DVN 8-NOV-72 16:59 12612

Integration of Halftones into Computer Output to Microfilm (COM): Current Status

On Monday, October 30 Walter and I had a phone conversation with Paul Johnson at DDSI in which we agreed upon a plan to incorporate halftones into the microfilms produced at DDSI pending operation of their MISER system. 1

They eventually hope MISER will reduce halftones to digital information which they can handle just like whole tone information. 1a

Paul would like us to send him screened negatives of the halftones we want to use, sized to fit on the page and the whole page image reduced to fit on a 3 x 5 negative. This negative would not contain any whole tone information. The whole tone information, including space for the halftone illustrations wouldcome on the tape as usual. They plan then to merge optically the frame they make of whole tone information from the tape and the frame we will send them. I have sent a sample set of halftones for the Rome report to SRI photo lab to be sized and made into screened negatives and have set up a file that will provide the necessary whole tone substring for them. 2

DVN 8-NOV-72 16:59 12612

Integration of Halftones into Computer Output to Microfilm (COM): Current Status

(J12612) 8-NOV-72 16:59; Title: Author(s): Van Nouhuys, Dirk H./DVN; Distribution: Meyer, N. Dean, Auerbach, Marilyn F., Stone, Duane L., Bass, Walt/ndm mfa (for your information, and how is your throat?) dls (for your information) wlb ; Sub-Collections: DPCS ; Clerk: DVN;

JBN 8-NOV-72 13:24 12613

Dear Nancy -- We are chagrined to find you fell through a crack, perhaps because of CXP's departure. We are reissuing the Mailing lists to get you listed where you should have been, and we're getting the basic documents to you. -- Jeanne 1

(J12613) 8-NOV-72 13:24; Title: Author(s): North, Jeanne B./JBN; Distribution: Neigus, Nancy J./NJN; Sub-Collections: SRI-ARC; Clerk: KIRK;

RWW 8-NOV-72 9:25 12614

Request to JFV for Further Work Along the Lines of Query

The purpose of this note is to get into writing the needs of the NIC for further work along the lines of Query. 1

Technology is getting increasingly complicated. People seem to be having more and more feelings of helplessness at not being able to effectively learn, use and access this technology for their purposes instead of being overwhelmed by it. 2

The network represents a potentially very useful piece of technology, but one which is very complicated because people cannot easily findout what is there and then at some even simple level learn how to do useful(to them) work. The lack of standard user interfaces and other features on the various network systems compound this problem. 3

The NIC should show the way toward how to solve this problem. 4

Query was well received during the ICCC because of its simplicity while yet allowing access to one important class of information about network resources. Clearly much more work needs to be done in gathering, organizing and, indexing the information about resources in ways indicated by more experience on what information of theis type people seem to need and how they use it. 5

The Query system needs some cleanup in places, but is probably adequate for the purposes of the resource notebook until more work has been done on the database and we have more user experience and feedback. 6

What seems to me to need doing at this point is to think about the problem more generally and to find a way to provide a similar quick and easy access to users questions about how to actually use a given system. Inother words we need an easy way for untrained inexpeienced people to find appropriate user documentation and query, browse etc in this documentation online. 7

Querying the catalog system possibly starting with the formatted indices and then from these being able to get to hardcopy and online documents with a novice ease is also needed. 8

The solution to all the above should be an integrated one and have a minimum of concepts needed by the user to accomplish something useful to himself with what he would feel to be a reasonable amount of time and effort. 9

In other words what we ideally want is to have the user be able to deal with his needs and not the NIC. The NIC should be almost

invisible.The goal should be to produce a study and recommendation for where to go from here, and a suggested design for either an extension of Query or its replacement to handle the full range of material now found in NIC Locator. 10

It would be nice to have something fairly concrete in the design stage in early 73. 11

RWW 8-NOV-72 9:25 12614

Request to JFV for Further Work Along the Lines of Query

(J12614) 8-NOV-72 9:25; Title: Author(s): Watson, Richard W./RWW; Distribution: Vallee, Jacques F., Engelbart, Douglas C., Irby, Charles H., Watson, Richard W., Norton, James C., Engelbart, Douglas C., Kudlick, Michael D., North, Jeanne B., White, James E. (Jim), Rech, Paul, Feinler, Elizabeth J. (Jake)/jfv emc dce mdk jbn jew pr jake ; Sub-Collections: SRI-ARC EMC; Clerk: RWW;

MEH 9-NOV-72 13:42 12615
Motor-Generator for ARC's Computer facility

DRAFT *** MEH 10 NOV 72 6:25AM 12615";

Ref: "Motor-Generator dialogue JCN,MEH" (12616,) 1

Questions to resolve: 2

1. Who will be the pusher? 2a

(JCN recommends Delivery; MDK) 2a1

2. How to approach the problem, knowing past experiences and foreseeable complications. 2b

ie: Getting together other groups to explore the possibility of sharing a system.. 2b1

I talked to Jack Bialik this morring, (11/9/72). He has no interest in pursuing the acquisition of a motor generator. Nevertheless he did say; his preference would be to be on a motor generator system as apposed to not, if one existed. 2b2

Ed talked to Bert Raphael some time ago, Bert was interested at that time, what he wanted was a "uninterruptible" system. 2b3

3. What does Tymshare have? 2c

4. What Hardware needs. 2d

- When a power failure occurs, the power should go down and stay down until a manual restart, (when power is stable again). 2d1

- A detector circuit that opens the computer-facilities breakers when the frequency falls below a presetable value. 2d2

- 50KW service, at least. (this is what we need now, 11/8/72) 2d3

actual now = 270 amps @ 120 volts = 37KW 2d3a

Recommend a 75KW model since "buffer-time", (time after a PG&E power failure), is proportional to percent of generator power being used. 2d3b

- 115v 1PH and 200v 3PH, both plus or minus 10%, (DEC requirement). 2d4

- 60HZ plus or minus 2.%, (Dec requirement). 2d5

- Frequency regulation of Plus or minus 1.%, (DEC requirement). 2d6

- By-pass switch, (a way to manually switch from Gen source to PG&E source). 2d7

- Remote control panel in the computer room containing all switch controls and unit indicators. 2d8

- PM contract on the motor-generator unit. 2d9

5. What hardware does not want. 2e

-not a battery system. This would be more trouble than its worth.. 2e1

ie: Another supply to charge the batteries (high charge and trickle), someone tji2bo maintain and PM them, etc. 2e1a

6. What does Software need? 2f

- Indication that power is going to go down. 2f1

- Time, before power actually goes away to, clean up software . 2f2

HOW MUCH TIME? 2f2a

7. What does ARC want? 2g

- GE Generator: 2g1

"Ride-through"? 2g1a

; Drops power after each PG&E power outage greater than or equal to 300ms. 2g1a1

Gives 200MS to 2.sec clean up time, depending on load. 2g1a1a

Costs: $8,000. - $24,000. 2g1a1b

"Extended-ride-through"? 2g1b

; Drops power after each PG&E outage greater than or equal to 15 sec.. 2g1b1

Gives 1.5sec to 3.3sec clean up time, depending on load. 2g1b1a

Costs: $19,000. - $56,000. 2g1b1b

"Uninterruptible"? 2g1c

; power source that transfers to a 15. min battery pack. 2g1c1

Costs: $44,000. - $99,000. 2g1c1a

MEH 9-NOV-72 13:42 12615

Motor-Generator for ARC's Computer facility

(J12615) 9-NOV-72 13:42; Title: Author(s): Hardy, Martin E./MEH; Distribution: Hoffman, Carol B., Lee, Susan R., Michael, Elizabeth K., Dornbush, Charles F., ARC, Guest O., Feinler, Elizabeth J. (Jake), Handbook, Augmentation Research, Kelley, Kirk E., Meyer, N. Dean, Byrd, Kay F., Prather, Ralph, White, James E. (Jim), Vallee, Jacques F., Kaye, Diane S., Rech, Paul, Kudlick, Michael D., Ferguson, Ferg R., Lane, Linda L., Auerbach, Marilyn F., Bass, Walt, Engelbart, Douglas C., Hardeman, Beauregard A., Hardy, Martin E., Hopper, J. D., Irby, Charles H., Jernigan, Mil E., Lehtman, Harvey G., North, Jeanne B., Norton, James C., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff, Jake, Row, Barbara E., Riet, Ed K. Van De, Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I./SRI-ARC; Sub-Collections: SRI-ARC; Clerk: BER; Origin: <HARDY>MGEN.NLS;19, 9-NOV-72 13:38 BER ; HJOURNAL="***

MEH 9-NOV-72 13:47 12616
MOTOR-GENERATOR DIALOGUE JCN, MEH

DRAFT *** MEH 10 NOV 72 6:27AM 12616";

MOTOR-GENERATOR (J4M)* (FJ4M:lyw)* 1

(J4M)* As we were discussing yesterday, the need for protection from power failures seriously affecting our computer system must be met as soon as possible. ARC really should have worked out a solution to this problem long ago... but perhaps we still have time before another serious failure... let's hope so. 1a

I think this is a question that our Delivery team should help us with, but as Operations-Hardware you and I have the greatest interest in seeing that such protection is secured and therefore should get work started on the solution to the problem. 1a1

When you have gathered any information on motor-generators that Ed may have, let's get together with Mike and the Delivery team to discuss how to proceed. 1a2

We may find that Tymshare has a good solution.. Mike is probably the best one to contact them. We can work that out later. 1a2a

There has been some talk about sharing such a device with the other computer facilities on the second floor. If that is technically feasible, it might be a good idea. 1a3

Since this will be capital equipment, it really seems to be Bart Cox's decision about whether to spend the money or not... and how much. 1a3a

Let's find what we think is the best solution, either including sharing or not, and get a recommendation to EMC and Bart Cox - after discussing with Jack Bialik and Bert Raphael. 1a4

If possible, I would like Mike and his team to be responsible for the study and recommendation after the first meeting. Your bringing some preliminary data will help,. OK? 1a4a

(FJ4M)* I should have it together by this afternoon or tomorrow, if things don't get to busy. 1b

ED has completed most all the ground work already; who makes them, how much, and what controls we want. 1b1

As far as getting other groups involved We best first define exactly what we want, and maybe even put the request in. 1c

(There have been some attempts to get other groups involved in the past, by ED, and in all cases it bogged down for one thing or another, AND HERE WE ARE 11/7/72, STILL WITHOUT). 1c1

MEH 9-NOV-72 13:47 12616

MOTOR-GENERATOR DIALOGUE JCN,MEH

(J12616) 9-NOV-72 13:47; Title: Author(s): Hardy, Martin E./MEH; Distribution: Hoffman, Carol B., Lee, Susan R., Michael, Elizabeth K., Dornbush, Charles F., ARC, Guest O., Feinler, Elizabeth J. (Jake), Handbook, Augmentation Research, Kelley, Kirk E., Meyer, N. Dean, Byrd, Kay F., Prather, Ralph, White, James E. (Jim), Vallee, Jacques F., Kaye, Diane S., Rech, Paul, Kudlick, Michael D., Ferguson, Ferg R., Lane, Linda L., Auerbach, Marilyn F., Bass, Walt, Engelbart, Douglas C., Hardeman, Beauregard A., Hardy, Martin E., Hopper, J. D., Irby, Charles H., Jernigan, Mil E., Lehtman, Harvey C., North, Jeanne B., Norton, James C., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff, Jake, Row, Barbara E., Riet, Ed K. Van De, Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I./SRI-ARC; Sub-Collections: SRI-ARC; Clerk: BER; Origin: <HARDY>DMGEN.NLS;3, 9-NOV-72 13:45 BER ; HJOURNAL="***

DVN 9-NOV-72 14:51 12618

Lost Journal Messages

I got your message just now. I sent you a journal message a couple of days ago or late last week, which I checked your initial file and JCAT and discovered to be lost. Technology does make ocmmunication difficult. 1

The journal item explained what happened to our system last week, thaked your for your information about sndmsg, gave my address: j2078/Stanford Research Institute/ 333 Ravenswood ave/ Menlo Park 94025,and some other damn thing abut the net I've forgotten now.Also something about me I've forgotten. 2

While wandering around in information space I found the journal message you sent Cindy Page. She has quit to teach scientology. Susan Lee (SRL) has taken over her work. Cindy was supposed to have sent out a journal message to that effect. I gave your message to Susan. You might tell a few people at BB&N. 3

I'd enjoy your comming to TNLS class, but remeber circumstances alter fantasies 4

DVN 9-NOV-72 14:51 12618

Lost Journal Messages

(J12618) 9-NOV-72 14:51; Title: Author(s): Van Nouhuys, Dirk H./DVN; Distribution: Neigus, Nancy J./njn ; Sub-Collections: SRI-ARC; Clerk: DVN;

HGL 9-NOV-72 11:48 12619

VISITOR LOG: Vicky Meyer and Matthew Heiler of Stanford Art Department

Visit by Vicky Meyer and Matthew Heiler of Stanford University Art Department. 8 November 1972. 1

Vicky Meyer is a graduate student in art at Stanford. She is working on a computer system which hopefully will serve as a tool in the creation of art pieces. She discussed her conception of the use of formal algorithmic techniques in the plastic arts and played a video tape of a piece made on an Adage computer terminal of the Industrial Engineering department. 1a

Her ideas are as yet not completely developed. 1a1

Matthew Heiler is interested in design and graphic arts as well as the production of films. He recentlly became interested in the possibilities of computer animation, although he currently is not aware of much of the work that has previously been carried out in the field. 1b

He was interested in some of the COM materials we showed him, as well as the work of people like Ron Baecker which we described to him. 1b1

We pointed out that although we do not currently have available the use of pictures in NLS, it is likely that as the SEAS community expands, graphics capabilities will be among the first additions to be added to the system, probably by other groups in the community. 1b2

HGL 9-NOV-72 11:48 12619

VISITOR LOG: Vicky Meyer and Matthew Heiler of Stanford Art Department

(J12619) 9-NOV-72 11:48; Title: Author(s): Lehtman, Harvey G./HGL; Distribution: Engelbart, Douglas C., Van Nouhuys, Dirk H., Norton, James C./dce dvn jcn ; Sub-Collections: SRI-ARC; Clerk: HGL; Origin: <LEHTMAN>LOG.NLS;2, 9-NOV-72 11:44 HGL ;

JLM 9-NOV-72 11:01 12620

ftd documentation

i have been talking to IR personnel and have discovered interest in ahi and in particulara potential application of your doc,distribution and preparation cabilities.D luther is apparently providing them(FTD with a stand alone post editing system and has built a good rapport with a mani dealt with c.manggio.He is in charge of report preparation and this has been identifed as a bottle neck in their operation.Since you know dave it might be smart if you contacted him though if you prefer we can . Suggest that you send us refernces which might be helpful . 1

JLM 9-NOV-72 11:01 12620

ftd documentation

(J12620) 9-NOV-72 11:01; Title: Author(s): McNamara, John L./JLM;
Distribution: Engelbart, Douglas C., Stone, Duane L./DCE DLS;
Sub-Collections: RADC; Clerk: JLM;
Origin: <MCNAMARA>DOC/DIST/FTD.NLS;1, 9-NOV-72 10:53 JLM ;

PR 9-NOV-72 14:15 12621

Visit from Zimmermann of IRIA (France)

Visit Report: Date: Nov.6, 1972

1

Name of Visitor: Hubert Zimmermann

1a

Title: Ingenieur de Projet

1b

Name of Company: IRIA (Intitut de Recherche d'Informatique et d'Automatique)

1c

Address: Domaine de Voluceau
78150 Rocquencourt, France
Tel: 954-90-20

1d

Main Contact: Paul Rech

1e

Other Contacts: DCE, RWW, JEW, JBN

1f

Remarks:

1g

Zimmermann is working for IRIA on the project Reseau Cyclades (Network "Cyclades"). This poject, which is managed by L. Pouzin, was set up about a year ago by the "Delegation de l'Informatique" for the purpose of coordinating the development of French computer communication networks. At the present, the project is a small one, and only employs about 10 people.

