

v iWC CA 8b3d

g CA 8b3e

On the resulting file of NIC citations one applies the following programs using the collector sorter to produce intermeiate files for the different indexes and listings. 8c

The program getrfc builds a file of RFC citations sorted by rfc number. 8c1

load file <nic>prog 8c1a

compile the getrfc branch 8c1b

e x- to get the collecto-sorter 8c1c

i CA 8c1c1

f Sp file name of nic collection citations CA 8c1c2

l CA 8c1c3

o an output fil name CA 8c1c4

v iWC CA 8c1c5

s CA 8c1c6

d CA 8c1c7

g CA 8c1c8

The program authorkey builds a file sorted by author. 8c2

load file <nic>proog 8c2a

compile the authorkey branch 8c2b

ex to get the col- sort. 8c2c

i CA 8c2c1

f SP file name of nic collection citations CA 8c2c2

o an output file name CA 8c2c3

v iWC CA 8c2c4

s CA 8c2c5

d CA 8c2c6

g CA 8c2c7

The program numberkey builds a file sorted by NIC number. 8c3

load file <nic>prog 8c3a

compile the numberkey branch 8c3b

ex to get the col- sort. 8c3c

i CA 8c3c1

f SP file name of nic collection citations CA 8c3c2

o an output file name CA 8c3c3

v iWC CA 8c3c4

s CA 8c3c5

d CA 8c3c6

g CA 8c3c7

The program titleword builds a file sorted by title and subtitle word. 8c4

load file <nic>proog 8c4a

compile the titleword branch 8c4b

ex to get the col- sort. 8c4c

i CA 8c4c1

f SP file name of nic collection citations CA 8c4c2

o an output file name CA 8c4c3

v iwC CA 8c4c4

m-set max number of statements to 2000 8c4c5

s CA 8c4c6

d CA 8c4c7

g CA 8c4c8

After the intermediate files have been created, one applies formatting programs using the collector sorter without sorting to produce the indexes and listings. 8d

The titleword index is produced in two steps: 8d1

First one applies the program for number + author or titleword formatting. 8d1a

load file <nic>prog 8d1a1

compile the fmtauthortitle braNCH 8d1a2

e x to get the colector sorter 8d1a3

i CA 8d1a3a

f SP-appropriate file names CA 8d1a3b

o-Appropriate file prefix CA 8d1a3c

m-max =2000 CA 8d1a3d

v i CA 8d1a3e

g CA 8d1a3f

Second one goes through each statement in the titleword intermediate file and deletes statements for trivial words. This process needs to change and be automated from a file accessed by a hashing scheme. 8d1b

The number listing is produced by use of the program formatter %listing format by number%. 8d2

load file <nic>prog 8d2a

compile the formatter braNCH 8d2b

e x to get the colector sorter 8d2c

i CA 8d2c1

f-appropriate file name CA 8d2c2

o-Appropriate file prefix CA 8d2c3

v iWC CA 8d2c4

g CA 8d2c5

The number index is produced by the program fmtnumber. 8d3

load file <nic>prog 8d3a

compile the fmtnumber braNCH 8d3b

e x to get the colector sorter 8d3c

i CA 8d3c1

f SP-appropriate file name CA 8d3c2

o-Appropriate file prefix CA 8d3c3

v iWC CA 8d3c4

g CA 8d3c5

The author index is produced by the program fmtauthortitle. 8d4

load file <nic>prog 8d4a

compile the fmtauthortitle braNCH 8d4b

e x to get the colector sorter 8d4c

i CA 8d4c1

f SP-appropriate file name CA 8d4c2

o-Appropriate file prefix CA 8d4c3

v iWC CA 8d4c4

g CA 8d4c5

The RFC index is produced by the program fmtrfc. 8d5

load file <nic>prog 8d5a

compile the fmtrfc braNCH 8d5b

e x to get the colector sorter 8d5c

i CA 8d5c1

f SP-appropriate file name CA 8d5c2

o-Appropriate file prefix CA 8d5c3

v iWC CA 8d5c4

g CA 8d5c5

When the above files are created one has to build headers for them for use by the output processor. This is presently done by assimilating the header from the corresponding index or listing from the last catalog and updating it. 9

When the above process is completed the listings and indexes are output for proof reading. 10

After proof reading a final set of listings and indexes with any corrections is output using a new printer ribbon and mocked up for photoreducing. The listings are to be produced in two columns, the indexes in one. 11

Catalog Requirements

<JOURNAL>7263.NLS;1, 11-JUN-71 9:58 HGL ; (Expedite) Title: Author(s): Richard W. Watson/RWW; Distribution: William S. Duvall, Walter L. Bass, Douglas C. Engelbart, James C. Norton, Jeanne B. North, Cindy Page, Charles H. Irby, William H. Paxton/WSD WLB DCE JCN JBN CXP CHI WHP; Keywords: ; Clerk: HGL;
Origin: <NIC>CATREQ.NLS;8, 9-JUN-71 11:13 RWW ;;14 JUN 71

Activity of General Research-- RE 7057

Activity of General Research-- RE 7057

<JERNIGAN>NOTE7057.NLS;1, 10-JUN-71 15:39 MEJ ; 1

NOTE RE (7057,), IN ACTIVITY OF GENERAL RESEARCH CORPORATION 1a

RWW contacted Dr. Chrisler of General Research Corporation and learned that is isn't that they have a contract from ARPA to collect its documents; rather they have an interest in learning about ARPA IPT research, and were trying to locate a ready-made collection. Call made about June 2. 1a1

Activity of General Research-- RE 7057

<JOURNAL>7264.NLS;1, 11-JUN-71 10:00 HGL ; (Expedite) Title: Author(s): Douglas C. Engelbart/DCE; Distribution: Harvey G. Lehtman/HGL; Keywords: ; Clerk: HGL;

RECEIVED AT ARC

Week Ending 4 June 1971

RECEIVED AT ARC Week Ending 4 June 1971

Periodicals 1

International Journal of Man-Machine Studies April 1971
Contains: A Man-Machine Synergistic Approach to Planning and Creative Problem Solving. Part 1. by Aiko M. Hormann. p.167-184 1a

Journal of the ACM April 1971
Contains: A Mathematical Method for Analyzing the Growth of a Scientific Discipline, by William Goffman. p.173-185. Analyses growth of symbolic logic, 1847-1932 1b

Communications of the ACM May 1971
Contains: Introduction to "Feature Analysis of Generalized Data Base Management Systems" the revised Codasyl report, p.308-318 1c

Datamation 1 June 1971
Contains: IIA and Proprietary Rights, by Phil Hirsch, p.45,47. A report of the Annual Meeting of Information Industry Association, with pros and cons of government microform publishing.
Also: TRADAR: Death of a Retailer's Dream, by Richard M. Peterson, p.34-37. Report of failure of GE - J. C. Penney store information system. 1d

Modern Data May 1971
Contains: Survey of Software Packages -- Data Base Management Systems, by Ken Falor. p.58-59
Also: Product Profile - Teleprinters, by Malcolm L. Stiefel and John A. Murphy. p.66-70, 71-76 1e

Reports 2

/Brown University/ 7065
Systems Programming Languages
R. D. Bergeron and others. 29 November 1970
Discusses criteria and describes extensible language (LSD, Language for Systems Development). 2a

CERN 7066

Graphic Display System (GD3);
CERN Computer 6000 Series Program Library
Long-Write-Up J510
A. Yule and others 9 February 1971
A subroutine package for producing graphic output. Brought back by WHP. 2b

CMU 706h

A Paradigm for Software Module Specification with Examples
D. L. Parnas March 1971
Presents method for writing specs of parts of software systems with sufficiently precision that other pieces can be written to interact without additional information. 2c

Stanford University. Computer Science Dept. 7201
Mathematical Analysis of Algorithms.
Donald E. Knuth March 1971 STAN-CS-71-206
Consists of lectures presented to International Congress of Mathematicians, 1970, and IFIP Congress, 1971, intended to popularize work in algorithmic analysis.

Efficient Algorithms for Graph Manipulation. 7202
John Hopcroft and Robert Tarjan.
March 1971 STAN-CS-71-207
Algorithms are presented for partitioning a graph into connected components, biconnected components and simple paths.