Their initial charter is limited both in scope and time. The first phase does not extend beyond 1975, when a general review and appraisal should take place. At that time the project might be either terminated or reorganized. As far as the scope is concerned, they consider themselves as the French counterpart of Larry Roberts' office with, however, greater involvment on the technical aspects of network technology. One application area being considered is the possible sharing of data bases between the various French Government Administrations.

1g1

PR 9-NOV-72 14:15 12621

Visit from Zimmermann of IRIA (France)

Zimmerman was interested in:

(1) our knowledge in information handling with NLS, and
(2) in our experience as Network Information Center for the ARPA
Network.

1g2

Comments: Doug explained the potential we see for networks. They will not only support the sharing of data and computation resources, but they will also have a strong impact on all information services. In particular, they will offer new means of collaboration in knoledge-work, and thus increase greatly its effectiveness (12380,).

1g3

Action:

1h

L.Pouzin, to whom Zimmermann is reporting, has approached me during the ICCC meeting in Washington with the following request. He would like to send one of his engineers on a nine month assignment to ARC to work on the NIC and other network related problem areas. Pouzin gave me a resume of his candidate, and specified that he would pay his salary while he would be working for us. I told him that I would raise the question with Doug.

Which I did. I also passed on the request to Mike Kudlick who is hanling it. I told Zimmerman that Doug is seriously considering the possibility, but that we are presently reorganizing ARC and that, therefore, I doubted that we would be able to commit ourselves before early next year. I have added that an official answer will be sent out shortly. See links below for reference to the answer.

1h1

At his request, we gave Zimmermann the following NIC documents:
6784;# 5806, 5763; 5143; the graphic protocol #9929; the official host-host protocol 8246;and the documents 12390 and 7155

1h2

Furthermore, Doug gave him a copy of (12380,) entitled "Centrally Coordinated Information Services for a Discipline or Mission Oriented Community."

1h3

PR 9-NOV-72 14:15 12621

Visit from Zimmermann of IRIA (France)

We promised to send them the Resource Notebook and the NIC Indexes (JBN).

1h4

It should be noted also that Pouzin has been made member of the Network Associates Group and, therefore, will from now on be on our regular NIC mailing list.

1h5

Links to Related Items:

1i

Letter to Pouzin from Engelbart & Kudlick answering their request; (12543,) (the decision will be posponed until next March).

1i1

Transmittal letter to Pouzin of some NIC documents requested in August: NIC # (10941,).

1i2

PR 9-NOV-72 14:15 12621

Visit from Zimmermann of IRIA (France)

(J12621) 9-NOV-72 14:15; Title: Author(s): Rech, Paul/PR ;
Distribution: Hoffman, Carol B., Lee, Susan R., Michael, Elizabeth K.,
Dornbush, Charles F., ARC, Guest O., Feinler, Elizabeth J. (Jake),
Handbook, Augmentation Research, Kelley, Kirk E., Meyer, N. Dean, Byrd,
Kay F., Prather, Ralph, White, James E. (Jim), Vallee, Jacques F., Kaye,
Diane S., Rech, Paul, Kudlick, Michael D., Ferguson, Ferg R., Lane,
Linda L., Auerbach, Marilyn F., Bass, Walt, Engelbart, Douglas C.,
Hardeman, Beauregard A., Hardy, Martin E., Hopper, J. D., Irby, Charles
H., Jernigan, Mil E., Lehtman, Harvey G., North, Jeanne B., Norton,
James C., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff,
Jake, Row, Barbara E., Riet, Ed K. Van De, Van Nouhuys, Dirk H., Victor,
Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W.,
Andrews, Don I./sri-arc ; Sub-Collections: SRI-ARC; Clerk: PR;
Origin: <RECH>VISITS.NLS;2, 8-NOV-72 18:30 PR ;

DLS 10-NOV-72 10:27 12700

MISUSE BRIEFING

This is an after the fact document describing the pitch I gave to the MISUSE committee. It may not be exactly what I said, but should convey the general thrust of the AHI Evaluation Project at RADC. If it's OK I'll print it out on the mag card typewriter.

MISUSE BRIEFING

The system which I will discuss is a "Management Information System" only in the sence that managers as well as workers can use it. Managers should be able to follow the development of their workers' activity on a daily basis if necessary. One of the basic problems in designing MIS's which is often overlooked is the problem of obtaining up-to-date information which is accurate. This is often a problem where the information in the data base is of little or no use to the individuals who have to update it. This is the case in most MISs in use today. However, if a way could be devised to "tap-off" the workers everyday documentation, that information pertainent to managers, then the updating problem should disappear. 1

There is a broader problem in many organizations than just management. It could be classed as a communication problem brought about by the combined forces of reduced manpower, increased complexity of problems, coordination within a large and complex hierarchial organization, and the pencil & paper technology. To gain an appreciation of this problem let's look for a moment at R&D in the Air Force. 2

Recent concern has been expressed over the cost effectiveness of weapon systems, particularly over the R&D process which brings these systems into being. 3

Witness the adoption of the TCP concept by high level Pentagon Management. This was instituted primarily to improve the "relevence" of R&D to the needs of operational commands, and to reduce the duplication of effort among the services. 3a

A general reduction in dollars available for R&D can be expected in the next few years. 3b

Reductions in manpower have already begun. 3c

We are being advised by Heilmeier and others to "discourage increases in in-house programs in electronics and computer sciences and not to preserve them at the expense of contractual efforts". 3d

General Brown is discouraging travel in the hopes of saving a few bucks. 3e

Inflation will further reduce the amount of R&D obtainable per dollar spent. 3f

On the other hand, the problems which must be faced by R&D people are becoming more complex. The systems themselves are more complex, ie. they contain more components which must work together to respond faster, more accurately, and with greater reliability. 4

MISUSE BRIEFING

The information availible to developers continues to proliferate. 4a

The amount of review and coordination of R&D projects increases every year due to: 4b

the size and complexity of the organization 4b1

and the accummulated regulations which govern its behavior. 4b2

If one examines how R&D is actually conducted within a place like RADC for example, one discovers that a large % of it is already done by contractual means. This means endless paperwork, documentation, justification, coordination, etc. It is doubtfull that managers above the section level have any idea how much of their "engineers'" time is spent on paperwork and related administrative tasks. Of course this time is taken away from legitimate engineering and system design effort. 5

A similar thing has been noticed in Air Staff concerning the Action Officers. They end up spending 90% of their time in coordination, documentation, and administrative tasks and only 10% of their time considering issues of national defense 6

A recent study by PRC of the intelligence organization at FTD found that the biggest prblem was production and coordination of documentation. 7

In short, in the R&D community, in Air Staff, in intelligence and undoubtedly in other organizations throughout DOD, we are reaching a state of stability as defined in Cohn's Law. 8

Cohn's Law states: 8a

"The more time you spend in reporting what you are doing, the less time you have to do anything. Stability is achieved when you spend all your time doing nothing but reporting on nothing you are doing." 8a1

Both the efficiency and the effectiveness of engineers, action officiers, etc are limited by the media through which they are forced to communicate. Pencil, paper, typewriters, filing cabnets etc have outlived their usefulness. Information should flow throughout an organization freely, should be readily be accessable to all who need it and should be in a form which is easy to manipulate for one's own purposes. 9

Why should it take 6 months to a year from the time a procurement package is composed until a contract is awarded? 9a

Why are technical meetings seldom documented and each individual attending leaves with a different view of what transpired? 9b

Why are workers seldom consulted on questions of policy which affect their projects? 9c

Because communications are breaking down within DOD organizations due to the limitations of paper-and-pencil technology and thinking. 10

For a number of years, the computer has been viewed as a possible means of aiding the human communication processes. Only recently has this become a distinct possibility due to advances in two areas. 11

The design and implementation of an on-line system to augment the intellectual proccesses and; 11a

the design and implementation of a communications network to allow high speed reliable and inexpensive communication between computers. 11b

The communications network is the ARPANET. It works, is reliable and is economic. An extensive evaluation of it is not required. One has only to use it for a period of time to be convinced of its capability. 12

A system to augment the human intellect is another matter. Dr. Englebart at Stanford Research Institute claims to have developed such a system. When one visits their facility, it is easy to see that the people that work there are indeed augmented. That is, the intellectual processes of composing, storing , distributing, and recalling ideas, notes, memos, documents, computer programs, etc. are enhanced by use of an on-line computer facility by highly trained people. 13

There is reason to believe that SRI's system could be successfully implemented within an Air Force environment. SRI has been concerned with augmenting the whole system, that is, the human plus the language, methodology and the artifacts he uses. As a result of this systems approach, a highly user oriented system has evolved where procedures, terminals and the command language are integrated into a whole whose value exceeds the worth of the individual parts. The system is also open ended and can be easily "customized" for a particular application. The end result is an ever evolving system which has reached the state where it is reasonable to expect that people without a computer background could readily use it in their every day communication tasks. 14

Three questions remain to be answered however, before this technology can be recommended for general Air Force use. 14a

MISUSE BRIEFING

Can it be introduced into an Air Force environment at all? Individuals may not be motivated to use the system. Training is required, procedures may have to be changed to take advantage of the technology. 14a1

If it can be used, what is its value? Does it increase efficiency of individuals and organizations? Is there an increase in their effectiveness? How much are efficiency and effectiveness increased? 14a2

What is the cost of the improvements and are they worth it? 14a3

These questions will be the subject of the evaluation at RADC over the next fiscal year (FY-74). Comparisons will also be made between the system developed by SRI and a conventional state-of-the-art on-line system such as GECOS. 14b

The entire Information Processing Branch (ISI) will be trained on the system and its performance in conducting everyday jobs will be compared with a sister branch using conventional techniques. A representative sample of people (42 total) consisting of managers, secetaries, administrators, and engineers will conduct their everyday jobs over an extended period of time using the system. This type of evaluation should give us data which can be generalized to other environments such as Air Staff. 14b1

It appears that on-line computers will be used more and more within the Air Force, not just to support Command & Control functions, but to support "everyday" office functions through out Staffs, R&D, Intellegence, etc. We should be ready at RADC to advise and design systems for these users as they come to us. We should also continue developing the technology. Much remains to be done in the area of management aids, graphics, and computation capability. 15

Status and Plans (as of Sept 72) 16

All the efforts in this area are based on the Augmented Human Intelect (AHI) technology developed at Stanford Research Institute (SRI) under ARPA sponsership over the past 10 years. RADC personnel have monitored this program for the past 5 years and are convinced that the feasibility of significant job performance improvement in an intellectual environment is indeed possible. SRI has developed the system through a "bootstraping" process where the system's capabilities at any particular instance in time are used to further develop the system. The augmentation capabilities of the system have evolved through the individual, to the team, to the organization stage, and are now approaching the community stage via use by individuals and teams around the ARPANET. 16a

The development activity during FY-72 was concentrated on acquiring the necessary physical plant for use and evaluation of the SRI AHI system. RADC is connected to the ARPANET via a standard H316 Terminal Interface Processor (TIP). Internal lines have been acquired to connect the terminals to the TIP. Tweleve Execuport 300 teleprinters, three IMLAC PDS-1D crt display terminals, and four Termicette cassette recorders have been purchased. Nine engineers, a section cheif, a secretary and an administrator have recieved varing amounts of training in the use of the system and the rest of the ISIM section are currently undergoing training. The initial specification of a baseline management system complete with SOPs, file design, and personnel role assignment has been completed. The research group at RADC has progressed to the point where they are doing the bulk of their daily work using the system; in fact, this writeup was prepared, coordinated and edited a number of times using the system. The FY-73 activity will be concentrated on training the rest of the ISI branch (giving a total of 45 people using the system), procuring additional terminals and a medium speed line printer, and refining the baseline management system--to include interfacing it with MASIS. The activity in FY-74 will be concentrated on evaluating the efficiency and effectiveness of using the system. Out years will be concerned with developing and incorporating advanced management techniques such as DELPHI, resource allocation straegies, and advanced graphics capabilities. This activity will be significantly enhanced by the use of others' research work via the ARPANET. 16b

MISUSE BRIEFING

During FY-73 & 74 it will be possible (based on the evaluation activity under 6.3) to specify and refine the design of a prototype system for a portion of the DCS/P&O's problems. An engineering development project will be created to allow for equipment procurement and installation. The current estimate of a minimal configuration for useful test would consist of a TIP to connect to the ARPANET, an IMP for connection to the Command Post computer or the Data Services computer, a secure line or krypto device connecting the two IMPs and a mix of 10-15 teleprinter and crt terminals. The test population within DSC/P&O should consist of a working group, its secretaries, and at least three levels of administrative and command personnel in the management chain. 16c

DCS/P&O has been given engineering support by RADC at a low level since FY-68 under ESP project 921A-9339, "Data Handling Support for Air Staff". During FY-72 an Execuport-300 was loaned to the office of Assistant for Automation (AF/XOA) and one action officer given preliminary training in using the AHI system via the NBS TIP and the ARPANET. He in turn has given instruction to another officier in Data Services. The purpose of this activity is to familiarize a limited number of people within Air Staff with the capabilities of the AHI system. 16c1