The Heuristic Dendral Program for Explaining Empirical Data 7203
Bruce G. Buchanan and Joshua Lederberg.
February 1971 Memo AIM-141
Rpt. CS-203
Use of an information processing model of scientific reasoning to explain experimental data in organic chemistry. Summary of planning, structure generation, and evaluation, and of results of the program for computer scientists. 2d

ILL

FOURUM; ILLIAC IV Users Group Newsletter

1 February 1971 No. 21 7205
1 March 1971 No. 22 7206

ILLIAC IV Research Document Abstracts 7204
1 January 1971
Citations and abstracts of all current
ILLIAC IV documents 2e

UCLA

SEX Beginner's Guide 7207
Kevin Sei 1 June 1971 Document 2
Manual for UCLA time-sharing system SEX,
offering 8K resident system, a non-resident
system containing system call
and file management routines. 2f

RECEIVED AT ARC Week Ending 4 June 1971

<JOURNAL>7265.NLS;1, 11-JUN-71 10:42 HGL ; (Expedite) Title: Author(s): Jeanne B. North/JBN; Distribution: ARC Black Board, Little Black Book, Douglas C. Engelbart/ABB LBB DCE; Keywords: ; Clerk: HGL; Origin: <LEHTMAN>REC.NLS;1, 11-JUN-71 10:23 HGL ;

RWW 11-JUN-71 13:49 7266

Questions and Comments for WSD on the Journal

Questions and Comments for WSD on the Journal

;14 JUN 71

Questions and Comments for WSD on the Journal

Questions and Comments for WSD on the Journal 2

There are a number of, what appear to me at this time as, loose ends in the complete Journal picture. This note lists them as I am aware of them today. Cleaning these up should be given high priority before June 18-stage 0. 2a

RFC's should automatically be in the NIC and NWG subcollections. 2b

The catalog entry for an RFC should be as per (journal,7241,) 2c

The format of all Journal entries should be that used in the Master Catalog. 2d

The above is required so that all the index producing programs will work. 2e

Please read the JOurnal section of the NIC TNLS Guide that Marilyn has written and give her your comments. 2f

How is group identification going to work in terms of using it and entering group ids into the id file? 2g

How or where do RFC numbers appear on hardcopy output. 2h

Please talk to Jean about the procedure for handling access copies. 2i

We need to clean up the way we are handling the Journals running out of space. Harvey has essentially lost a weeks work fixing things up by hand. The Journal is one of ARCs major research projects and NICs major service. It is therefore worth considerable effort to create the total people and computing methodology to handle the total process in a clean, efficient, reliable manner. 2j

The Journal must be able to handle several people making enties essentially simutaneously, be fast on entry, and very reliable. 2k

When people are entering new people into the id file at author or distribution time how do they specify the persons group membership? 2l

For handling preassigned numbers we have decided on the following temporary procedures and have the following questions 2m

Questions and Comments for WSD on the Journal

Network users will not bee told about being able to get numbers preassigned online. 2m1

By stage 1 there should be a lock to actually make it impossible for them to get a number preassigned as part of "novice mode" or there should be a new number system that meets the needs of Jeans manual system. This whole number keeping track of question is nontrivial and needs a thorough discussion sometime soon.. 2m2

To get a preassigned number people will call JEan as now. 2m3

Jean will get a block of NIC numbers from the preassignment process. 2m3a

Jean keeps a manual record of who she assigns numbers to and for what they are going to be used for. 2m3b

She also pairs the associated NIC and RFC numbers. 2m3c

She uses this recod to avoid multiple assignment of the same number and for later follow up purposes. 2m3d

The following questions about the present system arise 2m3e

How do users get numbers which were preassigned to Jean into the system as the system requires identification at the point of entry? 2m3e1

What if the system bombs after the number has been entered? The person entering an item can use the RFC number on the next try, but can he use the NIC number? IF he comes back in and cannot use the NIC number and then has the system assign him another one the pairing of NIC and RFC nummbers has been destroyed. How do we handle all of this? 2m3e2

AS an aside, the sorter has a bug and does not sort some of our indices in alphabetical sequence. Please look in (nic,ttlind2,) in the R sction for examples. I would appreciate your looking at this problem sometime within the next 2 or 3 weeks. Thanks 2m4

RWW 11-JUN-71 13:49 7266

Questions and Comments for WSD on the Journal

<JOURNAL>7266.NLS;1, 11-JUN-71 13:50 HGL ; (Expedite) Title:
Author(s): Richard W. Watson/RWW; Distribution: William S. Duvall,
Harvey G. Lehtman, James C. Norton, Jeanne B. North, Douglas C.
Engelbart, Bruce L. Parsley/WSD HGL JCN JBN DCE BLP; Keywords: ;
Sub-Collections: ARC; Clerk: HGL;
Origin: <WATSON>MESS.NLS;5, 11-JUN-71 12:42 RWW ;

DCE 12-JUN-71 9:55 7269

Letter: D. C. Engelbart to Professor Joseph Modrey, CODSAM Project, Purdue University.

Professor Joseph Modrey
Purdue University
Department of Mechanical Engineering
Lafayette, Indiana 47907 1

Dear Professor Modrey: 2

Attached is an accounting of expenses attributable to my visit on Thursday, June 3. 3

I am grateful for Professor Malone's persistence in prying me out of my rut and arranging the visit, and for your effective hosting of the visit. I came away much stimulated, quite delighted, and fully expecting that the future will find your group and mine in continuing communication, if not in explicit collaboration. 4

I must say that the CODSAM set up is an unusually promising one for achieving the kinds of objectives that its acronymic title declares. Being based outside the Computer Science Department is, I think, an important advantage. This statement implies no negative judgment of Purdue's Computer Science Department -- rather it stems from the fact that the proper role for computer science in what I call "computer augmented systems" is to provide the computer subsystems that support the larger scale system of concepts, methods, procedural skills, organizational structure, etc., which constitute the higher levels of an "augmented human system." Almost without fail, an endeavor within a Computer Science Department to do research in augmentation systems results in a serious distortion of the overall system in favor of the "experimental instrumentation" (the computer techniques) that should be in but the supportive role. 5

In Professor Dick Garrett, you have an unusually valuable asset for your project. Coming from a design discipline and being healthily motivated toward seeing the instruments put to work, he yet demonstrates an extremely effective grasp of the "engineering" side of the computer development world (including both hardware and software) and has collected a nucleus of young computer-systems people to support the instrumentation work that is fully on a par in terms of intelligence and dedication with any university computer-science group I know. Using a continued emphasis on improving the effectiveness of a laboratory in which to do research in "computer-oriented design, science, and methodology," this crew stands a good chance of becoming the most

effective of its kind in the country -- it's that rare to find such a combination of goals, organizational environment, and team members. 6

In Professor Malone you have an unusual combination of experience and orientation relevant to what I feel are some of the most critical aspects of augmentation systems: while being most adequately grounded in the principles of computer technology, and being also well oriented and highly motivated in seeing that this technology can be of significant help in particular design and analysis tasks, he also shows what I find much too rare in the engineering world -- a sensible and growing awareness and concern for the human aspects of augmentation systems. 7

It has become firmly established within my own framework, stemming from 20 years of persistent efforts towards creating more effective goal-oriented organizations, that all of these glorious computer aids will only begin to produce gains in human effectiveness consistent with their potential when the augmentation-systems designer comes to know how to provide for the shifts in attitudes, intrateam relationships, organizational structure, etc., that enable a group of people to work as an "augmented team". It will only be by developing coordinated changes in human organizations that the full power of the computer support systems can be harnessed by humans toward human pursuits. 7a

Here is a small item that I mention as an introductory point towards a suggestion: there was in evidence several times during the day a bit of conflict between the interests of Professors Malone and Garrett. In no sense do I consider this to be unusual or unhealthy. Rather the opposite, in fact: 8

In any "deep" discipline, I feel that there is a natural and important need for establishing recognized levels (almost "sub-disciplines"), and giving each a clear domain within a consistent framework such that a professional person can clearly take a position as "representing Level X". 8a

Here is a simple example: In the building industry there is clear need for both a professional architect who serves a client in trying to produce a best value-cost configuration in terms of the client's value framework, and a builder who at the next level is interested in the most efficient means of producing a specific structure. 8a1

Dave Malone and Dick Garrett represent different levels in

your system, and their conflict is just the kind that should be fostered -- perhaps in the expanded environment of representation (and conflict) that I outline below. 8b

I expect actually that there will be many discrete levels within the framework of what I call augmentation systems; but the point to be made here is that Malone and Garrett should each be encouraged to represent their respective levels, and that the conflicts of interest between these levels should be openly dealt with as a natural part of the discipliine that must come to exist in a multilevel system environment. I would recommend your considering this -- establish four explicit levels within CODSAM, each with a (different) person as its pusher/custodian: 9

(1) The "methodology" level which considers the general working environment and approach that designers are to take in this new environment. 9a

(2) The "tool" level, where such as Gerry Michaud's optimization scheme and Dave Malone's proposed network-analysis scheme are representative examples (and where a computer debugging scheme, or an information retrieval scheme would also be representative examples). 9b

(3) The "user-service interface" level, where there must be evolved principles of design, measurement and analysis towards providing effective means for the users to elicit computer support in all of the different ways in which such support may be integrated into their tools and methods. It is obvious that the Methods Level will need to integrate many types of tools, all of which need to be exercised in rapid and mixed succession, at one interface console. The concepts, control techniques, control language, control repertoire, control-display transducers, and the associated procedural skills, cannot sensibly be designed separately for each tool, but rather should be designed to support each tool within an "intellectual workshop" type of environment. 9c

(4) The "service-system" level in which the techniques for providing the interaction and the tool functions are designed to give optimum value-cost configuration. 9d

It is evident that the first three levels aim to increase the value of the computer service system to a team of designers, while the fourth level must learn how to extend the range of service and how to minimize cost. 10

It is easy to find people to work in Level 2 -- to develop explicit and exotic tools towards component tasks in the designer's world. It is much rarer to find people interested in pursuing Levels 1 and 3 explicitly, but it is obvious to me that there is a great need there. 10a

For Level 4 (which actually contains within itself many sublevels), it is rare to find effective people who see the endeavor as truly one of providing support to these higher levels and who are strongly motivated towards maximizing the effect of their efforts on the overall mutilevel system. 10b