In addition to the AHI activity, RADC has leased a BR-700 Information System for a 3 month operational test within DCS/P&O. The 700 will be used by administrators to track the progress/status of some 800-1000 actions which come into the organization each month. This system is a stand-alone message composition, sending and retrieving device; which is representative of an off-the-shelf intermediate operational capability for use prior to the instalation of any portion of the AHI technology. 16c1a

During FY-73 & 74 a continuing operations research activity will be carried on within DCS/P&O. This will be conducted by a combined team from AF/XOA, RADC and SRI. The purpose of this activity will be to explicitly identify the functional and organizational units and their environmental constraints which will allow a meaningful test of the AHI technology. The team's productivity should be significantly enhanced by using the system to plan, implement, and document this activity; and will constitute an informal evaluation of the effect the technology can have on team performance, where the team members are geographically separated. 16d

APPENDIX 17

What is an AHI System? 18

The total augmentation system available to the people at SRI is not being used or evaluated at RADC. We are interested in only two of some six major subsystem available. These are the Dialogue Support System and the Documentation Production and Control System (these are all that are necessary for the creation of an "electronic office"). 18a

Artifacts 18b

The computer itself is a PDP-10X consisting of 128K core, disc pacs, and a swaping drum. 18b1

There are three types of teminals which are used, which correspond to the three ways in which the system can be accessed. These are: 18b2

Offline--typwriter like terminals coupled to digital cassette recorders. 18b2a

Online--high speed (30cps), portable, acoustically coupled, quiet, TTY like printing terminals. 18b2b

Online--highly interactive programmable CRT with mouse and keyset for rapid interaction with data on the screen. 18b2c

Communications from the terminals to the SRI facility are accomplished via the ARPANET. They are "instantaneous" as far as the human at the terminal is concerned. Its just like being there. Unlimited communications to SRI or any other site on the ARPANET is obtained for an initial capital investment of $100K and an annual fee of $25K for maintence and line charges. 18b3

Software 18c

Dialogue Support System 18c1

File Structure 18c1a

The basic file structure is an indented or outline form, with essentially unlimited depth and breadth in the tree. Examples of the structure are seen in this document. 18c1a1

Text Editor 18c1b

MISUSE BRIEFING

The text editor portion of the system is a subset of the commands available under the basic on-line system (NLS). It is designed with the user in mind--that is, the command language is easy to learn with minimal exposure ex.(Maj Logan (AF/XOA)--one day of hands on use plus the user's guide). The command syntax consists generally of a two letter statement followed by an address---"is" means "insert statement--"dw" means "delete word"--"mg" means "move group"--etc. The capability exist to edit both the content and the structure of the file. 18c1b1

The commands are: insert, print, move, copy, delete, replace, transpose, append, break, and substitute. 18c1b2

Textual enities are: character, word, text, visible, invisible, number, and link. 18c1b3

Textual structures are: statement, branch, plex, and group. 18c1b4

Adresses are any combination of the following: 18c1b5

statement number (.7c6a) 18c1b6

statement name (.name) 18c1b7

struceral (s, p, h, t, n, b) 18c1b8

link (stone,demo,1:mwy) 18c1b9

In addition to direct editing commands there are a number of subcommand modes which allow other functions: 18c1b10

"ej" execute journal allows the sending of messages and files to other individuals and groups (the files are also automatically catalogued and filed by the journal). 18c1b10a

"ea" execute assimilate--allows a xerox, cut and paste type operation 18c1b10b

"ee" execute edit allows another set of subcommands to be used for editing within statements. 18c1b10c

Journal System 18c1c

Messages can be prepared and "sent" to other individuals or groups using the system. 18c1c1

More lenghtly files or documents can also be sent to users of the system. 18c1c2

In both cases a notification of a message or document is placed in the receipent's "mailbox file", which he normally checks every morning when he logs into the system. Every message or document sent by anyone on the system is automatically catalogued and indexed by keyword in the title, author and number. 18c1c3

Automated Searching 18c1d

Searching a file for content is facilitated by commands like: "jump to name"(the first word in a statement if it is surrounded by parentheses), "jump to literal"(any string of text) and "jump to link" (which allows cross file jumps) ie, live referencing. 18c1d1

Document Production and Control System 18c2

A number of output subsystems exist which "pretty up" files for output to various devices. Current devices include line printer, teletype and its many versions, and COM (Computer Output to Microfilm). Output directives (over 200 in all) specify such things as: page headings and their position, length of pages, margins of pages, spacings between lines and statements, occurrence of statement numbers and their position, etc. 18c2a

Languages 18d

There are a number of integrated languages availible on the system which may be used by anyone with the interest or job requirement to learn them. In order of increasing complexity they are: 18d1

Command language (for majority of users) 18d1a

Analyzer-Formatter (allows creation of search patterns, sorts etc.) 18d1b

L-10 (assembly language-string oriented language in which NLS itself is written) 18d1c

Executive (TENEX) 18d1d

Meta language (allows the creation of new programming languages) 18d1e

MISUSE BRIEFING

Training 18e

A certain level of skill must be developed by the users of the system, depending upon their particular jobs. Secretaries need only understand the indented file structure and need only remember to insert a statement number and terminate each statement with a . Engineers and other heavy users will want to go more deeply into the editing and cross file manipulation techniques. Managers need only understand the rudiments of displaying files from other peoples' directories. The system is equiped with self help capabilities and its documentation is maintained, updated and available on-line so that any one can go as deep into the system as he desires with a minimal amount of tutoring. 18e1

People 18f

People are a vital and integral part of any augmentation system. At SRI they have established a People Support Organization (PSO). The role of individuals in this organization is analogous to the combined roles of secretary, clerk, and administrator. In addition they perform librarian, transcription, and document production functions. To be effective it was necessary to take secretaries etc away from individuals and bring them together into a "pool" (just one example of the type of change that might have to be made within the Air Force when introducing this technology). The people within the PSO of course have the full power of the augmentation system at their disposal to assist them in their support role. 18f1

Proceedures 18g

To be effective, many proceedures must be changed and new ones invented. Individuals must maintain self disipline and enter information into the system. Coordination should be accomplished online and hardcopy only made when the final coordinated product is prepared for the "outside world". One must continually check his mailbox to discover messages and documents that have been sent to him. Some amount of common file structure must be maintained for things like meeting notes, status reports, plans, etc if others are to easily view individuals files. Privacy codes must be used sparingly, ie the system works best if all files are open and available to everyone in the organization. 18g1

DLS 10-NOV-72 10:27 12700

MISUSE BRIEFING

(J12700) 10-NOV-72 10:27; Title: Author(s): Stone, Duane L./DLS;
Distribution: McNamara, John L., Bucciero, Thomas J./JLM TJB2;
Sub-Collections: RADC; Clerk: DLS;
Origin: <STONE>MISUSE.NLS;1, 10-NOV-72 8:53 DLS ;

DHC 9-NOV-72 13:35 12702

Changes

Greetings;

I need to change my affiliation to Ucla-Nmc, from Arpa, with my address at Ula-Nmc and phone numbers (213)825-1700 and (213)825-2368 and (213)826-2641.

Can you do it for me, or how do I do it?

many happy thanks of the day.
D/

1

DHC 9-NOV-72 13:35 12702

Changes

(J12702) 9-NOV-72 13:35; Title: Author(s): Crocker, David H./DHC; Distribution: Row, Barbara E./BER; Sub-Collections: NIC; Clerk: DHC;

DLS 10-NOV-72 10:41 12703

Bill Bethke is Augmented??

Bill Bethke is starting to use the system under Bucciero's directory. If you have any messages to send to him use Tom's ident, TJB2. Hopfully SRI can be persuaded to create a directory for him. William P Bethke, Information Sciences Division, RADC, Griffiss AFB, New York 13440. Phone 315-330-2204 1

DLS 10-NOV-72 10:41 12703

Bill Bethke is Augmented??

(J12703) 10-NOV-72 10:41; Title: Author(s): Stone, Duane L./DLS; Distribution: Stone, Duane L., Bair, James H., Lawrence, Thomas F., Norton, James C., Rech, Paul, Van Nouhuys, Dirk H., Bucciero, Thomas J., McNamara, John L., Norton, James C., Iuorno, Rocco F., Petell, Marcelle D., Stellato, Josephine R., Panara, Roger B., Sliwa, Frank P./RBMS TJB2 JLM JCN RFI MDP JRS RBP FPS; Sub-Collections: RADC RBMS; Clerk: DLS;

Basically, your footnote ideas are great. I especially like Jump to Footnote and Jump Through Footnote. 1

Considerations I have-- 1a

I don't think backlinks from footnote to reference are desirable. 1a1

I prefer (J)ump to (Fo)otnote syntax. 1a2

It is operationally difficult to update documents which are likely not to be on-line anymore. 1a3

Can anyone cause my document to be pock-marked with remarks, even if I don't want that? 1a4

There is a real difference between the author using FOOTNOTES on his own document, and someone else COMMENTING on certain statements. 1a4a

DSK 10-NOV-72 8:36 12704

(J12704) 10-NOV-72 8:36; Author(s): Kaye, Diane S./DSK; Distribution: Kudlick, Michael D./mdk ; Sub-Collections: SRI-ARC; Clerk: DSK;

Lost Journal Messages

One of the lost journal messages was (journal,12614,) 1

DVN 10-NOV-72 15:26 12705

Lost Journal Messages

(J12705) 10-NOV-72 15:26; Title: Author(s): Van Nouhuys, Dirk H./DVN; Distribution: Neigus, Nancy J./njn ; Sub-Collections: SRI-ARC; Clerk: DVN;

DVN 13-NOV-72 8:58 12706

My Hours

1

DVN 13-NOV-72 8:58 12706

My Hours

(J12706) 13-NOV-72 8:58; Title: Author(s): Van Nouhuys, Dirk H./DVN; Distribution: Norton, James C., North, Jeanne B., Auerbach, Marilyn F., Lehtman, Harvey G., Rech, Paul, Watson, Richard W., Hardeman, Beauregard A., Row, Barbara E., Lane, Linda L., Lee, Susan R., Jernigan, Mil E., Kelley, Kirk E./JCN JBN MFA HGL pr rww bah ber lll srl mej kirk ; Sub-Collections: SRI-ARC; Clerk: DVN;

JBP 10-NOV-72 12:51 12707

message

I read your comments on my prospectus and fuond them very helpful, and i an glad that you called my attention to the really hard questions about other work, importance, uniqueness, relevancy, and predicted results. i'll try to talk to you next week. --jon. 1

JBP 10-NOV-72 12:51 12707

message

(J12707) 10-NOV-72 12:51; Title: Author(s): Postel, Jonathan B./JBP; Distribution: Cerf, Dr. Vinton G./VGC; Sub-Collections: NIC; Clerk: JBP;

JBP 12-NOV-72 14:41 12708

wild sockets

dave: could you please tell me the exact form of the socket numbers that are listened to by a device once it has been set wild. i am interested in putting together a program which could simulate a wild printer on a tip or even a wild card reader. one thing i want to do is to match up to tenexs tipcopy program.
--jon.

1

JBP 12-NOV-72 14:41 12708

wild sockets

(J12708) 12-NOV-72 14:41; Title: Author(s): Postel, Jonathan B./JBP; Distribution: Walden, David C./DCW3; Sub-Collections: NIC; Clerk: JBP;

JBP 12-NOV-72 14:49 12709

simulated tip ?

bob: could tell me somthing about the program tipcopy. i am interested in putting together a program to simulate a wild printer and possibly a wild card reader on a tip which actually interfaces to our file system. what i need to know is the exact form of the socket numbers used in tipcopy and how they are composed from the information supplied by the user. would tipcopy complain if i told it ucla-nmc was a tip and if not what host number would it use ? -- jon. 1

JBP 12-NOV-72 14:49 12709

simulated tip ?

(J12709) 12-NOV-72 14:49; Title: Author(s): Postel, Jonathan B./JBP; Distribution: Thomas, Robert H./RHT; Sub-Collections: NIC; Clerk: JBP;

JCP 10-NOV-72 11:21 12710

The New DELD

Hey, people, there now exists a new and better DELD. For anyone who doesn't know, DELD is the little program that goes around and expunges the deleted files from every directory. DELD no longer prints out the names of all the directories as it finishes them. If you want to know which directory it's on, you do a control-W and it prints out the directory name and its number. 1

Additionally, the new DELD has a detached running option. When you enter, it will ask you if you want it to run detached. If you respond with N, it will work as it normally would, except without printing directory names. If you respond with Y, it will ask for the number of minutes between each run. This means that, after it detaches, it will rerun DELD indefinately as often as you have specified. After you enter the number of minutes between runs and do a carriage return, it detaches you and runs. 2

If you do a SYSTAT, the user running the detached form of DELD will be seen to be detached and found under one of two different subsystem names. If DELD is actually running the SYSTAT will say DELD for subsystem. If it is in the waiting mode between runs, the SYSTAT will say DELDWT. 3

It is my hope that this new DELD will make things easier for everyone during times of disc page scarcity. Now if we run out of disc pages, it will simply be because people didn't get rid of the garbage in their directories. We shall see what we shall see. 4

JCP 10-NOV-72 11:21 12710

The New DELD

(J12710) 10-NOV-72 11:21; Title: Author(s): Peters, Jeffrey C./JCP; Distribution: Andrews, Don I., Bass, Walt, Dornbush, Charles F., Ferguson, Ferg R., Hopper, J. D., Irby, Charles H., Kaye, Diane S., Lehtman, Harvey G., Michael, Elizabeth K., Vallee, Jacques F., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), White, James E. (Jim)/SRI-PROG; Sub-Collections: SRI-ARC SRI-PROG; Clerk: JCP; Origin: <PETERS>NEW-DELD.NLS;2, 9-NOV-72 13:57 JCP ;

JEW 11-NOV-72 14:53 12711

STAN COHEN will be visiting MONDAY

Stan Cohen, from Argonne Natl Labs, author of SPEAKEASY, a mathematical package demonstrated at ICCC, will be at ARC on Monday, 13 Nov. He'll be around in the morning if anyone cares to see him demo SPEAKEASY through the Net at UCLA. He's bringing a 20 minute film on SPEAKEASY, which tentatively will be shown at 1 pm in the conference room for all who are interested. 1