From what I see, I feel that in Dave Malone you have a good pusher for explicitly evolving significant work at Level 1, and in Dick Garrett an unusual find for a Level-4 pusher. I see no dearth of Level 2 tool builders in existence or cropping up. 10c

I hope that someone will emerge in Level 3 -- Dick Garrett shows much interest, but in my experience, there should be two different individuals representing these two levels (either can contribute to both levels, but I don't think it is possible to avoid a conflict of interest, if one person is the pusher for both levels). 10d

I must congratulate you upon forming the CODSAM activity and also for attracting such good personnel. I hope that you continue strongly to provide the motivation, guidance, and "maturation", because I think that CODSAM has an unusual potential. 11

I would like to make one explicit suggestion toward establishing a particular "vertical slice" in CODSAM's multi-level activity -- i.e., toward a four-level effort aimed at a particular kind of designer clientele. I refer to designers of augmentation systems; you have just the environment in which should be pursued the development of a Computer-Oriented Design Science And Methodology explicitly aimed at supporting your own CODSAM support-system designers, at all of the four system levels mentioned above. 12

In particular, I might suggest that Garrett and Company be encouraged to launch a subproject towards augmenting "software engineers." For one thing, I should like to see this because it would provide the most direct and explicit association between my work and yours; it would facilitate communication, and increase significantly the chance of the early establishment of explicit, network-coupled collaboration

between our groups -- a situation I would very much like to see develop. It would also promise to increase CODSAM's developmental effectiveness in Levels 2 and 4, for all of your projects. 12a

Letter: D. C. Engelbart to Professor Joseph Modrey, CODSAM Project, Purdue University.

Again, my thanks, and I look forward to our future collaboration. 13

Best regards,

DOUGLAS C. ENGELBART, Ph.D.
Manager
Augmentation Research Center
Stanford Research Institute
333 Ravenswood Avenue
Menlo Park, California 94025 14

DCE 12-JUN-71 9:55 7269

Letter: D. C. Engelbart to Professor Joseph Modrey, CODSAM Project, Purdue University.

<JOURNAL>7269.NLS;1, 12-JUN-71 9:55 DCE ; Title: Author(s): Douglas C. Engelbart/DCE; Sub-Collections: ARC; Clerk: DCE;
Origin: <ENGELBART>MODREY.NLS;6, 12-JUN-71 9:51 DCE ; .DIR=1;
.SCR=2; .MCH=65; .SNF=72; .DLS=0; .PGN=0; .PES;

JCN 12-JUN-71 14:45 7270

Test

this is a test

Test

test for JCN/DCE

1

JCN 12-JUN-71 14:45 7270

Test

(J7270) 12-JUN-71 14:45; (Expedite) Title: Author(s): James C. Norton/JCN; Distribution: Douglas C. Engelbart/DCE; Keywords: ; Sub-Collections: ARC; Clerk: JCN;

ARC/IPT Project-Continuation Thinkpiece

INTRODUCTION 1

This is a thinkpiece toward a proposal to ARPA's Information Processing Techniques Office (IPTO) for ARC's contract period, 8 Feb 72 to 7 Feb 74. 1a

ARC would like to resolve a set of conflicting planning problems by negotiating a "Base-Project" contract, for our continuation work beginning 8 Feb 72, that concentrates completely upon the goals of: 1b

Making the Network Information Center into both (a) a very useful service to the Network Community and (b) an important part of the Network Experiment (in its distributed, collaborative operations and in its Network-utility role). 1b1

Advancing the techniques available to Network system builders/users for augmenting the development and application of computer-based information systems. 1b2

Moving useful augmentation techniques and services out into the ARPA-Network Community. 1b3

In the sections that follow, and in the supportive Appendix documents, we outline the types of activity that seem to us best to meet these goals. 1c

A central point of our proposed approach is that we want to get ready to negotiate and provide an extensive amount and range of services to distributed users, but we want to do it in a certain way. Our position stems from the following reasoning: 1d

Our planned NIC services involve a steadily expanding set of explicit "reference and communication" services (see Appendix A). This is considered by us to be the central commitment of a "Network Information Center." We plan to be ready to expand the operational capacity of these services as needs and possibilities emerge. 1d1

Aside from these NIC-explicit services, there are other services that our general set of tools and methods can provide, and that are of interest to other parties. Over the years that the Network has been evolving, there have been many discussions about the potential value ARC's tools might have for different Network individuals and groups; and recently there has been a distinct (alarming?) increase in interest and expectation in this regard. 1d1a

In general, we enjoy this show of interest in our products, and in particular we want very much to collaborate with and support some of this experimentation (as in the goal set cited under 1b). 1d1b

But it is quite obvious to us that significant value will not be obtained from extra-NIC experiments with our computer services, or from interaction with our staff, unless these be done in a non-dissipative way, with individuals or groups 1d2

(a) whom we can adequately support with computer and personnel resources, and 1d2a

(b) that show promise of following through, by being able to acquire adequate resources and being able to integrate our services significantly into the work that they will be doing. 1d2b

Furthermore, it is also obvious to us that there will be considerably more payoff (to our goals, and likely to IPTO) from the external use of our finite resources, if these are "Type-B" (for "Bootstrap") individuals or groups -- defined as those who 1d3

(c) will pursue actiities that either add to the techniques and capabilities subsequently available to other participants, or that help other people learn about and obtain this kind of service. 1d3a

On another tack, if the concept of a distributed community making use of "network utilities" is to materialize, then certainly there must evolve a body of techniques and conventions involving 1d4

(a) Service Delivery -- where these utilities can deliver responsive, interactive transactions, over a complex repertoire of service functions, with both a high degree of reliablity and a high degree of availability, and 1d4a

(b) Service Marketing -- where a customer can negotiate with a utility for the quantity and type of service that suits his needs; and where there is a negotiation environment at service-transaction time that enables the customer to get the service when he needs it, but with a resource-utilization framework that is balanced between efficiency and demand capacity. 1d4b

Therefore, we want to concentrate our efforts within a four-pronged project wherein coordinated advances can be made in: 1e

(1) Developing service functions that will be of maximal value in our above-mentioned goal structure, 1e1

(2) Developing the knowhow and capability for delivering signiicatly useful service to the Network, as a Utility, 1e2

(3) Developing the knowhow and capability for marketing a utility service to the Network, 1e3

and wherein we become ever better at 1f

(4) Operating a utility service. 1f1

We are proposing that under the Base Contract with IPTO, ARC's "utility" would initally serve but two, bulk-commodity customers -- ARC workers, and NIC customers. 1g

Until we learn how to market and deliver service better, we would rather concentrate heavily upon developing our marketing and delivery capabilities, as contrasted with expending a large amount of energy in trying to meet the beyond-basic-NIC services that might be wanted by "customers". 1g1

And as we learn how to deliver and market different types and quantities of service, we feel that there will be a logical progression of service types and of customer types to be effectively and beneficially promoted and served in our growing "utility market." 1g2

In the following thinkpiece material, we have outline what seems like a natural succession of "service systems" that might be thus marketed, and we would propose concentrating our service-FUNCTION development efforts on getting prototypes of these service systems shaken down within ARC's internal domain in readiness for marketing them when the time is right. 1g2a

And we will hope to develop a market for our services that leans strongly toward Type-B customers. 1g3

If we make unexpected progress in developing delivery and marketing capability, and if it appears that the IPTO funding could profitably be diverted to "buying" more service for some types of utility customers, we assume that the utility service provided under the contract would be extended beyond that initially negotiated. 1h

But basically we propose that the Core Project count on putting a significant and constant effort into continous development of delivery/marketing techniques and principles; and that any expansion of ARC's service-delivery capacity be supported by means of explicit additional negotiations with customers (and perhaps with the customers' sponsors). 1h1

IPTO might in this way sponsor more utility service through some of their contractors (e.g. in extending the nature and quantity of NIC services). 1h2

But, importantly enough, IPTO also would be able through these developments to divest itself of supporting the operational delivery of NIC services, letting customers negotiate directly with the "NIC utility." 1h3

In our utility, the development of service FUNCTIONS is to be made a separately negotiated activity from the subsequent marketing and delivery of these functions. 1h3a

So IPTO could choose to unburden itself from supporting NIC operations (or to share the cost with others), while yet (optionally) continuing to support development of NIC-service FUNCTIONS, or of NIC reference data. 1h3b

D. Documentation services (as operational prototype of DPCS, within ARC). 2b4

III. Develop Service-Marketing Principles and Practices 2c

A. Note: A person will be a "user" when he is in the working processes of using our services -- he will be a "customer" when he is negotiating for such service, paying for it, complaining about it, etc.. 2c1

B. Learning how to negotiate with prospective customers for delivering various kinds of service to them, including questions such as: 2c2

1. On what basis are the agreements made? 2c2a

2. How does the financing get done? 2c2b

3. How is the accounting performed? 2c2c

4. The scheduling and billing of service delivery? 2c2d

5. Resolution of conflicts (Market conventions, arbitration)? 2c2e

6. What guarantees can practically be made regarding, accessibility, reliability, documentation accuracy and completeness, etc.? 2c2f

7. How are user training and helping provided? 2c2g

IV. Provide Operational Marketing and Delivering of Services 2d

A. Clearing the framework, as the marketing and delivery systems begin to take shape, in which the current service resources are marketed within the ARC and NIC customer market. 2d1

B. Studying the possibilities of evolving the various "prototype" services into marketable items, negotiating the resources for this, extending our service market -- all in an orderly process involving a number of multi-party agreements (e.g. NASA, IPT and ARC, for supporting the development and operation of a DPCS for the ILLIAC IV project). 2d2

PRELIMINARY COST ESTIMATE
(for the two year period starting 2/8/72)

Personnel Costs 485 man-mo.	
Total Direct Labor	578,400
Payroll Burden	152,119
Total Labor and Burden	730,519
Overhead	767,045
Total Personnel Costs	1,497,564
Direct Costs	
Travel	14,200
Facility *	873,059
Consultants	40,000
Report Costs	1,926
Total Direct Costs	929,185
Total Estimated Cost	2,426,749
Fixed Fee	118,000
Total Estimated Cost Plus Fixed Fee $	2,544,749

* See breakdown, Branch 3g

PRELIMINARY FACILITY COST ESTIMATE

Total Facility Costs:			$ 873,059
Computer Facility Support			549,459
Lease Cost		519,459	
Computer Facility	$ 423,264		
Data Products Line Printer	24,300		
Terminal rental	37,000		
Telephone expenses	34,895		
Maintenance and Operation		30,000	
Maintenance Materials	11,500		
Operating Supplies	18,500		
Anticipated improvements			323,600
Display system upgrade or replacement		113,000	
PEP 400 character/vector generators with PEP 801 displays 12 @ 6,500	78,000		
Controller	30,000		
Interface equipment	5,000		
Tertiary store		165,600	
RP02s disc storage: 24 months @ 6,900			
1 DF-10 channel	600		
Memory cables	550		
Disc controller	600		
9 drives	5000		
Other	150		
Experimental lower performance displays		45,000	
Such as: 3 Imlacs @ 15,000			

DISCUSSION 4

About replacing ARC's Display System 4a

Reasons for updating the current system 4a1

The operation of the current system is requiring an excessive quantitiy of daily and weekly maintenance as well as replacement of expensive parts. 4a1a

One of the basic limitations of the system is the lack of enough total light on the vidicon surface. This means that many design factors are marginal. The Tasker CRT's run at such high intensity that their life is relatibely short. This high intensiity also causes difficulties in maintaining good focus over the entire image. To operate with these low light levels, the vidicons must be quite sensitive; since sensitivity drops off with age, they have a relatively short useful life. 4a1b

Because the acceptable-quality writing speed of the Tasker display generator turned out to be lower than specified, we still have a flicker problem when all 6 screens on one system are reasonably full of text. To some extent we are able to compensate for this by careful adjustment of the vidicon beam current and target voltage, but these adjustements need frequent attention. We are considering the use of longer persistance CRT's and/or vidicons, but these solutions will only make the problem easier to live with. 4a1c

For a more complete description of the experience we have had with this system, see the RADC Final report of April 1970, Section 111. 4a1d

Despite all the effort that goes into maintenace of the system, as described above, the console-display quality achieved is only barely acceptable, and will be even less acceptable when we start to make use of graphic capability. 4a1e

our proposed solution utilises a storage-tube scan converter 4a2

The storage tube eliminates the need for refresh so that the character and vector generator may operate significantly slower - thus providing higher quality at lower cost 4a2a

Many of our problems stem from the difficulty of matching the precision CRT and the TV vidicon system. In the Princeton Electronics PEP-400, one tube performs the function of both. 4a2b

Since the output of the princeton scan converter is a video signal, all of the flexibility of TV mixing and alternative data inputs (live images, microfilm, scanned documents) are maintained. 4a2c

There are two principle approaches utilising the storage scan-converter 4a2d

One approach is to utilise our current Tasker character and vector genorators, with a scan converter for each station, all at the central location. 4a2d1

Without the requirement for constant refresh, the current Tasker display-generator system could be run at say 1/5 its current speed, at which it would provide high-quality images. 4a2d1a

By utilising as much of our current hardware as possible, this approach keeps the price at a minimum. 4a2d1b

It must be kept in mind that the Tasker equipment may not be suitable for driving the scan-converter system, and may have to be replaced. This would have to be determined with more careful study of the situation. 4a2d1c

The second approach is to use a separate character-vector genorator attached to each scan-converter tube. 4a2d2

Princeton Electronics has a self-contained package, containing both a character-vector generator and a storage-tube scan converter, which sells for about $7,000. 4a2d2a

This approach would make each station completely independant of the others. Heavy traffic, i.e. many concurrent display re-paintings among the other users of the system, would not threaten to impose delays in any one of them. 4a2d2b

The number of stations will not have an arbitrary boundary and could be expanded by increments of one very easily 4a2d2c

Remote display consoles could be implementeed easily, since each console would be completely self sufficient. 4a2d2d

In the Core Project, our plans for hardware expansion are aimed only at reliability and file-capacity needs; expansion for increasing user-load capacity will await explicit, further negotiations (and may indeed be supported by others, e.g. RADC or NASA). 4b

For effective reliability protection, we should have backup for two critical rotating devices: the swapping drum, and the secondary-file disk. 4b1

Either of these is vulnerable to as much as a two months down period if mechanical damage is done by a fault. We assume that this much of a gap in both ARC's internal development work, and in the experimentation and service for Network users, would want to be strongly insured against. 4b1a

It looks as though the following course of action is our best bet: 4b2

Get extra spindles for our moveable-head disk system (like perhaps four) to back up the secondary-file disk. 4b2a

Experiment with using the moveable head disk system for swapping -- perhaps some configuration here would provide adequate swapping performance for backing up the drum. 4b2b

Keep our UNIVAC drums, at $7k/mo, to back up the Bryant drum, until can we have a better (e.g., cheaper) alternative installed. 4b2c

As one future solution to these problems, we intend to watch progress on the mini-computer moveable-head-disk controller planned for development by the PARC group. 4b3

Other notes regarding Estimate Figures 4c

Assume that we tune up the present configuration as well as we can, and have a plan for the route to follow in altering the configuration toward more capacity, before we propose additions. 4c1

ARC/IPT Project-Continuation Thinkpiece

<JOURNAL>7271.NLS;2, 13-JUN-71 3:21 DCE ; Title: Author(s): Douglas C. Engelbart, James C. Norton/DCE JCN; Sub-Collections: JOU; Clerk: DCE; Origin: <ENGELBART>ADPROP.NLS;6, 13-JUN-71 3:13 DCE ; .DIR=1; TC(LevClip=1; Trun=1; SCR=1; / .SCR=2; .PLEV=1;) .Leading=Delete; .Trailing = Delete; .Pfit=Yes; .HED= "ARC/IPT Project-Continuation Thinkpiece"; .F=" .Split;.GPN=Dec+Brackets;"; .RM=72; .BRM=65; .SNF=72; .PN=0;

DCE JCN 12-JUN-71 19:27 7272

Descriptive notes about DSS, a Dialogue Support System
14 JUN 71 1:21PM

These notes were combined from various documents written by DCE over the past year.

Descriptive notes about DSS, a Dialogue Support System
14 JUN 71 1:21PM

The Need 1

ARC has become more and more involved in augmentation of teams, and we are giving serious consideration to improving intrateam communication with whatever mixture of tools, conventions, and procedures will help. 1a

If a team is solving a problem that extends over a considerable time, the members will begin to need help remembering some of the important communications -- i.e., some recording and recalling processes must be invoked, and these processes become candidates for augmentation. To consider some of the different conditions where such storage and recall may be useful, suppose Person A communicates with Person B about Item N at Time T. 1b

They may well be counted on to remember their exchange during the problem-solving period. But consider the case of Person C who, it will turn out, is going to need to know about this communication at time TT: 1b1

perhaps he was there at Time T but 1b1a

he was too heavily involved even to notice the communication, and/or Item N wasn't relevant to his work at that moment and so wasn't implanted for ready recall. 1b1a1

Perhaps A and B didn't anticipate his later need and thus failed to invite him into their interchange or inform him of its conclusion. 1b1b

Perhaps, although Persons A and B knew he would later need the information, they didn't want to interrupt their own working sequence with the procedure of interrupting Person C and getting him involved. 1b1c

or, if the consequences of the interchange carry over into a long-lasting series of other decisions, one or both parties may fail to remember accurately, or may remember differently because of different viewpoints, and troublesome conflicts and waste of effort may result. A single person will make a list of things to do on a shopping trip because he's learned that the confusion and pressure may make him forget something important. It's obvious that to be procurer for one of a mutually

developed, interdependent pair of lists would make it even more important to use a record. 1b2

Further consider the effect if the complexity of the team's problem relative to human working capacity requires its partitioning into many parts where each part is independently attacked, but where among the parts there is considerable interdependence through interactions on mutual factors such as total resource, timing, weight, physical space, functional meshing. 1c

Here, the communication between Persons A and B may well be too complex for their own accurate recall. For example, their communication period resulted in scratch paper or a chalkboard covered with possibilities and the essence of the agreed-upon solution which has since disappeared. 1c1

We envision effectively augmenting our collaborative team by having an "intragroup documentation system", containing current and thoroughly used working records of the group's plans, designs, notes, etc. Therefore, we have begun to develop a system for entering and managing those records. The ARC Journal is this intragroup documentation system. 1d