JEW 11-NOV-72 14:53 12711

STAN COHEN will be visiting MONDAY

(J12711) 11-NOV-72 14:53; Title: Author(s): White, James E. (Jim)/JEW; Distribution: Hoffman, Carol B., Lee, Susan R., Michael, Elizabeth K., Dornbush, Charles F., ARC, Guest O., Feinler, Elizabeth J. (Jake), Handbook, Augmentation Research, Kelley, Kirk E., Meyer, N. Dean, Byrd, Kay F., Prather, Ralph, White, James E. (Jim), Vallee, Jacques F., Kaye, Diane S., Rech, Paul, Kudlick, Michael D., Ferguson, Ferg R., Lane, Linda L., Auerbach, Marilyn F., Bass, Walt, Engelbart, Douglas C., Hardeman, Beauregard A., Hardy, Martin E., Hopper, J. D., Irby, Charles H., Jernigan, Mil E., Lehtman, Harvey G., North, Jeanne B., Norton, James C., Page, Cindy, Paxton, William H., Peters, Jeffrey C., Ratliff, Jake, Row, Barbara E., Riet, Ed K. Van De, Van Nouhuys, Dirk H., Victor, Kenneth E. (Ken), Wallace, Donald C. (Smokey), Watson, Richard W., Andrews, Don I./SRI-ARC; Sub-Collections: SRI-ARC; Clerk: JEW;

JBN 13-NOV-72 11:52 12712

Request for New Heading Provision for Journal

NIC, and possibly others, has need of a provision for a more formal heading to be applied to documents journalized. At present, the issuer is identified only by his ident, and any text indicating the organization must be inserted as statements following the title. 1

An example of a format which would be desirable is: 2

```
  .HJOURNAL="
ARPA Network Information Center                    NIC xxxxx
Augmentation Research Center                  day Month 1972
Stanford Research Institute
Menlo Park, California 94025
";
Title:
Author:
```
3

JBN 13-NOV-72 11:52 12712

Request for New Heading Provision for Journal

(J12712) 13-NOV-72 11:52; Title: Author(s): North, Jeanne B./JBN; Distribution: Bass, Walt, Watson, Richard W., Norton, James C., Hopper, J. D./WLB RWW JCN JDH ; Sub-Collections: SRI-ARC; Clerk: JBN; Origin: <NORTH>NEWJLHD.NLS;1, 13-NOV-72 10:30 JBN ;

JRP 13-NOV-72 9:02 12713

i have a little more time now so ill try to answer some of your questions. first, the message program echoes the underline character for space which is translated into backarrow for the net,. thats inconvenient for net users but it works. 2nd, if your imlac has the standard text and edit package you can do graphics with limited resolution. to log into the graphics for imlac capabilities socket see the nic release which just came out from here (entitled something like UCSB Sockets) i think the socket number is x'703' but im not sure. try to get the graphics to work and send me another note. would you like a UCSB user manual? ($4.50 i think) let me know. 1

(J12713) 13-NOV-72 9:02; Author(s): Pickens, John R./JRP;
Distribution: Neigus, Nancy J./NJN; Sub-Collections: NIC; Clerk: JRP;

LMM 10-NOV-72 10:53 12714

GREETINGS

Dear Ray: this is a test message 1

LMM 10-NOV-72 10:53 12714

GREETINGS

(J12714) 10-NOV-72 10:53; Title: Author(s): Masinter, Larry M./LMM; Distribution: Carhart, Ray/RC; Sub-Collections: NIC; Clerk: LMM;

LMM 10-NOV-72 18:49 12715

Request for account

We are currently users on the USC-ISI TENEX machine. We would like to obtain an account at your site for production use at those times when USC-ISI is not available. We also would like to do some experimentation with BBN-LISP on machines with various core sizes.

Would you let us know about your rate structure, availability of file storage, and such? Thanks.

Larry Masinter (LMM /SU-HP)

The accounting parameters we would like, if they are arbitrary:

(USER) MASINTER

(PASSWORD) DENDRAL

LMM 10-NOV-72 18:49 12715

Request for account

(J12715) 10-NOV-72 18:49; Title: Author(s): Masinter, Larry M./LMM;
Distribution: Moore, Gail/GM2; Sub-Collections: NIC; Clerk: LMM;
Origin: <SU-HP>ACCTREQUEST.NLS;1, 10-NOV-72 18:10 LMM ;

LMM 10-NOV-72 18:53 12716

Request for account

We are currently users on the USC-ISI TENEX machine. We would like to obtain an account at your site for production use at those times when USC-ISI is not available. We also would like to do some experimentation with BBN-LISP on machines with various core sizes.

Also, could we be placed on the mailing list for updates & revisions to BBN-LISP Manual. The manuals we have are dated Feb, 1972, and it seems that several revisions of the system have been implemented since then.

Would you let us know about your rate structure, availability of file storage, and such? Thanks.

Larry Masinter (LMM /SU-HP)

The accounting parameters we would like, if they are arbitrary:

(USER) MASINTER

(PASSWORD) DENDRAL

LMM 10-NOV-72 18:53 12716

Request for account

(J12716) 10-NOV-72 18:53; Title: Author(s): Masinter, Larry M./LMM;
Distribution: Chipman, Steve G./SGC; Sub-Collections: NIC; Clerk: LMM;
Origin: <SU-HP>ACCTREQUEST.NLS;1, 10-NOV-72 18:10 LMM ;

PR 10-NOV-72 9:35 12717

Visit from Quirici (Graduate Student at Stanford)

Visit Report: Date of Visit: Nov. 1, 1972

1

Name of Visitor: Daniel Quirici

1a

Title: Graduate Student / Ph.D. Candidate

1b

Name of Company: Stanford University

1c

Address:: Stanford University
Dept. of Political Science
Stanford, Cal 94305
Tel: 327-4323 (Res.)

1d

ARC Contact: Paul Rech

1e

Other ARC Personnel Involved: Doug Engelbart

1f

Remarks:

2

Daniel Quirici is in the Training Program in Organizational Research which is a multi-disciplinary program which has been instituted about a year ago at Stanford University. The Training Program operates now under the direction of a Policy Committee presently made up by :

Harold J. Leavitt, Professor of Organizational Behavir (GSB)
James C. March, Professor of Education, Political Science and
Sociology, and
Richard W. Scott, Professor of Sociology.

2a

Quirici, who is planning to write a thesis under March, was interested in the new aspects of information technology and its expected impact on organizational behavior. In particular, he seemed quite interested in the organizational aspects of the ARPA network and in the new possibilities for collaboration and communications it offers.

2b

Visit from Quirici (Graduate Student at Stanford)

Note:

2c

Quirici made contact with ARC at the request of Florence Vidal who is a French Consultant in industrial psychology specializing in problem solving and creativity. She had read the Innovation article about ARC and had asked Quirici to make arrangements for her to visit ARC. -She saw Doug on October 9- She is the author of the book "Problem Solving" which was published by Dunod in 1971.

2c1

Action:

3

No action items are pending.

However, several possibilities might, be considered. One of them might be to encourage Daniel to work in an area related to our activities. This could allow us to have contacts with a group of people who have great visibility and whose collaboration could potentially fit quite well in any future bootstrapping community.

Is this suggestion worth any further consideration?

3a

Links to Related Documents:

4

"Training Program in Organizational Research at Stanford University" XDOC # 12318

4a

PR 10-NOV-72 9:35 12717

Visit from Quirici (Graduate Student at Stanford)

(J12717) 10-NOV-72 9:35; Title: Author(s): Rech, Paul/PR ;
Distribution: Engelbart, Douglas C., Kudlick, Michael D., Watson,
Richard W., Norton, James C., Vallee, Jacques F./dce mdk rww jcn jfv
; Sub-Collections: SRI-ARC; Clerk: PR;
Origin: <RECH>QUIRICI.NLS;1, 10-NOV-72 9:25 PR ;

RWW 10-NOV-72 10:33 12718

Three Tasks Requested of JEW for Evolution of NLS Integration into the NET

Three Tasks Requested of JEW for Further Evolution of NLS into the NET 1

Integration with Network Text Editers 1a

We need a general solution to the problem of allowing documents prepared in text editers on net hosts to be input to NLS in a way which will be easy, will allow people to create the desired NLS structure, and will make them feel satisfied with the result. 1a1

At this point I see the need for three mechanisms: 1a2

Some sort of default that utilizes doublespacing or indentation between paragraphs to distinguish NLS statements and structure. 1a2a

A set of conventions which maybe utilize DEX conventions for special delimiters etc imbedded in the text. 1a2b

The availability of user program features to allow a user to create his own conversion conventions. 1a2c

I would visualize a NLS command which would take an address in an NLS file where the new material is to be inserted and a network host address and file pathname in that host as to where to get the file and would do all the connections, file transfer, input etc. 1a3

Jew also suggested a complementary capability so that a person at the remote site could, from within his system, name his file in his local system which he would like transfered to us, name the NLS file pathname for the file which he wants to end up with and get the file across without logging into us. 1a4

The inverse operation seems to me to be required, namely to get an NLS file back to the format required in the foreign text editer in one of the three formats described above, with control either from within NLS or from the foreign host. 1a5

We will probably want to consult with some people around the net to find out how they would want to use such a schemme and their preferences. 1a6

Integration of Journal 1b

RWW 10-NOV-72 10:33 12718

Three Tasks Requested of JEW for Evolution of NLS Integration into the NET

We need to allow people to receive Journal delivery through the net to files in their own host and to allow people to enter messaes and documents into the Journal prepared in their hosts. 1b1

The former would e an option for people at hosts having an FTP and procedures for handing the material once it is received. This will requiree working with people at the hosts to get a workable system set up. 1b2

The latter would use the features designedfor file input to NLS and specify some simple protocol which people could implement in their local message sending systems. 1b3

For example, I could see a capability within the Tenex send message that would allow entry in the Journal with the possibility that the Journall mail could end in text files etc. 1b3a

Archiving of Files 1c

We have limited online storage and will probably always have limited storage,but some sites on the net will have large amounts of inexpersive storage, such as at the data computers. 1c1

The goal is to archive our files in such a system instead of on magnetic tape and to be able to get them back within a few minutes over the net. 1c2

The two initial systems open to us to set up a prototype system are at UCSB and at the data computer CCA. We could start with automatic archiving and retrieval of Journal documets and messages. 1c3

A scenario for the user might be that when he does a Load File or a Jump Link and the file is not online here the system would flash a message, file archived on the net, do you want to wait x minutes while it is retrieved. If the user says yes then he can continue with other NLS operations while the retrieval is going on and when the file is retrieved he is notified. 1c3a

RWW 10-NOV-72 10:33 12718

Three Tasks Requested of JEW for Evolution of NLS Integration into the NET

(J12718) 10-NOV-72 10:33; Title: Author(s): Watson, Richard W./RWW; Distribution: White, James E. (Jim), Engelbart, Douglas C., Irby, Charles H., Watson, Richard W., Norton, James C., Wallace, Donald C. (Smokey), Hopper, J. D., North, Jeanne B., Kudlick, Michael D., Feinler, Elizabeth J. (Jake), Engelbart, Douglas C., Lehtman, Harvey G., Van Nouhuys, Dirk H., Vallee, Jacques F., Auerbach, Marilyn F./jew emc dcw jdh jbn mdk jake dce hgl dvn jfv mfa ; Sub-Collections: SRI-ARC EMC; Clerk: RWW;

RWW 13-NOV-72 8:54 12719

I received your printout and have the following explanations: 1

First the NIC user guide is out of date in a number of places, although <NIC>locator folklore is reasonably uptodate. We are planning a new version of the user guide. 1a

The reason you could load the file, but not do a secondary distribution is that due to its present size and problems associated therewith we have not been updating te Journal catalog very frequently, and the secondary distribution code looks in the maste catalog to get the needed information and does not check the temporary buffer catalog. The file loading code checks both master and temp. We plan to correct this problem so that the secondary distribution also checks the temp catalog. 1b

The catalog has been updated since you tried your problem so it should work now. 1c

With regard to your wanting to refuse links; we plan to allow net users access to more exec commaads such as refuse links in the next couple of weeks after Don Wallace finishes some other work. 1d

(J12719) 13-NOV-72 8:54; Author(s): Watson, Richard W./RWW ;
Distribution: Norton, James C., Hopper, J. D., Irby, Charles H.,
Auerbach, Marilyn F., Wallace, Donald C. (Smokey)/jcn jdh chi mfa
dcw ; Sub-Collections: SRI-ARC NIC ; Clerk: RWW ;

RWW 13-NOV-72 9:01 12720

Request for A Query Capbility for Ident in DNLS Journal

Charles, Dave,
I notice that in DNLS the ability to query the Ident file during ident specifications . lastname etc. does not exist. This is a useful feature and I would like to see it added to the DSS task list.
Also now that we have the template feature a problem which has been discussed before now exists, namely given that you are in one subsystem how can you move to also use capabilities in a higher level or other system. The example is the desire to edit a command form from within the Journal subsystem. 1

RWW 13-NOV-72 9:01 12720

Request for A Query Capbility for Ident in DNLS Journal

(J12720) 13-NOV-72 9:01; Title: Author(s): Watson, Richard W./RWW;
Distribution: Irby, Charles H., Hopper, J. D./chi jdh ;
Sub-Collections: SRI-ARC; Clerk: RWW;

TJB2 13-NOV-72 8:33 12721

afsc planning meeting

read file on afsc planning meeting 1

TJB2 13-NOV-72 8:33 12721

afsc planning meeting

(J12721) 13-NOV-72 8:33; Title: Author(s): Bucciero, Thomas J./TJB2; Distribution: Stone, Duane L., McNamara, John L./DLS JLM; Sub-Collections: NIC; Clerk: TJB2;

CHI 13-NOV-72 20:34 12723

Acknowledgment: (journal,12720,), Query Capability for Ident System in DNLS

Dick,
Re (journal,12720,), Ident system Query in DNLS: It has been in our plans all along. I am amazed that you bothered to mention it -- Charles

1

CHI 13-NOV-72 20:34 12723

Acknowledgment: (journal,12720,), Query Capability for Ident System in DNLS

(J12723) 13-NOV-72 20:34; Title: Author(s): Irby, Charles H./CHI; Distribution: Watson, Richard W., Hopper, J. D./RWW JDH; Sub-Collections: SRI-ARC; Clerk: CHI;

CHI 13-NOV-72 20:42 12724

Coment on (journal,12719,)

Dave,
Is Dick right about secondary distribution not checkint
TEJOURNAL? in (journal,12719,) 1