The ARC Journal 2

Our Journal is an open-ended information storage and retrieval system. It accommodates and retrieves whatever thoughts any member of the group feels worth keeping. All entries in our internal "mail" system automatically bcome part of the Journal. In addition, any online user may flag any file for transcription into the Journal within a day. In addition to NLS files, other hard copy including photographs, line drawings, and scratch notes can be logged into the Journal. In handling extra-computer copy the Journal draws on the techniques we are developing for NIC and RINS. 2a

We believe the Journal is the key to the development of our Dialogue Support System. We are encouraging members of the group to enter items freely, to err on the side of loquaciousness, even to enter information that will become useless. We hope to learn from such a flow how to winnow worthwhile information, to refine the techniques of query, analysis, and access that are necessary to proliferate all our augmentation research. 2b

As each item (in this case, every NLS file) enters into the

Journal it receives master Catalog Number (CNUM) and is catalogued. 2c

The CNUM is generated from the one master-collection sequence that ARC uses for all of its frozen-item storage: XDOC, NIC, Journal, RINS, and, we assume, an increasing number of other special collections. The CNUM becomes the master identifier of the NLS file: it is printed in the upper right corner of each page of a printout of that file; it is the standard reference name to use in an NLS link; and it becomes the "file name" of that file within the storage and retrieval system of the Journal. 2c1

When the Journal System takes a file into custody, it guarantees retrieval of that file (by its CNUM) at any later time. 2d

A Master Catalog holds descriptions of each item that is stored in ARC's Master Collection. The Master Catalog is composed of a set of NLS files in which each entry (describing one collection item) occupies one statement whose NLS name is 'M+CNUM -- e.g., (M5237) 2e

The catalog entries are formatted in a special way to delimit the different data elements. For instance, for most items there is a "*a1" preceding the first-author's name, and within this type of main field there often are flags such as "#2" or "#3" to delimit a particular subfield. The initials of the ARC author are stored after the data element code "*a6". 2e1

We don't really expect to use this format permanently for storing our catalog data. Within a year the size of the collection will make query and file management operations too inefficient and we will change it. A collector sorter and special reformatting programs will reduce the work of designing and changing the new format to several hours at the console. 2e1a

The organization and formatting of the catalog files will evolve during the next year, but the user's concept of this function probably won't be affected. 2e1b

Special data elements are under consideration for processing our NLS files into the journal. For instance, it is likely that the catalog entry will invove a record of the whereabouts and the reference target of every

cross-file link with the file. Such a notation would be an important aid in querying and is also the base for the "back-linking" we have been considering for so long. 2e2

Journal entries now also exist as a shelf of hard copies. For the shelf-stored copies we have used what we call "catalog-management processes", (Executeable Text) Programs to help manage and retrieve the information. 2f

The catalog-management techniques that we have used were designed expressly to accommodate special collections. For example, a working subset of the Master Catalog holds the Catalog entries for the items that have been entered in the Journal. This subset is called the "Journal Catalog", and can be extracted automatically from the Master Catalog. Our initial shelving is by Catalog Number, so the shelf list is by CNUM. 2f1

We can automatically generate hard-copy citation lists in various layouts by means of a library of reformatting programs. The Collector-Sorter Processor is invoked in one set of executeable text programs, to produce listings sorted on selected keys. 2f2

One such listing is the shelf list. A Shelf List for a given collection is a list of citations ordered in the way in which the collection items are physically "shelved" or otherwise stored. 2f3

If the items are standing on the shelf arranged by catalog number, you would probably find one easily without looking at the Shelf List. But, if the item is gone, the Shelf List can verify that it should be there. 2f4

The items might very well be shelved according to a subject outline -- e.g., a set of user-reference volumes whose sections would each be a separate Journal entry. Here the various sections would be updated independently, and their catalog numbers would bear no relation to their ordering within the binders. The Shelf List here would look like a Table of Contents. 2f5

An "Index" contains one-line citations ordered alphabetically or numerically on one or more of the terms found in the catalog entries. We automatically produce indices ordered on: Catalog Numbers; Author; and Keywords

from the title (having an entry for each non-trivial title word). 2f6

We plan to make journal material ever easier to read online. By next Fall we hope that any NLS user studying a Journal item may jump from a link to any Journal item that has been referenced within the past few days with the speed of disc access, and with a "worst case" time of less than five minutes for a file not used recently. 2g

Automatic Journal Entry 2h

After the transfer of NLS to the PDP-10, our journal entry and cataloging procedures was made more automatic, and brought under direct user control from NLS. 2h1

Entry commands such as the following are used: 2h1a

Execute Journal 2h1b

Submit	(file/stmt/branch/plex or literal input)	2h1c
Interrogate	(optional interactive input request mode)	2h1d
Author	(the user by default, others are entered)	2h1e
Comments	(optional comments about the document)	2h1f
Distribution	(to ARC or non-ARC people by name)	2h1g
Subcollections	(NIC,AFIPS,JOU,NAS,etc)	2h1h
Keywords	(at user's discretion)	2h1i
Expedite	(for 3-4 hour delivery to ARC addressees)	2h1j
Go	(to start file and catalog process)	2h1k

Catalog entry, hardcopy formatting, and secure on-line filing of the document are included in this process. 2h1l

Hardcopy distribution was used for all documents at first. Optional on-line delivery of links (references to the Journal document files) to addressees is planned to follow soon. 2h1m

DCE JCN 12-JUN-71 19:27 7272

Descriptive notes about DSS, a Dialogue Support System
14 JUN 71 1:21PM

<JOURNAL>7272.NLS;1, 12-JUN-71 19:27 JCN ; (Expedite) Title:
Author(s): Douglas C. Engelbart, James C. Norton/DCE JCN; Distribution:
William S. Duvall/WSD; Keywords: ; Sub-Collections: NIC; Clerk: JCN;
Origin: <NORTON>JCNAPPB.NLS;4, 12-JUN-71 19:24 JCN ;

RDB 12-JUN-71 20:25 7273

NOTES ON HARD COPY EQUIPMENT RDB

NOTES ON HARD COPY EQUIPMENT RDB

Hard-copy for general network sites 1

Basic considerations, for the Network: 1a

Graphic-text communiques sent in a common, standard Network Transmission Code (language) for graphic description. 1a1

Each site assumedly would be responsible for developing translators to and from this language, relative to their own languages and devices. 1a2

Each site would probably want a hard-copy printer device for mixed-text and graphics, for both 1a3

Receiving network-transmitted communiques 1a3a

Outputting their own, locally developed graphic portrayals. 1a3b

For implementing this, each site would likely have unique requirements and budget ranges. 1a3b1

A site would probably like to use the same hard-copy printout device for both types of use -- network communiques, and locally generated portrayals. 1a4

Therefore, the solution picked for Network Graphic Communiques would be better if it could readily accomodate the different-quality needs of the different sites. 1a5

The Scan-Converter Approach: 1b

Basic configuration: 1b1

A Line-scan hard-copy printer, of which there is available commercially quite a range in cost, quality, printing speeds (e.g. Gould, Xerox LDX, Varian, Statos 21, etc.). 1b1a

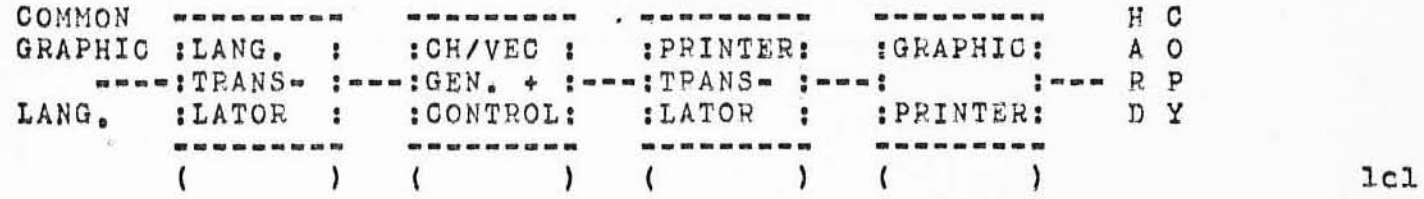
A Princton Storage-Tube Scan-Converter Device, with an output interface of suitable nature for driving the printer. 1b1b

A Random-Deflection Picture Generator to drive the Scan Converter. 1b1c

A Picture Translator Processor (Software) for drivng

the Picture Generator from the Network Picture Description Language. 1b1d

The system can be broken down into the following blocks. 1c



1c1

The Common Graphics Language is a standardized convention for specifying characters and vectors for transmission over the network. 1c1a

The Language Translator is a program for converting the Common Graphic Language to a format compatable with the particular printer system. 1c1b

This may be in the host computer. 1c1b1

For a TIP site, this would have to be a mini-computer. 1c1b2

The character/vector genorator and control would be chosen at each site to meet any particular needs. 1c1c

The "printer translator" would be any device or technique necessary to match the requirements of the particular printer to whatever is provided by the character/vector genorator. 1c1d

A printer capable of mixed text and graphics hard-copy. 1c1e

COM and graphic hard-copy for the ARC needs 2

The general approach to be taken in implementing hard copy is to utilize a portion of the equipment that is used in the COM system chosen for our microfilm requirements. Special hardware will be added which will perform the functions required for hard copy. 2a

Our requirement for COM is for a high quality system capable of putting text and graphics onto 16mm and 32mm film. This would most likely be in the form of an outside service bureau which would process mag tapes. 2b

It would be advantageous if the COM electronics were also used

in our hard-copy system so as to maintain complete compatability between the two systems. 2b1

The two primary considerations in the system are compatability with avaliable computer output to microfilm services, and suitability for multiple stations on the Network. 2b2

The choice of manufacturer of the COM equipment used here would be dependent on system quality, versatility, and the suitability for modification for implementing hard copy capability as described below. 2b3

One such COM system under consideration is Information International's FR-80. This is about the highest quality system on the market, but the use of a PDP 15 for system control will probably make the system excessivly expensive. 2b3a

There is a possibility that the FR-80 can be connected on-line to the PDP 10 without the PDP 15 front end, thus performing the character genoration subroutines in the PDP 10. 2b3a1

The local company is Computer Micrographics in San Francisco, But they do not have the capability for "painted" characters. 2b3a2

The next possibility is Information International in Los Angeles, who manufacture the FR-80, and I beleive offer a full service system. 2b3a3

A second system under consideration is manufactured by Link Singer Corp. This is again high quality text and graphics, but does not contain the capability for "painting" very high quality symbols. 2b3b

The are no current firms offering the Singer system as a service, but there is supposedly one preparing to open San Francisco, and Link Singer in Sunnyvale will be setting up a service facility latter this year. 2b3b1

The prime requirement for graphic hard-copy is to enable output of mixed text and graphics from our system for referance as well as proofs of files before they are sent out for microfilming. 2c

If this basic service is to be provided, then it is also possible that it be used to replace the system's line printer for general hard-copy. This places additional requirements on the printer system. 2c1

The speed of our present printer (7 sec. per page) should be matched if not improved. 2c1a

Over the last six month period we have used 900 pages per day on our printer. 2c1a1

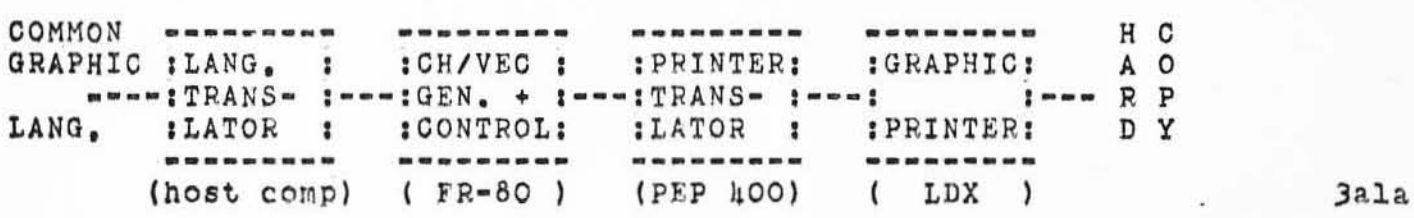
The quality of print and paper must be high enough so that people will feel that they are not going down from that of our printer. 2c1b

For maximum convienence, the printout should be delivered in 8.5 by 11 inch pages with the pages in the correct sequence, as well as binder holes punched if possible. 2c1c

System Configurations 3

Hardware genorated text and graphics 3a

FR-80 compatiable 3a1



3a1a

Since this system would use the PDP 15 and associated hardware contained in the FR-80 system, the system would be completely identical at the front end. 3a1b

The cost of the system is probably going to prohibit placing complete systems at multiple sites. Some form of video distribution could be used with printers at multiple sites. 3a1b1

If the scan line printer chosen is the Xerox LDX printer, the the signal genorated to drive the local unit can be sent directly to a video quality phone line to remote printers. 3a1b1a

The other alternative is to digitize the scan signal off the Princeton and transmit the resultant code as a binary file over the established network. 3a1b1b

The estimated quantity of bits required to produce a resonable quality picture is 2000 bits per line by 1000 lines per page or approximately 1.4 million bits. 3a1b1b1

With this quantity of bits involved, some form of code

compression is indicated. If the picture is predominantly graphic (lines), then significant reduction on data may be expected (by a factor of say 10 to 25), but if the picture is primarily text then I doubt that significant gains are possible. 3a1b1b1a

More study could be conducted in terms of algorithms for code suppression in order to confirm the rough estimates that are given above. 3a1b1b1b

Link Singer compatiable 3a2

COMMON GRAPHIC LANG.	LANG. TRANSLATOR	CH/VEC GEN. + CONTROL	PRINTER TRANSLATOR	GRAPHIC PRINTER	H A R D	C O P Y
	(HOST COMP)	(SINGER)	(PEP 400)	(LDX)		

3a2a

This would be very similar to the FR 80 system, except that the Singer system has a much less extensive control system which will make the hard-copy version if the system less expensive. 3a2b

Low cost system at each location 3b

COMMON GRAPHIC LANG.	LANG. TRANSLATOR	CH/VEC GEN. + CONTROL	PRINTER TRANSLATOR	GRAPHIC PRINTER	H A R D	C O P Y
	(host comp)	(ARDS)	(PEP400)	(LDX) (GOULD)		

3b1

System configuration 3b2

Computer Displays Inc. symbol and vector generator 3b2a

Princton Scan Converter 3b2b

Any scan line printer 3b2c

This system could be implemented at multiple Network sites for a cost somewhere between $15,000 and $20,000 per installation. 3b3

Data necessary to drive the system is standard ASCII-2 code for characters, and relative lengths for straight line vectors. 3b4

For a more complete discussion on the ARDS terminal, see the next section of this file. 3bka

Monatoring of the data on the storage surfiace could probably best be acomplished by purchasing a TV monitor and runnig it off of the Princton system. 3b5

The time necessary per page of hard copy will be in the range of 1 second for writing on the storage surface, and 7 seconds for printing on the LDX, or 1 second on the Gould. 3b6

Software Generated text and graphics 3c

System configuration 3c1

Small computer front end -- optional 3c1a

Special hardware to look like CALCOMP plotter (short fixed length vectors) 3c1b

Princton scan converter 3c1c

Any scan line printer 3c1d

This system would have the flexability of generating any character font and special symbols desired. 3c2

If the hardware is made to look identical to a CALCOMP plotter, then any of the software packages which are around for this plotter may be used, thus saving software development. 3c3

The use of a small computer front end should be considered in order to decrease the load this system would place on a time sharing system. 3c4

This could also supply a place where the system could be made to look exactly like the FR-80 system. 3c4a

System Components 4

Princton Scan Converter $5,000 4a

The princton scan converter (PEP 400) has the following general characteristics. 4a1

Resolution	1400 TV lines
Retention time	>12 minutes

Spot writing time <20 nsec.
Erase time 500 msec. 4a1a

525/1029 line composit TV sinc signals are provided by the PEP 400 for driving a TV monitor. 4a1b

It is quite reasonable to expect that the TV sinc can be modified to 875 line to be compatiable with our system. 4a1b1

The scan converter and printing device is capable of printing with far more resolution than can be seen with a monitor, but with the use of the X and Y position and ZOOM control, the user could monitor either the general format of the total page, or zoom in on any portion for detailed examination. 4a1b2

Scan conversion is achieved by deflecting the beam in a line by line scan at whatever rate is required by the printing device used. 4a1c

Princton is offering an interactive graphics terminal with their own symbol and vector genorator. 4a1d

The character set is upper and lower case 4a1d1

The characters are made on a 5 X 7 dot matrix 4a1d2

If this is the symbol genorator that I saw at the FJCC, The individual dots of the matrix are somewhat visible, especially when adjacent dots are on opposit corners of a box. 4a1d3

The displayed data is 80 ch./line by 50 lines 4a1d4

Writing time is 50 usec per character. 4a1d5

Computer Displays Inc. character and vector genorator $7,815 4b

The price given is for an ARDS terminal without Tektronix 611 desplay unit. an additional $224 can be saved by not purchasing the kay board, although that is probably not desirable. 4b1

The Multi Symbol Siz option is also included for a price of $490. 4b2

Sysmbol genorator creates upper and lower case characters from the standard ASCII-2 character code 4b3

Symbols are genorated by unblanking dots within a 7 X 9 dot matrix. 4b3a

The increment from character to character is 9 4b3b

Characters that lay below the line are handled by first dropping the matrix down 2 increments. 4b3c

The time to print one character is approximately 250 usec., and could possibly be decreasedby a factor of 2 or 4. 4b3d

I feel that the character quality of this system is better than that of the Computek or the Tektronix terminals. 4b3e

Vectors are drawn by entering Set Point, Long Vector, or Short Vector modes. 4b4

One character is required to enter any mode. 4b4a

Four characters are required to position the beam. 4b4b

Four characters are required to draw a long vector. 4b4c

Either dashed or invisible options are available. 4b4c1

Two characters are required to draw a short vector. 4b4d

Invisible vectors are not avaliable. 4b4d1

Addressable points are plus-minus 1024 in both axis 4b5

General comments 4b6

The number of addressable points and the resolution of the Princton scan conver are very compatiable. 4b6a

The format for specifying vectors is very awkward, and will be complained about biterly by most programmers. 4b6b

The characters are generated by a dot atrix rathen than a stroke generator, which will tend to make for varying width lines which may be harder to handle in the scan conversion. 4b6c

Tektronix 4002 terminal 4c

This is another terminal which may be used in place of the ARDS, and should be investigated. 4c1

COMPUTEK terminal 4d

This is another replacement for the ARDS. It has the advantage that it contains a circle generator as well as a vector generator, and I beleive the symbols are created using short vectors and small curves. 4d1