CHI 13-NOV-72 20:42 12724

Coment on (journal,12719,)

(J12724) 13-NOV-72 20:42; Title: Author(s): Irby, Charles H./CHI;
Distribution: Hopper, J. D./JDH; Sub-Collections: SRI-ARC; Clerk: CHI;

CHI 13-NOV-72 20:50 12725

Comment on (journal,12718,1a)

Jim,
With regard to getting files prepared on other systems in nls form, KEV has given some though to generalizing the input assembler/sequential mechanism (and the output sequential, of course) to allow the use of a user program (some commonly used one could be inside NLS, of course) to determine statement breaks and level designation. This mechanism opens all kinds of doors for specially formatted files which can be converted into NLS files. When you start seriously thinking about this, please talk to Ken and I about it. -- Charles 1

CHI 13-NOV-72 20:50 12725

Comment on (journal,12718,1a)

(J12725) 13-NOV-72 20:50; Title: Author(s): Irby, Charles H./CHI;
Distribution: White, James E. (Jim), Victor, Kenneth E. (Ken)/JEW KEV;
Sub-Collections: SRI-ARC; Clerk: CHI;

CHI 13-NOV-72 21:17 12726
Comment Re: (journal, 12611,1),NLS Organization Notes: 1, by DIIA

Don,
Thanks for the note on NLS improvements. Looks like you have been busy. I have a few comments on your notes:
(journal,12611,1b3): UNPUT no longer exists, TINPTC, TODCHR,RAWCHR, AND SHIFT are already together (with the exception of two very small routines which are called by TINPTC, and HOW OFTEN IS NLCRMS CALLED?
In general, I agree with your handcoding and procedure movement recomendations (including inline coding of small simple routines which are used in a loop in a frequently called routine.
HOWEVER, I think we should keep these corrective changes under very careful contol so we can measure the gain we receive (this is almost as important as speeding NLS up). Also, learning about these slopey areas and building the tools and understanding that go along with them is more important than speeding up nls, when one consideres that we will be rewiting it in a few months. I will be glad to help code the changes you recomend, but I think one person, namely you, should be coordinating the changes and measuring the improvement. -- Charles 1

CHI 13-NOV-72 21:17 12726
Comment Re: (journal, 12611,1),NLS Organization Notes: 1, by DIIA

(J12726) 13-NOV-72 21:17; Title: Author(s): Irby, Charles H./CHI; Distribution: Mitchell, James G., Deutsch, L. Peter, Kaye, Diane S., Andrews, Don I., Bass, Walt, Duvall, William S., Church, Mary S., Hopper, J. D., Irby, Charles H., Lehtman, Harvey G., Melvin, John T., Parsley, Bruce L., Paxton, William H., Victor, Kenneth E. (Ken), Andrews, Don I./NPG KEV DIA; Sub-Collections: SRI-ARC NPG; Clerk: CHI;

DVN 13-NOV-72 19:40 12727

More on Lost Journal Items and Something on File Privacy

Part of the time last week the partial copy of both your and my initial file was bad... in my case it was a badness that occasionally arises from swapping errors. That is the reason for the various journal troubles. 1

As it happenes, I did not discover your message to Cindy by looking in your initial file, but rather by looking in (journal,jcat,) which is a rough (rough format) catalogue of all journal items net. It is a handy file to know about. I serached on ["NJN"] looking to see if the item I sent had got that far. 2

As it furthr happens, I did then load your intial file to try to figure out what was happening. 3

File Privacy has the following history here: In the ideal past it was an article of faith that all files were open, in order that we might bootstrap towards a more open society. 4

When we got the PDP-10 and TENEX we of cuores aquired the TENX file control options. They are very little used partly because people want to be open and partly beecause they are obscure and awkward to many NLS users. 5

Last Spring, under the pressure of a particular occasion, Doug promulgated a new custom (journnal,10452,) that people were not supposed to read one another's files unless invited. I immediatly went on record that everyone is invited to read my files, as did several other people. 6

In general people feel free to read the files of people they work with. 7

The journal system may fail to deliver things, but I have never heard of it delivering to the wrong person. 8

The journal system is a method of recording and making retrievable communication. Anyone who finds an item in one of the various catalogues will feel free to read it. 9

DVN 13-NOV-72 19:40 12727

More on Lost Journal Items and Something on File Privacy

(J12727) 13-NOV-72 19:40; Title: Author(s): Van Nouhuys, Dirk H./DVN; Distribution: Neigus, Nancy J./njn (comments in parentheses are delivered only to thee single ident to which they are attached, but can also be read in jcat) ; Sub-Collections: SRI-ARC; Clerk: DVN;

(DCE) What we have lined up to talk about was what's in an augmentation system. If we didn't keep working at where can all this go in terms of some sort of--in terms of of having an image of how's an augmentation system going to grow and what kind of components are in it and what kind of dimensions might there be yet to open up and explore and along any of these dimensions, how much development does it look like there really was to do. 1

I've found in the past that it makes a great deal of difference when you are discussing with people plans and strategies, if they have different views in their mind about how much work there is to do yet in an augmentation system, how big and complete and what sort of thing would it be and how much would it impact the lives of people that use it. So, in the FRAMAC series it seems appropriate to have a pass at that. I think, that's about what we'll get, is a pass today. I have this desparate feeling that there are a thousand items that I couldn't even get into outline form, that's organized, but it's a good exercize for me to make this. 1a

So, I think I would like at various points to stop and just see what other people have to toss in in the different places. But, I'll start out as a sort of a little lecture. The relatively natural place for us to start is at the interface between us and the service system that's giving us this support. And if we try to imagine what is there to develop about that interface, I'll just pick these two sorts of categories to talk about today. 1b

One is you might say, the physical channel of, the channels of how you are going to interact with this sytem. By what sort of media channels and then for instance, we use the graphic channel right now. But also there are the channels of sound and kinesthetic motion and smell and most of your senses could be affected. In fact you could even have things coming in and get your signals coming to you via implanted electrodes if thre were an advantage someday. So there are really quite a few types of channels to explore and in every channel you can say, alright, what kind of signals can be sent along with it. For instance, in the video in the graphic channel we're just sending a two-dimensional .... old character string, sort of . .... signals, But, these can go to color. We can get three-dimensional sorts of signals coming through, we can get time-varying signals so you can have, three-dimensional, color, moving, dynamic sorts of things that you can use to convey the information to you if you want. 1c

In sound you can have human voice coming. You can also have

all sorts of tonal combinations computer generated convey information to you if you wish. So signal form is just a rough area in which you can, your perceptions can take note of different patterns coming to you. Then in any of those there's a question of how you are going to code it. If you can say you can use color and you can use three-dimensional and you can use time dynamics on a visual display, great. There are tremendous variations in the way you can produce portrayals that blink and flicker and move and have color, shape, and size to carry information to you. 1d

There was one about relatively basic hypotheses in that 1962 paper that with the computer here to service any of these channels, the freedom we have for incompassing new and different forms--coding forms and information forms is extended greatly beyond that which we ever experienced in the past. And our practice in using particular forms and codes to do our commnication and support our reasoning in the past, has been affected a great deal by the means we have those times to manipulate them. Speech was affected a great deal by the physical characteristics of our vocal cords and our acoustic characteristics of our resinating chambers and by general environmental characteristics and noise levels and by the psychological characteristics of the people living and that were working together so that some kinds of things, it was important not to have redundancy that didn't get missed, other kinds of things, it didn't matter. 1e

So there was a very different environment existed in which our verbal communication evolved. And in the graphical forms for representing speech evolved in this series of technological developments. And there too, the limitations in the performance of our portrayal we can use, even in science and mathematics, the formalisms the kinds of complex kinds of graphs and charts, we can use to represent some of our most sophisticated concepts, the facility we have for forming and manipulating and storing and communicating these portrayals limits what kinds of concepts we thus can deal with, or how complicated a configuration we can indeed work with. 1f

The computer coming in here to help us forming the portrayal, storing, manipulating, an accessing them, opens up a whole frontier. So it's knowing that as we launch into our sort of pragmatic, exploratory persuit in augmentation. Knowing that there's a huge frontier open, we have to appreciate that we can't explore that .... We couldn't get the technology to get the three--dimensional color, time dynamics, we couldn't support the coordinated extra research to explore lots of

different portrayal forms while at the same time learning how to give computer support, group environment and learning how we do many other things, how to integrate new kind of thinking aids into our work. So we have to take a relatively small cut, relatively conventional, and try to integrate it into our work. But, there will be a time in which it's important to start adding the new dimensions in learning and learning how to integrate those. 1g

For instance, if you look at the visual, you realize you want to arrange an image source besides these other characteristics, computer-generated stored image is brought to you by live camera images and in these cases there's a question about if they're superimposed, what's the accuracy of their relative registration of these different images cause you realize that there'd be gain many times in depending upon it, the computer knowing, so that in your selection processes it knew that you point to a given area that you meant perhaps something that was a composite from the different sources. 1h

So there are refinements to work on in that direction. There are refinements in your selection techniques. If you have more and more dimensions going for you in there the dimensionality of your control of your selection techniques must also keep pace--you have a three-dimensional thing, you've got to have a three-dimensional selection device. And if you are going to designate more of these parameters , the validity of your interactive language has to keep pace with designated timing, color or shape or this or that. 1i

So that in most respects of your interactions complicates and makes more sophisticated what you are going to have to do .... During the thing you realize that you may want several selection channels going for you at once--have one pointer that's not quite the way you have worked physically in your own environment, oftentimes you've got two hands going and sometimes you kick something with your foot at the same time. 1j

So you know that you can coordinate more than one sort of dynamic thing at once and you can anticipate that if you really get involved with the process you may have going on in any given time, you want to just bring the full force of all the capabilities you have, at least to make them available if they can facilitate and control the process you are involved in, so that you can can anticipate maybe working with a combined mouse and pointer--mouse and keyset in each hand--both hands .... on keys and moving position things and have eye-tracking devices that technology for that would

probably beapproprite now, that computer can always know what your eye is fixing on. 1k

This could make very effective (tape unclear here) Body posture and all sorts of potentials for the way in which you are communicating and controlling. If you ever stop to think about how refined are the ways in which your body, say you are ice-skating, very refined ways in which your ankles are adjusting to the edging on the blades and the way you're doing when skiing, the way the weight is distributed, balancing on the .... so that there are, sometimes I reflect on the environment in which most of our biophysical systems evolved. We realize that it wasn't an environment in which we were doing a great deal of symbolic, I guess it can be assumed that our biological evolution hasn't been significant since before the time had a very sophisticated or any kind of written language at least. 1l

So that you think about the kind of dynamics in which the survival value of most evolutionary aspects were tested and you just know that there was a lot in there about taking care of timing that spacial things happen. We could just wonder about how much there is to explore in a realm of mapping the kinds imagery and dynamics that are involved in thinking and communicating processes in some kind of media and signal forms which are more akin to doing things spacially. Because your whole nervous system may well be much more adapted to the quick reception and quick effective coordinated reactions in a form like that. So you may well be someday sort of wired in kinesthetically to interact with it rather than just your hands the way they are now. It seems like it ought to be a little narrow window into what kind of real and dynamic nervous system we have going. 1m

You know the questions about no matter what channel you use to couple into your nervous system, what's the bandwidth that you can accommodate. This famous test by a psychologist named, George North, published a paper called, THE MAGIC NUMBER 7 PLUS OR MINUS 2, he showed that by lots of different experiments the actual information rate in bits per second was something like 7 bits a second, is that right? Anyway, some number that seems very low. I can type faster than that. But, what they were really testing is the information rate. That means based on Shannon measure of information. What's coming in that isn't predictable from what's already been happening. That's already come along the channel. So you have many ways the piano players if you really look at it, move their fingers at just fantastic and just doing fantastic in coordination,

information rate to drive a piano player .... wouldn't have to be higher than 7 bits a second, or what ever the number he picks. 1n

But, I have a hard time adjusting to that and even if I did, I'd say I'm not sure that I'd find a way to interact with say a skiing automaton that was doing all the work for me and I was sitting in it going down a hill. You can get it to do all the dynamic things of shifting weight and blades and everything else to accommodate what the dynamic needs are. How better would I communicate to that than by my weight and ankles if I had some alternate choice. It may only take 7 bits a second to do it. But, what kind of pre-processing back in here does it take to get to that right kind of 7 bits a second? Someplace in all of that there's sort of a domain of concern I'm left with a strong .... feeling that there's a lot of future value to be gained in exploring portrayal forms and interaction forms that really bring in a lot more channels, and a lot more sort of 1o

You know it's an interesting and fun thing for me to be reaching back, years back to bring up talk and ideas like this. There's I guess, I want to point one more thing about this, the channels of communication. It bears on a section in the second OSR report that we finally issued in 1965, there's a chapter there on communication questions which I sort of generalized upon what a computer aided communication channel would be assuming that there is a person at one end of it and digital processing or storage transmission system at the other and that I began with the, some sort of place in your head in which there is the formation of message you wanted to communicate. In realizing that inside your head you need a process that transforms that into the signal forms for whatever channel you're using. Fingers on the keyboard or finger patterns on a keyset. And so that your coordination system and your muscles actually the .... signals. 1p

There are then some physical transducers that take those actions and convert them into the .... signals, generally and then we have a computer process that can translate those into some form standard form acceptable back into your computer. Now this is representative of what we do now. Do you realize that there usually are processes, feedback processes that come back to the person that .... to go on a loop there's a process that takes interpretation and comes back into some kind of transducer that changes it to higher signals or some kind of stimuli that comes back and goes through a perception

mechanism in your own body, back in here to be checked. So when we write we see, when we type, we don't, here. 1q

So there's a kind of a while loop here that needs to be considered when you are trying to, say for instance, just to get really fast, efficient input. Trying to communicate your ideas, for instance into the computer. And if you're trying to draw a picture, for instance, there's a whole process here of the ways in which the computer can provide all sorts of kinds of feedback to you and can even do anticipatory things. At times you are just steering it through the probability sort of alternatives that it would calculate .... And there's a lot of study in evolution could go about in here towards really facilitating that .... and that's a similar kind and related the research coming back this way of what sort of signal forms can best commlunicate .... But the communication process in this direction from the computer to person also needs to be two-way. 1r

The computer in trying to give you the best presentation to satisfy your need at the time could benefit a great deal from feedback communicators to where you're at -- what you need, what you understand. So there's a whole two-way process both involving feedback .... for a lot or research in the future. 1s

And there sort of comes up as a point in here instead of if you're dealing for instance, with the kind of conceptual domain which we now use natural language when we're trying to communicate. For real effectiveness in this channel, what's the chances that you'd reach a design that's like natural language if you really want the most effective sort of communication to support you. I just think that laws of probability would come around saying not very high. That it happened that in the evolutionary environment that our languages evolved, that all this miscellaneous factors that were there that are very much different from the controlling factors in this environment would have produced a language form that would be most suitable for here. I just very doubt it. So I'm really quite sure that over the long term there will grow special language in here in which the attributes of speed and succinctness and clarity, ambiguity all that will be much improved. 1t

That does get you the question saying that if you go to all the trouble to learn this language does that mean that you have to be fluent in two languages or how do you converse with people? Or do you always have to converse through a robot? I'm not really sure about that, but, this sort of thing in

this sort of picture where you've got this generalized commuunication channel between you and whatever media is used or whatever system is going to be interacting with you. You assume that there are other people interacting in that same system and studying the same files and having dialogue with you and it really well may be that the specific disign of the interaction of the sufficient language for them is somewhat different from yours. Not only that, but there's a natural shift in the semantic mapping that we have even with what we think is the same language. 1u

So that the meaning of something transmitted into this end box here that we transmitted out is likely to be different. So I just assume that in long term evolution that the channels here would have tended to be shaped towards the characteristics of the individual both to meet the effectiveness of communication rate in accuracy or also to match with where the semantic maps ought to be. 1v

(DVN) Doug, could I ask a question? This is an aspect of NLS that I am very interested in. But, I began to think that what you said won't happen and there are two kinds of reasons: one is that I don't see it happening, but that may be local minimum. That's not a very strong argument. The other is that what I'm talking about is that there will be some kind of change in the way people think, the way it is possible for people to think analogous to the change calculus introduced, for instance. Descartes and people like that. Okay, but the computer operates linearally at bottom. That is, things happen one after the other in the CPU, as I understand it, and for that reason the language of NLS written in is a string-oriented language. And that seems to me that you never get away 2

(DCE) String-oriented? 3

(DVN) Well, structure. But, the structure, in the long run we deal with it by doing a walk around the structure. Don't we? That's my question. Does this seem what you're saying? 4

(DCE) Well, that question about the linearity that the medium usually would have to force to have to communicate our language in, and the fact that doesn't match with the form in which your concepts related back here in your head. You're trying to transfer them out to the media. It was one of the early disparities, I just want to point out .... The one thing the act of storage of the simple structure in the media is computer based can be structured so it would be a much better map of what would be conceptual structure back in your head some

place. But, knowing, then carrying out further the same is not very likely that most of the times when you're seeking comprehension you can't just sort of have all of the .... structural I mean all that structural in relationship thrown back at you in a particular view. So that you want to have tailored views generated and the idea of going to the hierarchical structure and then the view generation was part of the strategy of saying if I really believe in some of these long term trends, it's an important thing to get some their dimensions started in whatever .... form is workable in the environment so that then they evolve. 5

So the idea of structure and the different kind of views .... this thing. Looks like the one we can handle. There are lots of variations then that in mentioning the structural facility we have and view flexibility I never did expect that we'd stay in .... for as many years as we have. It's just that we expect a lot of evolution. In the studies in file structure are just ways to open up. But the, in the sense you've seen s step in the direction of special forms that this environment of with computer-aided feedback for communication are different even though we're using what we might call text strings. There's probably something more basic underlying the inpression about. 5a

(DVN) I'm not sure whether there is or not. 6

(DCE) Well, the challenge of a natural language is a dangerous thing. And I know it, so I don't do it. 7

(KEV) Dirk, I get the feeling that you're talking about how generally machinees work linearly and serially whereas the mind works in main cases in parallels. 8

(DVN) That's true, but what I meant was... 9

(KEV) I was going question that because, number one the CPU itself these days very rarely don't work and on a totally serial fashion. There are a lot of things done in parallel. Two, a lot of the computer languages are in affect serial but, from the user's point view there are lots of things going on in parallel all over the community and there's development being done in languages so that there will be parallel languages for individual uses. Fork structure and Tenex, for example is parallel structure.. But, by the same token, to my knowledge there's no evidence if you go down to a lower level inside your own mind that that's not being done in serial. 10

(DCE) But, serial doesn't have to mean linear. As far as it's relating to the conceptual form which things are stored and operated. 11

(DVN) The serial thing I had in mind resemble the computer was not your mind, but language. That is, whatever goes on in our head we talk to one another serially, and we read serially. 12

(RWW) That's not true, because when you talk to me you are communicating with your body gestures, your eye movements, your face, your head, your, you know. You're communicating a lot of information to me in parallel and one of the reasons people feel that they've got to get on airplanes and go see each other is because on the phone they get things serially and they miss all that information that's going on in parallel. 13

(End of side one of tape, begin side two) 14

(DCE) What're the chances that, of having things like the way you qualify some of yur adjectives or adverbs or something in a text string the way your body English that you're typing.... in qualifying information and ways associated with portrayal of that on the way back. Where you may have a very hard time translating that into current textual pages so you'd need new kinds of portrayals. It's just a particularly wide open field that I reflect like that and I just have a hard time thinking that natural language is going to last in this environment. In a sense I feel that the big challenge that the .... picked up to understand natural languages that it's significant in this environment may be, is going to be sort of ...., maybe they'll get languages that won't have the same kind of ambiguity in them, more effective. We won't need that much sophistication in the translation and in understanding them. 15

(RWW) Doug, isn't the significant thing though, in the .... people's work is that they are learning about what representation has to be done inside here to come to grips with "meaning" and structures and stuff. 16

(DCE) There really, very much is, very much , right. Here again I think that that would be lasting in this construct of the future, I'm thinking. That would be lasting whereas the struggle to resolve the ambiguities syntactically and medically has transit value and is a tremendous challenge to the system .... on the .... As we go and look at different aspects of an augmentation system and we find sort of a dimension like this--intercommunication dimension and we look downstream at that and get these pictures of what's likely to happen way down there,

there's a real problem then in .... some picture of what's the probable .... in which various things are likely to involve and in what order, but not only that, what would be a better order in timing for them if you look at the whole set of dimensions of the system. So that the next stage along each dimension represents now a new complete relation of the whole system. 17

So there's .... still .... that things are very complicated and one of the realizatins that comes with this kind of trip taking each different aspect of an augmentation system which is an example and starting to look for where we really can go realizing how much there is to do about it. And then you start thinking about the environment in which this would want to evolve in order that it is a succession in timing the stages it reached really made a difference. In an augmentation system utilization you realize that this .... being coordinated with what are the facilities for the technology at each of these levels back here for supporting both research and the application practicality. 17a

Then once the utilization environment back in here which can make a great deal of difference to the pay off. When I say "back in here", I mean, assuming that the guy's head here has formed the messages that he wants to transmit, then he engages in this interaction or he's busy perceiving something that started in the computer memory and wants to get communicated to it. But, he's doing that in a whole environment of activity of purpose, and of procedures and methods that he is involved in in skill training and in roles within an organization, etc. So sort of think of going back in some direction away from this particular place. 17b

It seems that our whole operating context in which this lies, so there aren't systems being put to work in the other dimension of it being pushed at it's very hard to know how to go about research like this. People could take independent .... laboratory and start to find out what's the fastest they could communicate in sort of a laboratory environment even though there's a chance that the work they do will pay off very directly back in the world of augmentation. It wouldn't be very large unless they were very closely involved with what an augmentation system is looking like in its entirety. I just don't expect it to come across to you just by one saying. I know that many of you have had enough experience in all of this so it's real to you. But every year it becomes so much more real to me and so much more of an overwhelming, important consideration. The point is really concerned with the speed

and sensibility with which the whole augmentation system has evolved. 17c

That's a very important consideration. And that really leaves us to the question of how can you get an environment so that there's people doing enough research in each of these pursuits being done in a coordinated way so that you get a chance for a whole system to evolve. I'll sort of leave that dangling and come back to it more when we talk about construct community becaause it's one of the very strong motivations for that we have a system that's got really a lot of complexities to it and lots of rich dimensions to explore and it's a real challenge to see how the coordination of these exploratory ventures could be facilitated. 17d

Let's then look at one dimension of the augmentation system and kind of go into the next part that I call transaction capability. I think I'd really enjoy it more though if there were more comments and dialogue about this, but, I leave it without a very good calibration of where people are. 17e

(RWW) I have one comment. I recommend an operations clean their 18

(laughter) 19

(RWW) ...Portrayal genrators... 20

(xxx) It looks to me like NIC left them dirty. 21

(DCE) Just to make some of this more real before we leave it, let's try a little dialogue. Like of the different sort of extentions we go into speech, or communications or graphics in these dimensions. What does it seem like to you people, what if next year we could get a three-dimensional, color or say suppose we know we could build a terminal that would give us three-dimensional color. We look through stereoscopic .eyepieces.. and you could see three-dimensional color? That's just an engineering thing to build. 22

(DVN) One of the more intersting kinds of terminal would be one where you could have actual images on. That is, hatonelf images, shaded in like on television and that you could then bug the image, you know draw a line around somebody's face on the screen and store that in your statement. Then you would be able to have much more leverage in the nature of language than you do as long as you're dealing with things that are just the same as written words. 23

(RWW) They've got things like that, like at TIME-LIFE magazine has a huge expensive system that has the capability of taking text, not NLS like things, but text images and the guy can do page layouts and you know delete that face, frame that picture and cut it in here, and when it comes out it comes out as a plate at the end 24

(DCE) Well, just consider some of those. What are some of the ramifications. What would we do along with that of course we'd need to be able to print out those composite things. We've assumed that we would be able to tie all sorts of .... But take .... if we had three-dimensional color and enough processor support so that you really could get dynamic. Say, you find this study of the dynamics of the service system dynamic. You have three-dimensional color and time dynamics in a way to convey to you the conceptual information things, would you like to buy one? (Laughter) Or you think about the color with which the word's printed you need qualification and content along with you could support almost like the 25

(RWW) Angry statements and that... 26

(MDK) I'd rather have a three foot screen 27

(DCE) Three foot screen, sure. 28

(DCW) I've been sitting trying to figure out what in the hell I would do with a three-dimensional screen. I can't think of a goddam thing I'd do with it; play SPACE WAR or something like that. 29

(xxx) I really think we are learning in terms of the kind of things we do as people. Like that would be really far out for an artist of a certain type. If you just want to sit down and play with it or maybe find something with certain problems that we know nothing about. 30

(DSK) I think that that three-dimensional color thing could help you experience your problem. Like if you have a lot of scheduler data or something like you know like a simulation of a .... system you could experience that system, experience how an NLS is only getting so much at a time and the dynamics of the problem. 31

(DCE) Stress analysis programs. Something like them would be cool. 32

(xxx) That's only half the problem. The other half of the problem is collecting all the information we want. 33

(KEV) I think that we've been so trained from birth and before, just by our history, not to think along those lines. I'm not sure that would happen. 34

(DCW) I'm not sure that that is true. Like a lot of the things that Paul has worked with where they work with all these N-dimensional things. Laying out models of this thing and that thing. More and more people are starting to funcion in that n-dimensional space in terms of formulating problems and getting solutions to them. 35

(KEV) But they still think in terms of, my thinking is that they may be thinking in terms of n-dimensional, but their representations of that are still two dimensional. 36

(HGL) Simply because they're limited to two dimensional media. 37

(JFV) There are people at Stanford who spend all their time doing two dimensional print-outs using the computer, and then reconstructing them, making movies (3-D pictures) of them, showing the movie and then talking about the movie. It took about six months to complete and could be done in just seconds. 38

(RWW) We had a guy at Shell who was interested in design of chemical experiments, you know to try to design the optimal fashion to get the data you really needed and he found that the only way he could effectively begin to portray this stuff was he was building all these plastic three-dimensional models. 39

(xxx) (Too unclear) 40

(HGL) You could use simulations of developments of cities, time and space. Rather than stereoscopic projections, you could do holograms. 41

(DCE) Sure, One of the ARPA meetings, it was the one in Michigan where they dropped a little bomb about they were going to start a network. They brought up this question programs because it just emerged as an interesting topic and they were doing a lot of it in that area. I got to go down in the basement and see one. There is a little aperture there and you look in there and all the world like looking through an aperture at the moon, Just incredible. But the kind of issue raised by Ken's comment about that isn't the way people think, well, that's right then on the question that along with the exploring of what can you do and new kinds of conceptualization and portrayal of, goes the whole buisiness of reorienting the way people do use the machnery they happen to have. 42

That when I come back and the old way involved lots of limitations and there's such a huge domain to explore about the new places we go and what we do to facilitate that. So you know very well that people have to be reconditioned for whatever, or whatever you want to call it to be able to harness new .... And it's a little tiny bit of the flavor of that is that you've gotten used to working NLS structure and the views and people can say but I don't work with outline form, well, there can be all kinds of reasons why they don't. There are some who can work with just the first level and linear paragraphs in duration. Pretty soon they begin finding out the value of it and value of the different views and they start evolving. That's just scratching the surface. 42a

(RWW) That brings up the whole marketing problem, though, And the history of that counsel design, the mouse has caught on in the outside world. The mouse is now recognized very widely. It's a much better thing than a joy stick or a light pen. But the keyset, no one has really ever gotten very excited about the keyset at all. Why is that? If you are starting to get in these other dimensions that are even more far out than the key set, getting people to ... 43

(DCE) This is a whole other important part of it. I accept the consideration completely. 44

(DCW) I think that's because no one has a system that's fast enough to make you feel like you're wasting your time when you move your hands with the mouse and keyboard. 45

(DCE) The trends in the evolution in that and in the evolution in the marker acceptance of it concerned interest are just part of the evolution and not only all these facets to be developed but they're almost .... one-dimension complexity. I'd be interested, too, in just stirring your heads a little bit about if we had three dimensional color dynamic display. 46

Since you are working with you are doing things we say in software design and development. You've already said "yes" when you are trying to study the dynamics of the computer process, sure that might help. Come back up and say to write the specifications and the source code and documentations that represent that. Can you imagine a task like that? Or a task like producing a User's Guide? That there wouldn't be, that you couldn't learn to make a lot of value from that kind of portrayal? Well if you could, how many man years of effort for foot of progress. That's sort of the new kind of exploration that our culture really hasn't done formally.