The format for specifying vectors is more straight forward than that of the ARDS. 4d2

Tektronix 4601 terminal $3,750 4e

This is an example of a scan line printer which looks almost identical to the LDX printer, except that it prints on 3M type 777 Dry-Silver paper. 4e1

The paper is not too objectionable to use, although definitely a processed paper. 4e1a

The cost per page is approximately 7 cents/page 4e1b

Process time is 18 seconds for first copy, and 4 seconds for each additional copy 4e1c

This package also includes the electronics necessary for scanning the storage serface, thus eliminating any special electronics to implement the hard copy system. 4e1d

This printer is suitible for low quantity applications, but for high output the cost of the paper becomes prohibitive. 4e1e

Xerox LDX printer leases for $650/month 4f

The prime advantage of the LDX is the quality copy that is produced on unprocessed bond paper. The paper is supplied of a continuous role, and is cut to length in printing. 4f1

The two major disadvantages to the LDX are the large physical size of the unit, and the unability to use paper with binder holes pre-punched. 4f2

General characteristics: 4f3

scan resolution is 135 lines/inch (190 lines/inch options1) 4f3a

prints one page in 7 seconds 4f3b

Gould Clevite printer $10,000 4g

This printer is referred to a matrix dot printer since it writes on its paper using a line of verry closely spaced dots. 4g1

The characters can either be generated with software routines in some computer, or they can be written on a storage tube and scanned off line at a time for the Clevite. 4g1a

The printer is very fast (about 2 sec. per page), but if the characters and vectors are generated in software then the computer could not keep up with this data rate. 4g2

The paper used is processed type which if very light weight although I have been told they now have a heavier weight avaliable. 4g3

An option of a paper cutter is available, or also the paper comes out in one continuous role. 4g3a

Versatec plotter 4h

The Versatec printer is a matrix printer much like the Gould printer. This printer comes with many options such as graphics only or upper case character generator or upper and lower case character generator, and two speeds of 14 or 7 seconds per page, fan fold paper or continuous paper, and 8.5 inch verses 11 inch wide paper. 4h1

The price for high speed printer/plotter with lower case and fan-fold options is $9,300. 4h1a

Also available as options for these printers are interfaces to several computers. An example of which is the PDP 11 -- this includes an operating software package for graphics and text wich runs in 12K of core. 4h1b

I have asked about the possibility of having two rows of staggered print heads so as to provide truely solid lines. This has been considered, and they are prepared to do this, but only on a contract basis. They feel the cost for a single unit would be prohibitive, but for say 10 units they could quote a competative price. 4h2

Varian Statos 21 printer $10,450 4i

This printer is a dot matrix printer similar to the Gould printer. There is a symbol generator with the unit which has a lower case option. The printer can be stopped for one or two seconds in the middle of printing, thus enabling either a

computer to calculate another segment of the page, or allow the Princton storage tube to be re-written for the next page. 4i1

Photophysics printer 4j

Tektronix 3701 printer 4k

Draft of ARC/IPT Proposal Cost Estimate

Draft of ARC/IPT Proposal Cost Estimate

PRELIMINARY COST ESTIMATE

(for the two year period starting 2/8/72)

Personnel Costs 485 man-mo.

Total Direct Labor	578,400		
Payroll Burden	152,119		
Total Labor and Burden	730,519		
Overhead	767,045		
Total Personnel Costs	1,497,564		
Direct Costs			
Travel		14,200	
Facility *		873,059	
Consultants		40,000	
Report Costs		1,926	
Total Direct Costs		929,185	
Total Estimated Cost		2,426,749	
Fixed Fee		118,000	
Total Estimated Cost Plus Fixed Fee $		2,544,749	

* See attached breakdown

Draft of ARC/IPT Proposal Cost Estimate

PRELIMINARY FACILITY COST ESTIMATE

9

Total Facility Costs: 873,059			$	9a
Computer Facility Support 549,459				9b
Lease Cost		519,459		9b1
Computer Facility	$ 423,264			9b1a
Data Products Line Printer	24,300			9b1b
Terminal rental	37,000			9b1c
Telephone expenses	34,895			9b1d
Maintenance and Operation		30,000		9b2
Maintenance Materials	11,500			9b2a
Operating Supplies	18,500			9b2b
Anticipated improvements 323,600				9c
Display system upgrade or replacement		113,000		9c1
PEP 400 character/vector generators				9c1a
with PEP 801 displays 12 @ 6,500	78,000			9c1b
Controller	30,000			9c1c
Interface equipment	5,000			9c1d
Tertiary store		165,600		9c2
RP02s disc storage: 24 months @ 6,900				9c2a
1 DF-10 channel 600				9c2a1
Memory cables 550				9c2a2
Disc controller 600				9c2a3
9 drives 5000				9c2a4
Other 150				9c2a5

Draft of ARC/IPT Proposal Cost Estimate

Experimental lower performance displays	45,000	9c3
Such as: 3 Imlacs @ 15,000		9c3a

Draft of ARC/IPT Proposal Cost Estimate

<JOURNAL>7275.NLS;1, 12-JUN-71 20:57 JCN ; (Expedite) Title:
Author(s): James C. Norton/JCN; Distribution: Douglas C. Engelbart/DCE;
Keywords: ; Sub-Collections: ARC; Clerk: JCN;
Origin: <NORTON>SUMCOST.NLS;8, 12-JUN-71 20:48 JCN ; .DIR=1;
.SCR=2; .HED=
"Draft of ARC/IPT Proposal
Cost Estimate";
.DLS=0;

Part of an ARC/IPT, Project-Continuation Thinkpiece, see (7271,) [0]

APPENDIX D: Descriptive Notes on a System Developer's Intelligence System

APPENDIX D: Descriptive Notes on a System Developer's Intelligence System

The following draws upon the ARC May 1971 report to ONR: 1

Introduction 2

During the past year, we have directed some effort toward the development a small computer-augmented information system oriented toward serving the "intelligence" needs of a research (and/or development) community. We call the system "RINS" (Research Intelligence System). 2a

Within the Augmentation Research Center, RINS is a relatively small project in a long-term activity, all of whose components are continuously developing. RINS is intended to become an operating intelligence system which will supply an active community of system developers with what they need to know about their outside world. Initially (during the current ONR-supported phases), RINS is being developed to serve the 26 people in ARC. 2b

It is ARC's plan to expand steadily the number of R&D groups that interact and collaborate to mutual advantage via computer-network and on-line services. In the planned future, RINS would serve the aggregate needs of these groups for collecting and digesting intelligence data about products, techniques, concepts and activities pertaining to computer-systems development and operation. 2b1

The fact that ONR is supporting development work on a Research Intelligence System carries no implication as to who will support the subsequent operation of such a system. ARC's assumption is that the operating costs will be borne by the party or parties making use of the system. 2b2

Over the years, ARC has developed an extensive set of computer tools and techniques. Among these is an emerging set designed to aid the management of our computer-held files and memos. The following developments toward this end have been made over the last year (by ARPA-supported activity): 2c

(1) Special catalog files, with structure and syntax conventions for encoding arbitrary types of data elements into individual "entries," each of which describes some discrete item that is to be kept track of, searched for, etc.; 2c1

APPENDIX D: Descriptive Notes on a System Developer's Intelligence System

(2) Special computer processes for -- 2c2

(a) Analysing a catalog entry for the nature and content of its data elements 2c2a

(b) Collecting a desired set of entries from the catalog files by scanning a specified set of catalog files and selecting entries according to specified content analysis (which may be directly programmed and compiled by the user) 2c2b

(c) Sorting the entries selected by content analysis into new order depending upon (multilevel) sort keys extracted/generated during the analysis of each entry 2c2c

(d) Formatting information extracted (or conditionally generated) from an entry by an analysis process into an arbitrary display/printout format 2c2d

(3) Methods for producing hard-copy listings and indices for any given sub-collection of items, using special versions of all of the above processes. 2c3

Recent RINS activity: 3

This year's activity for RINS has contributed to the development of our general information-management activity by adding particular details and extensions as required to serve the special needs of managing small, working collections of information items that are a selected portion of the Master Collection: 3a

(1) It helped pay for a professional librarian to be integrated into the practices, problems, and possibilities of ARC's tool-technique life on a full-time basis. 3a1

(2) It contributed to the development of ARC's Master Catalog system by: 3a2

(a) Designing the data-element conventions 3a2a

(b) Resolving the problems associated with developing a "universal" cataloging and information-management system -- i.e., one that could serve both for 3a2b

external-information items (reprints, conference schedules, etc.) 3a2b1

the computer held records of ARC's working information (designs, plans, memos, personal working notes, etc.) 3a2b2

(3) It provided procedures and training for a production throughput system suitable for cataloging into our new forms, and supported partial conversion of our existing XDOC (External Document) entries from our earlier, more primitive catalog form. 3a3

RINS contributed professional and clerical support for cataloging two special collections of reference materials that provide particularly relevant knowledge and techniques for further RINS activity. These collections were developed by other organizations with whom ARC personnel were participating professionally, and served to build useful intelligence base for RINS/ARC and to help these other activities with their reference-management problems. 3b

RINS contributed a small amount of special assistance in catalog coding and in index generation for two special sub-collections of the large NIC Collection. 3c