Most of those things have evolved as a side issue in other kinds of .... I look around and say I don't know how .... even where we now will, where we feel we can do it a .... job by speaking as a communications means. One could learn to communicate that same kind of thing so much more effectively with a real wide range of signal forms and that's an .... I appreciated the whole round. 46a

(DCW) I guess I was just wondering if the responsibility of operations also applies to toilet paper in the toilet. 47

(JCN) One thng that occurred to me about three-dimensional color was that I guess I'd like to go back some kind of dialogue about our history support system and be able to pull out easily selected periods of time and play them in some kind of hologram picture that I can look at at all sorts of angles and getting sound and maybe written material besides too. So that if I wanted to recapture the last hour here I could in fact create a little stage that I could look and talk and see different reactions around the room and actually have a little piece of history. At least what part you could capture and play it over again. 48

(DCE) Well, it's pretty clear if your concern is substantive things you are concerned with have natural attributes of being three-dimensional and dynamic, it would be marvelous to be able to represent them in order to read them. (unclear) But, there are also this challenge that's saying for areas, abstract areas that we don't already think of it like that. That now if we had a means for easily forming and manipulating these multi-dimensional portrayals we can then start hunting practically for ways to have those portrayals represent the concepts and abstractions more efficiently. 49

(KEV) I can see, you know, the question of how we can use three-dimensional color display in our actual work here. The structuring code and text such that as you go in procudure oriented language, as you go deeper into the structure, you go deeper into three-dimensions, for example. You can use your color facilities for extracting documentation or other things like that. But, I would still rather have the three foot screen. In the near future. anyway. 50

(DCE) There's, it occurs to me that there's another area that is in multi-dimensional color that can be relatively soon tried for help. That is if you begin in the .... system that an extra message is needed--cross-referenced as it may be. If you'd try a design and want some comments on it, now you are going to try to

update that, how do you manage all these different little messages you have .... in various places and have various attributes associated with them and who did it and when and they were talking from what point of view at the time. They fall into different categories as to what places you have to clean up or you have to change to accommodate them. It's a tough job to try to mange all those and keep track of them and coordinate them and imagine just playing with spatial, color views even dynamics to try to just .... on what's the status of ... 51

(RWW) Even a simpler problem came up yesterday when Walt was complaining about all the stuff that the Journal is now delivering to everybody because people are really starting to use the Journal a lot. The .... is trying to figure out the color codes, just some relative priorities of stuff. Like if you think this is something a guy really ought to read right now you can make it red and view spec red and you can see what's the most important thing. Just that simple level of color. 52

(DCE) We can do that now with some descripters and .... but, anyway we used have the blinker blinking feature wired in. You could set things to blink. You know, it was a very nice little touch. I'm sorry it's gone. But it's in the general capability of the continental .... and reformater it could fix it so that as you go through looking for different patterns in there that when it formats it to show it to you that sets the discover the pattern to blink. So that's using a new dimension of learning in there. It would just be tremendously effective thing when you are trying to find where it is in the passage. 53

(RWW) Jack Bialik has a nice little thing in his little .... display where when you are searching for content when you are saying find this word instead of like jumping that statement to the top of the screen, you have to find in that text where the word is. He just draws a line from the .... pattern from the top of the screen down to the word and circles and brightens it and it's a very simple and effective way to skim through there. 54

(DCE) There are just a tremendous number ways to conduct it. For every one that you can add every convention like that now that we are talking about capability and how many commands does one more thing we need to learn how to in effect to work with. But, I'll .... myself .... to after we get to that part of this next discussion. When we were talking about transactional capability you have a service system, and the reason I call it service system is that it's there for you to get service out of it and support you. You get that service generally in what I call transaction there are units of service you've got to do this....

So you make a transaction. There's a negotiating phases you could call it where you specify an interact to what you want to specify in the execution phase that does it. 55

So, the concept of transaction then is really interesting studying it. It does some interesting things.... You talk about building system with a capability for lots of different transactions. And that the execution of such a capability is a process, then. But, what you are building is a capability. I needed to keep capability and actually the execution process separate in my language because I know that I would have semantic problems if I didn't. 55a

So, looking at a capability you realize that in that term that there are really a lot of dimensions to a particular capability and if you look in the service system that is providing that capability, dimensions come by and in a kind of process in time and rate and responsiveness that are involved in it. The different resource committments that are involved, how much .... it takes and channel capacity,.... etc. 55b

So if you take a lot of those different parameters of .... you get n-dimensional states. How much processor time, what kind of responsiveness does it need, did you actually elicit when you transacted a service like that? In its multi-dimensional states in every particular transaction that you invoke, it has a particular attribute of how much time it took, how much capacity it took, etc. and you .... in that state and put a point down. If that transaction required, not kind of a service capability, but .... point. When you look and you realize that any given physical service systems provides someone has sort of has a limited domain in that state, responsiveness beyond which it can't go and a lot of memory requirements, and so on. And you realize then that sort of a subspace of capability is what the designer has at his disposal when he comes in. Say I can provide the user with service capability, the transactions of which lie in this subspace. 55c

So at some levels researchers are working on extending the dimensionality so that it will reach the subspace that will give you the design. For instance, one thing, if you are working at a typewriter terminal and you know that you have .... space than you have at a CRT terminal. 55d

Then are particular kind of action that you invoke of services and let's say at the beginning too, that there is another generalization that doesn't often get introduced in our

discussion and that is that you can get service directly from people or directly from a device and you usually think that if it's directly from a person it means someone that you can turn and ask directly. But if you also say that it is direct if you speak with someone over an intercom, that's pretty direct. It has a physical interface. Especially if your speech is stored for a little while and then given to a person. Pretty soon you realize that technology can start to mediate in the channel between you and people. It can mean support of you. And then that person that is giving you out support could go out to work on the computer in augmentative terms. There's nothing to stop some subprocess that the computer is trying to do from coming out with a message for some human again to say "Help do this." 55e

(end of side two, begin side three) 55f

It's going to be nice when we jump to a link and the file isn't there are automatically be a message from the operator who put it there and that will be a composite process then that you don't have to be involved and the other person, you are not involved in the interaction with the other person at the computer. So, some day computers will may be so flexible and so powerful that you don't need other people or just service support in there. But, I anticipate that in just a few years that the composite service system is the general way among us to look at the thing. 55g

So when I say nature of the transactional capability, we should realize that once we stem to including those kinds of services, people can give, as sort of being online in the system, and online support people. And other aspects of the nature of a .... advances an artificial intelligence in both the capability and economies which their processes can offer us will mean that the nature of services you can ask for can get more and more sophisticated. When question answering begins to look forward as a reasonable, practical thing. If you sort of learn over what domain a topic, and kinds of questions can that be effective, integrating that into your structure of capabilities means that you can start getting support from smarter and smarter computer processes. 55h

So there are dimensions to open up and explore, new kinds, new nature of service capability. The ideas of having an online support person around that can get you out of trouble or .... if you are hung up, that can sort of automatically be switched into, linked to you closely if you need help. The system is, it is not at all, it's got some engineering problems, of

course, and it can make a lot of difference to people especially when it comes to questions like .... was bringing up that we use only 3% of the commands we made. 55i

So people could be brought in to help tutor and get you out trouble, but there can be computer-managed instructional techniques too, which you expect to be a part of the service thing that you can transact. You can only expect anybody in a working environment has to evolve his skills and understanding and you expect that he can only reach peak when his vocabulary repertoire, transactional capabilities get very large in your workshop and you realize that you can only really get very skillful in some areas. And if you go outside that area, some of those things you occasionally want to do, you'll need help of various sorts. If you need training in testing or actual guidance. So many kinds of services fall under these sort of dimensions of what's the nature of the kind of service you've got. There are many kinds that we haven't started to integrate yet. The kind of, I'll get more specific later in our message about what we're talking about. 55j

First of all, I'll just try going to those that talk nothing about the repertoire of transactional capability that you have on tap. That means that out of a set of those the designer provided for you, what's the set that you are hassled with then you can call upon him. What are some of the characteristics of that repertoire that you want to think about. One of them is that for a lot of the tools that are heavily used they should have the care of lot of expert design and the polish given by lots of use and experience. 55k

So you'd expect there to be a solid core of these capabilities that are sort of universally provided for you that are built by experts that they don't seem quite natural, there's convincing evidence to show that if you just learned to use them, etc. they will pay off more for you than if you try to use a set of tools specifying now as feeling more natural. There'd be a big core of tools like that. One important attribute of that tool is that it should have the stages for a smooth continuum for you to learn and that you can do most of the things you want to do with basic stuff and considering each capability as sort of a word in your vocabulary. Your vocabulary would extend till it's more powerful, more fluent as you got skillful in the area and it's sort of a gradual process. So you'd assume that a kind of requirement be placed upon this set of capabilities that are designed to have that smooth .... where people could grow in each skill. 55l

(RWW) I think that it's a very key point that I think for example that one of the things that's lacking in our present system. There are a wide range of things. But, there are some fairly significant energy barriers describing the stuff. There are certain things that you can learn in sort of a linear fashion, keep learning and there are other things that there's a big energy barrier to get up and go to learn those things and those energy barriers tend to stop people either because they don't have the time to want to go over them or so forth. 56

(DCE) The design is sort of lacking in that respect. But there's also even when the designs get more refined like that they're going to have to be consciously in both processes that test and train people. Because even when one is around places where other people use a larger vocabulary it often takes a little bit of .... you to get you to extend your vocabulary, not just for your own good, but for everyone else's. There's a .... in this area of what your working vocabulary not only in the number and size of the repertoire that you can invoke. But with your skills and using them too, skills both means the skills and speed with which you can transact one of them, and nowadays it's keyboarding skills, etc., but you're skilled in quickly visualizing a succession of such transactions that comprises execution of some little or higher level task. So you call it procedural skill. 57

So this is a very important part of using any set of tool. You just get the picture of grabbing this wrench doing this and the screwdriver, next and hit it with a hammer and you're done. So the flow of sequentially envoking these things, it's a skill that it takes to learn. But also the actual transaction of any one of them. 57a

Skill and accuracy which use the keyboard and mouse and transfer your hands back and forth. So those things are such that if you consider the investment that's being made in designing and providing all of the services to a person and the sort of intermittent sort of roles and procedures and methods and .... and all of that which has evolved in which he has to train to use it, you realize that the matter the effort he puts out to keep tuned up in conforming well in this kind of skill, he receives knowledge and skills to use this thing are something that are of community concern, not just 57b

If you look, for instance say, a lot of money to provide this sort of computer service, then you look at the two phases now the .... was talking about, there's the time period in which you're setting up specifying the command and in the interval you say you've got to fix in your mind what you want

to do, it's that time set it up, and that time to execute it. We spend a lot of time worrying about, a lot of energy worrying about how to reduce the response time. Get it down so he can get on and do what he wants next. How much time do we spend in reducing that time? It's this whole time really that you have to save that sort of transactional cost in elapsed time. You really get diminishing returns if you bring that down past, you know below some fraction of the user's time for doing it. 57c

So you really realize that the skill for one guy may be able to do that in that time and another guy be able to do that in that time and it's not just a really coordinated investment to give both of them that kind of time. So one kind of thing I think of on occasion is "Uh huh, we ought to just keep track of that and then we worked hard to give this guy a response like that and this guy will say there's no sense in sweating your bits off to ... 57d

(DCW) A beautiful example that he gave was that the difference in programmer's effectiveness in the timeshared system versus a .... system is like a factor of two to one. But the variance in programmers is like a hundred to one. So the selection of programmers is far more important than whether they do it in a .... system or in a timesharing system. All that's really academic and it's picking the programmers that have the effective factors or training for them to be effective is much more important than what medium they use to get the job done. 58

(DCE) But if you say you are spending a great deal to design that medium then the .... is that you really have to pay attention to the skill level in persons you have sort of tested and training to see that you have matched investments. 59

(MDK) It's not clear to me what you are including in that left end. 60

(KEV) That was the time when the computer said go ahead and do something to the guy said ... 61

(DCW) No, that can't 62

(DCE) This time here is when you say, "Ah, I want to replace that word." So the decision in your head that you want to invoke a service transacted until the time when it's all done and .... your attention to something else. 63

(RWW) Doesn't that include the making the decision of, "Ah, uh, I want to do next is to ... (interruption) 64

(DCE) That's a part of the higher level skill or the procedural skill. How you really are procedurally organizing your flow of work. And that's a very definite one too. 65

(RWW) So what you're saying is that that's just the amount of time it takes you to bang on the keyboard in the right way to specify or replace. 66

(JDH) You've already decided that the way the computer is going to do it in the time that you are willing to wait for it. 67

(RWW) But if you don't know how to use the .... you do it with the lead and inserter. 68

(DCW) No, no, no. You, That's from a first .... In that specific system he was talking about the first character .... he typed (?) until the computer ... 69

(DCE) There's a succession of events of this sort spaced by time with your thinking that may need to put five or six of these together and you've got a next higher unit of things that sort of, that an augmentation system needs to get complete. We often spend a lot of time designing acute capability for print execution here. But we realize that a value of that comes from higher levels and how much that it lets us get done. So the designer repertoire of particular capability so that you can pull a group of them together in a particular sequence and you get a next higher or lower task done. And these tasks are something that can be divided in a slightly higher order so that there's a lot of very interesting study that we need to get going sometime about isolating some of these particular tasks. And just testing to see if the particular repertoire of individual tools or transactions is well matched so that we've got to keep set with things. Each one does a nice thing, but its value really comes when how can you .... then so you can really get things done. 70

So we need to learn a lot more about the working in a task environment in which these things are being applied and then to do the studies to say, "Ah, we have not only a good repertoire to select from in terms of the functions they perform, but in terms of coordinate invoking of them. A second set might look like it has more tools and might not be so neat but it might just be a more convenient thing from which to draw abbreviated procedures. You might be able to do it with a choice of three on the average instead of four

instructions, commands from a repertoire of fifteen instead of from a repertoire of two, whereas you might have felt without considering this slightly level environment you might have felt that it was much more elegant to have a ten. 70a

Instead of .... But then on the human side of the thing, it becomes a skill in conceptualizing there's a sequence of a particular transaction I want on a .... to get this task. Well, that's a learned thing that takes training, too. At least we know that right now and in fact I don't know how many people chat about it. But it'd be a very, it's something about the development of this system really has to concern itself with and in any environment, people need to have the training and awareness in testing in this area. And in higher areas. When you get into procedural levels you start calling methodology. 70b