The next phases of planned RINS activity are: 4

ARC plans the following activities for the next (second) year of ONR-sponsored development of our Research Intelligence System. 4a

(1) Develop a solid, prototypical research-intelligence data base over a limited subject domain in an early test case. We aim at a data base that involves a wide range of material types that clientele are interested in and query frequently. 4b

(2) Add to and/or modify as necessary the computer aids, developed under ARPA sponsorship, that will be used to support RINS processes. (We expect the cost of changes to be small in comparison with the total cost of developing these tools.) 4c

(3) Integrate the data base and tools of RINS into the working life of ARC researchers and NIC users. 4d

APPENDIX D: Descriptive Notes on a System Developer's Intelligence System

Only purposeful use of a system really verifies its design; the costs of shakedown tests are often shared between developmental and operational activities. In this case, the RINS-development project will spend resources to promote, negotiate, and facilitate arrangements with other groups that provide through actual usage the shakedown tests for our system. Added value will be sought in activities which develop the most valuable data and by negotiating working arrangements wherein the resulting data will be integrated into the general collection and made available to others. 4d1

(4) Develop augmented management and operations procedures for running the research-intelligence process: 4e

Exotic tools for cataloging, annotating, retrieving, analyzing, and publishing do not produce an intelligence SYSTEM. We will have such tools, and we will understand the elementary procedures involved in acquiring new materials and integrating them into the data base, but we do not yet have an organization and a methodology for RUNNING an intelligence SYSTEM. 4e1

For instance, a working system needs special conventions and supportive services to help perceive and evaluate various signs of information need, to plan and execute the acquisition of special types of information, and to integrate new information into the system with the correct partitioning, tagging, annotating, and summarizing. 4e1a

RINS will inherit a significant repertoire of computer-augmented techniques from other ARC activities that will help substantially to strengthen the management and operating functions of RINS, but it will take special, continuing attention to develop an effective, "total-system" research-intelligence operation. 4e2

APPENDIX D: Descriptive Notes on a System Developer's Intelligence System

<JOURNAL>7276.NLS;1, 12-JUN-71 21:18 JCN ; (Expedite) Title:
Author(s): Douglas C. Engelbart, James C. Norton/DCE JCN; Distribution:
Jeanne B. North/JBN; Keywords: ; Sub-Collections: NIC; Clerk: JCN;
Origin: <NORTON>JCNAPPD.NLS;4, 12-JUN-71 21:16 JCN ;

Part of an ARC/IPT, Project-Continuation Thinkpiece, see (7271,) [0]

APPENDIX F: Descriptive notes about PBMS, a Project Baseline Management System

14 JUN 71 1:51PM

APPENDIX F: Descriptive notes about PBMS, a Project Baseline Management System
14 JUN 71 1:51PM

Our ARC system development team has the same basic needs for planning, coordinating, documenting, and accounting for a constantly changing set of interrelated tasks as do other groups of people working in goal-oriented endeavours. 1

We constantly face more opportunities for changes or additions to our evolving system than we have resources to carry out. Therefore we must find ways to obtain as effective utilization of our ideas, and of our people, system, and material resources as we can so as to effect the most progress toward our goals. 1a

Planning requires a framework within which information about goals, needs, possibilities, resources, and related dialogue can be recorded, studied and modified usefully. 1b

The result of such coordinated analysis is the adoption of a current visible plan, or "baseline" of expected events, agreed upon system developments, their external configurations, and resource allocations. 1c

ARC planning and task activity is currently conducted in the following operational framework: 1d

- Operations (Providing services) 1d1
  - NIC (operations) 1d1a
  - Computer-System Operations 1d1b
  - Business Operations 1d1c
  - Clerical Support System 1d1d
  - Publication Support System 1d1e
  - RINS (operations) 1d1f
  - External-Collaborator Coordination 1d1g
- Primary Project-Development Activity 1d2
  - NIC (development) 1d2a
  - Computer-System Development 1d2b
    - Software Engineering (TENEX, NLS) 1d2b1
    - Hardware Engineering 1d2b2
  - ARC Organization and Method of Working (Development) 1d2c
    - Business Operations 1d2c1
    - Clerical Support System 1d2c2
    - Publication Support System 1d2c3
  - Team Augmentation (System Development Team) 1d2d
    - Collaboration (Dialogue Support) 1d2d1
    - Baseline Planning System 1d2d2
      - Baseline Record System 1d2d2a
      - Methods, roles, terminology 1d2d2b
    - Augmentation of direct team activities 1d2d3

APPENDIX F: Descriptive notes about PBMS, a Project Baseline Management System
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Software-Engineer Augmentation 1d2d3a
Operations (Maintenance, Requisitions) 1d2d3b
Accounting 1d2d3c
Documentation production 1d2d3d
Measurement and Analysis 1d2d4
User Systems Development 1d2e
RINS (development) 1d2f

The Baseline Record is a special sub-collection of the Journal. It will consist of a series files specially formatted to contain task and resource allocation information, including particularly mixed text/graphic files of plans, specifications, analyses, designs, etc. 2

It will be composed of that portion of our currently accurate working records that represents our best definition of tasks we plan to perform in the future, how we are planning to do them, and what uses of resources (people, system service, materials) are expected. 2a

This record will be produced from central planning data contained in on-line files at ARC, and will contain various views of that information as needed to give meaningful representation of our situation. 2a1

A basic set of Baseline record views includes: 2a1a
1. Schedule: by activity group (NIC,NLS,TENEX) 2a1b
2. Schedule: all tasks by ARC planning stage 2a1c
3. Schedule: all tasks by person 2a1d
4. Baseline record by task, formatted as "status" report, with elements such as: . 2a1e
Information: (about nature of task and agreements) 2a1e1
Buyer(s): (for whom or what task is this task being performed) 2a1e2
Requirements: (agreed upon needs this task will fulfill and certain design criteria as needed) 2a1e3
Design: (details of design - or links to such, user interface features, internal implementation) 2a1e4
Milestones: (significant delivery/evaluation points used when relevant) 2a1e5
Subtasks: (smaller segments made visible for more detailed planning purposes as needed) 2a1e6

APPENDIX F: Descriptive notes about PBMS, a Project Baseline Management System
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Sub-Contracts:(other tasks initiated in direct support) 2a1e7

We will keep some or all of the Baseline Record within a specially organized subcollection of the Journal, shelved separately, and we will use as a "Shelf List" a topically organized Table of Contents. Sections of the Baseline Record that are superceded by new Journal entries will be retired to obsolete status. Changes will be approved and recorded as in configuration management of hardware designs. 2b

We are developing new tools to aid analysis of estimates, schedules and staff involvements, with interactive factor adjustment features to permit consideration of the effects of potential changes in configurations of dates, people, and interdependent tasks. 2c

APPENDIX F: Descriptive notes about PBMS, a Project Baseline Management System
14 JUN 71 1:51PM

<JOURNAL>7277.NLS;1, 12-JUN-71 21:30 JCN ; (Expedite) Title:
Author(s): James C. Norton/JCN; Distribution: Bruce L. Parsley/BLP;
Keywords: ; Sub-Collections: ARC; Clerk: JCN;
Origin: <NORTON>JCNAPPF.NLS;4, 12-JUN-71 21:26 JCN ;

APPENDIX B: Dialogue Support System

APPENDIX B: Dialogue Support System

The Dialogue Support System (DSS) involves techniques for use by distributed parties to collaborate effectively by means of the inter-linked referencing between NLS files, particularly within the recorded-dialogue medium of an NLS Journal. See (7272,) for description of our current Journal conventions and practices. 1

Our DSS will provide the following general on-line aids: multi-windowed displays; simultaneous and independent mobility and view control among many files; link-setup automation; back-link annunciators and jumping; aids for the formation, manipulation, and study of sets of arbitrary passages from among the dialogue entries; integration of cross-reference information into hard-copy printouts. 1a

It also will include people-system developments: conventions and working procedures for using these aids effectively in conducting collaborative dialogue among various kinds of people, at various kinds of terminals, and under various conditions; working methodology for teams doing planning, dssign, implementation coordination, etc. 1b

More detail is given about special DSS techniques in the 7 Dec 69 memo (5220,5d). 1c

Our DSS development will be coordinated with our other developments toward serving teams of people involved in developing complex computer-based systems. Hence we will concentrate upon making a prototype DSS that really supports the developers and users of the systems that ARC is developing and operating -- NLS, NIC, DSS, DPCS, etc. 2

The ARC Handbook is the prototype "super document" (see 5022,5b) that our collabortive dialogue will concentrate upon for ARC's internal, prototype development of DSS. 2a

As features of DSS are seen to be useful to the NIC system of services, they will be so provided. This will provide us with early experience in the use of DSS features among a larger, distributed community. It is assumed that there may be special DSS required for this distriuted-community service; we expect to do this sort of work within the "functional-development" part of our NIC activity. Some discussion of the "distritubed-dialogue" features is to be found in the 7 Dec 69 memo (5220,5e). 2b

APPENDIX B: Dialogue Support System

<JOURNAL>7278.NLS;1, 12-JUN-71 23:35 JCN ; (Expedite) Title:
Author(s): Douglas C. Engelbart/DCE; Distribution: James C. Norton/JCN;
Keywords: ; Sub-Collections: ARC; Clerk: JCN;
Origin: <NORTON>APPB.NLS;2, 12-JUN-71 23:28 JCN ;