So your question .... what was this left hand box measuring. That's when in the procedure the guy really knew that's what he wanted to do next. So there's a skill at that level and a person may be very good at that but we kind of .... in putting it together. So there's big gaps we find in here. There too, you say does it coordinate a design to work very hard at reducing this time here when the percentage that that amounts to in this whole interval is ten percent of the time. But reduce .... response time in half, that will save by five per cent of the time over here and perhaps a tremendous cost. 70c

(JCN) you're on the replace word level. 71

(DCE) No, I'm at the next 72

(JCN) It could well be I want a table of contents extracted from somebody 73

(DCE) That's even higher. The next level is like looking at a statement and you suddenly see that you want to reword it. You remove this .... replace that .... You know the wording that you want and you have to fit into your head the succession of operations to do it. 74

(JBN) Well, Doug I think that from what you just said though you are arguing along the same lines as an important point that you had made particularly when you talked about the demonstration that you had given at MIT. That response time is not dependent, the other thing at MIT. That response time is not independent, the other thinking and actions are not independent of the response time. If you can, by bringing that machine's response

time down by half frees the man's mind maybe his thinking process goes on five times as fast because you have reduced the machine time by half. 75

(DCE) Alright... 76

(JBN) ... And isn't that applicable here. You made that point before. 77

(DCE) I think it's including in what I'm saying. Here is a unit of thinking time, this larger interval here that includes four or five command executions. 78

(JBN) One point is that you are saying don't want to bring down the five per cent response time is all these other things take ninety-five percent of the time. I think what is applicable is your earlier point that five per cent response time has such an effect on the way the man's mind works that it could be that if you reduce that five per cent in half that maybe the fifty percent time that his mind was working or he was trying to get something done would be reduced even more measurably. So it isn't completely independent. 79

(DCE) One doesn't want to forget that sort of thing and I'm not quite sure how we can clarify the issue to isolate those kinds of considerations. 80

(JBN) I don't think you can. 81

(DCE) Let's just say that we promise not to forget the possibility that the subjective effect on the guy in his thinking, then that means that you just have to move up to higher levels in the process. But you should end up with something measurable. How long does it take him to do a certain quality type of task. Or how well is it done? But I'm just trying to coordinate some the more visible ones, but particularly that emphasis on execution time in relation to the skills that the people actually have attained in the .... So enough of that. We should go on to something else. Unless someone else has more questions. 82

(KEV) Well, I just want to spend a little on what Jean was saying in that .... in his studies .... that that left box there, the user's response time and the right box. 83

(DCE) Now he sort of included this sometimes. 84

(KEV) I think that had better include that .... in that box as user's response time and consistent response time. 85

(DCE) The user sits there and finds that hits the carriage return .... that he may be thinking and then he starts typing. 86

(KEV) But what he was saying was that as the system's response time was up, the user response time went up. So by decreasing the system's response time you also decrease the user's response time. 87

(DCE) Sure, but the .... returns, say that this is a minute and a half and you get this down to a few seconds, it doesn't seem like it's going to increase the number of units ... (interruption) 88

(KEV) Except that he was talking in terms of that was about twelve seconds and the system response time was only on the order of about three seconds. 89

(MDK) But I think that the problem isn't one of comparing those two numbers at all. It's really looking at the effect of the mind of a given value for the right-hand box. The model I have in mind is the refresh rate on the scope. If it's not fast enough it doesn't matter really how fast it is in absolute terms. It's going to be damned annoying. It's go to be, say, sixty cycles per second. So we don't see it. If it's twenty, that's still a pretty fast speed. But it's not fast enough. 90

(DCE) But in knowing the subjetive thing and all ...., we want to get these things balanced. So a guy can say I want to have a little faster. But if he's taken forty seconds here and doesn't like the way, you know if anyone objects that this is more than five. 91

(MDK) There has to be recognizes as valid, ... the universal... 92

(DCE) I'M just saying we don't want to lay all the burden on this part of it and the machine side. We say there's a burden on the .... in this area. And that's all I'm trying to ... 93

(DVN) There's a tremendous matter of experience. When people are out on the net using teletypes they are never annoyed by the delay that sixty characters a second makes because that's a new high for them. When the system is loaded down in the afternoon when we're working here, and we go down to response rates something like sixty characters a second on display. Then it's frustrating and confusing because we are having the same experience that the other guy has. That's I'm trying to say. 94

(DCW) That thing on the left, that box on the left is somewhat of a sacred character. You never question why a guy is doing something a given way or why he's being .... or not. That kind of, it seems like it's always his domain and you spend an inordinate amount of money making the computer a little faster and the code run a little bit faster, when you can in fact get the same sort of a gain by the guy just doing something a little bit differently. 95

(RWW) That's one of the experiences in industry with assembly lines, you know with all these methods engineers .... back what you say. 96

(DCW) No, but you just never question a guy. We do that here. People just keep doing the same dumb things day after day and nobody says "How come you do that?" You know, well, that's my business. 97

(xxx) Can I comment on a parallel that's very striking. We are working in a field of aviation and the parallel is with the air traffic controller. The FAA is trying to augment him with computer aids and various other things to have better communications with the airplanes, and so on. But they are very concerned with their capacity of the national system. It's getting to the point where it's a serious problem and you can't just keep adding air traffic controllers and they've reached their capacity linearly. Well, they have asked us to do a little bit of this to study one aspect of this and that is what's the attitude and behavior of the controller, this person as the technological improvements are being introduced in the system. So we've had to come up with ways of figuring out what's going on in his mind and we've broken down it into very similar kinds of boxes that you discribed here. 98

And what we're doing, we're going out into the field and taking TV tape recordings of the controller. And then he gets off his job, we come back and replay it with him and talk about it with him what was going on in his mind. We've discovered some things that they've been sort of surprized at that are important. 98a

(DCE) The augmentation system is designed .... of that. The designers just have to do that. I'm .... would be that in case after case how incomplete we are and I almost doing that with ... with a purpose. The end case that I'm going to making is that there wouldn't be any chance for .... just at SRI. Or be able to make significant headway at all in all these different ordinate parts. The choices we've made over the years, and some

of them have been by fault and by surprize and so on, but a lot of them been painfully having to subjugate other people. What I'm trying to pull out from among the different things we can do is that that would be the best sort of bootstrap. 99

And then in the very early years that was very very hard to maintain. It was so much more dramatic to go off and study a lot of, there were a lot of dimensions you could go out and open up. The effort to try to get something you could say, here now is a workable model for me to work. And you sit and work on it and help with your stuff and communicate .... and new programming .... and so on. But the many many permanent parts of the many parts that design does not run at all by the sort of disciple principle that's involved. We're not trying to pretend this otherwise. 99a

Back on the matter of repertoire of capabilities that one, that there are categories of transactions that we can point to cases in our own environment. I've been speaking so far on the ones that are sort of made by the experts in design is taught to you very carefully. So they fit in the hierarchy of task execution and they are very efficient and the procedural skills for you to learn are something that could be taught in certain ways. Like if you taught how to swing a golf club in a certain way that evolve via the experts for many years and it's highly unlikely that you could provide your own mathod of swinging that would be better. 99b

(RWW) The data point, I was talking to a guy who is really into golf the other day and he was telling me that it takes seven years to set a swing, to get that swing down and be able to do it day in, day out. 100

(DCW) If you ever played golf, you can believe that. 101

(DCE) There's really a difference when you start talking about the .... not here. But in almost any of these cases where you are really talking about where these different dimensions can mature to, you are not talking about the casual walking up and sit down and suing it. You are talking about the person for which this is really a professional supportive tool. And he's certainly skilled in it and his skills going to grow and the guy that's been using it for seven years will be really more effective than the guy who's only been in it for a year. And the size of the vocabulary in terms of how many tools you've got to call upon and all the so many variations and the way you can invoke them and qualify the parameters etc. will just grow and grow. 102

Until any end can be advertised .... with the way our natural languages are in terms of the size of the vocabulary. That's just, I can't prove it but that's just where I've gotten to in all these years. So that's totally incompatible with the picture of the system you are designing is easy to learn. It's the whole system is easy to learn. That's not that they are just really desparate thngs. One the other hand, you've known many people for a long time who will be casual .... So it takes a special kind of design for the kinds of transactional capabilities and procedural skills that are needed in the utmost simple, simplicity so they can get value out of that they want to do. I just make the difference between the guy that can run the huge construction machines in the middle of a complex construction job and a guy walks and looks at the vending machine and says I want the comb. And put the quarter here and push the button and I get it out. 102a

There's a machine to serve you for the transactions made--very simple and it's purpose for wide casual usage that you just never think of something like that that's what you have in ... and complex indicates its support to us. Like an airplane 102b

(end side 3 begin side 4) 102c

There are different design characteristics. But there's a lot to say to you. LIke .... spectrum at least there's sort of a one system in which people are casual and experienced useres then you have to realize that as the world evolves in this direction, more and more people are going to be vehicle drivers of this sort. LIke more and more people will be car drivers. And it's likely to become, to want to be these groupings like some people drive on the right, some on the left. But, there won't be a sort of endless number of sort of basic ways to do things. Cause some people are going to be casual at some things and good at others and just cannot .... them learning all that. 102d

So, what the processes by which the major systems evolve and are accepted, who knows? But it's a real question of interest there. If you want to participate in making contributions that are significant news, what's the difference between if you are contributing, I mean there is a difference if you contribute to a development that's going to end up being one of the major accepted kinds of standards or if you're contributing to smething that's going to be very cute .... You know that the latter probably contribute something to the

way conceptualization and experience and the whole discipline, but it isn't .... to think about. 102e

(RWW) On the history of programs of languages is very rich with that kind of ... You've got .... and we've got a ... 103

(DCE) .... was there first and was kind of crude. It had wide use for a number of reasons. .... tried to come along later with something better but didn't quite make it. Except a .... even if it's crude doesn't go in the list processing manuals and there's .... and later came .... got there first but it didn't make it. So a .... system and there are quite a set of dynamic parameters in that evolution that I want to understand more and make a kind of a pact in terms of decisions aoubt about how, what I am going to do .... There too, it's where the bootstrap really comes in saying that at some point catching the interest and attention of key people and enough of them to make a critical mass so that at least they start evolving together and not get so uptight about what the particular evolution is. The process ought to be so that it's upwards .... It's a good bet for trying to capture enough momentum to stay with a major evolution area. **104

(RWW) Can we come back to .... There is something there that has been bothering me about the whole .... thing and that kind of analogy. And that is that .... was sponsored by IBM and .... was sponsored by a university or a group of researchers. So ... 105

(DCE) You mean 106

(RWW) Okay. ITL file, okay. And the reason that Fortran made it was that there was this gigantic thing there that guaranteed that there were Fortran compilers and sixty to seventy per cent of all the computers that lived which created the motivation for people to write books, teach it in classes, and so forth, and a similar kind of thing within this little bootstrap community is to improving the research over here. 107

If IBM in its office systems research that .... Miller was mentioning is going on back there, comes up with Fortran sort of text editor or whatever it will be, that's the text editor that's going to be in eighty per cent of the offices around the world. No matter how good this little thing is that's sitting over in this bootstrap community and occasionally IBM will take an idea out of it and will put it in its next version and may be in ten years later you'll get TL-1 or whatever. So that says something to me about if you really

want NLS to survive in a big way you've got to get it into IBM computers . 107a

(DCE) YOu've got to get it to work in an IBM operating systems. It doesn't mean that you have to get it accepted by IBM. 108

(RWW) Well, I'm not sure that's not true also. 109

(DCE) I'm just trying to isolate the 110

(RWW) It may be that you have to get it accepted by IBM . That may be a very crucial part of our strategy says that we have to work with IBM. 111

(DCW) It means that we have to get them to distribute them. 112

(MDK) The case with APL relates to that last concept. Because until they accepted it, they didn't do anything with it and no matter how good it was, it wasn't pushed . It didn't get anywhere. 113

(DCW) Yeah, and you know the monolithic myth of IBM isn't really anything either. Look at .... They tried to ,.... was the cooling thing that was supposed to be in the operating system in NLS .... It was a .... system written by a bunch of guys and it essentially became the standard and like almost everyone runs. It like a standard modification to NLS and all of the neat stuff they did on their own and everything else pretty much died because it was clearly something better than what they produced and their stuff has gone up all over the floor and .... was now the big thing . 114

(RWW) But it did run on 360, so it could make that transition. 115

(DCW) But that's not relevant to that unless it runs on 360. Well, it's in seventy per cent of the market that... 116

(RWW) Well, I think that it's relevant to us in planning for our strategy. In some level our stuff has to run on IBM equipment or it's a minority thing . 117

(DCE) It's a strong media in my mind that it gets in lots and lots of operating systems. 118

(RWW) At least in IBM. (laughter) 119

(DCE) You look at the sort of clientle and marketplace that has opened up are putting in each particular marketplace and that

makes a difference in your selection , what sequence and what things you can do. There is a kind of question all the time you can say that rises all the time. And I keep reflecting when I say something on what it's going to sound like and look like when it's typed. I'm probably making it more horrible by rephrasing everything. 120

(JCN) If you're going to type all of them, just that. 121

(DCE) I realize that I've got bad, I do very badly in some process like this converting in my head in some sort of sensible stream of words. You can ask yourself a question of if you can talk IBM into just buying us out .... aiming just for an IBM product, would that be the better way to get the road out of the augmentation system. Well, you say if it really were accepted, if they really did that what's the chances that if you got in IBM that you could build and survive a chances that if you got in IBM that you could survive and build a good product. 122

(RWW) I'm not making that argument. 123

(DCE) I know. I know you're not. I'm just saying that I have gone as far as to think that through. When you look at different environments and you talk to the people, for instance, about different ideas and they have only one management hierarchy to sell it. It's a very difficult .... to change strategies and market approaches and changing guys and the fact that in that stratification there's a great deal lost in any kind of sense that .... internal appreciation for for instance things like this. They are frustrated people. Guys who'd like to develop it. On the other hand, suppose you have a wider market where people get support from and you choose from those that are excited ones and ones that get turned on. Then the way you give support is in a way that doesn't have the same kind of domination of the actual approach. And the choice of hardware and and a particular market clientle , etc. that you'd need. You realize that there are better to like BART that people are developing but that still leads you up to saying Boy it sure would be nice it in the end you could buy it in the end they'd buy it supporter of it or at least tolerate it. 124

(JBN) Could I ask another development question. I mean a question about development? Along the line of a three-dimensional color TV tube, what are the implications to it and in our thinking if on the one hand we say think about what we could do if we had three-dimensional color TV display available to us next year as opposed to our thinking would we like to be at a spot where in seven years or ten years or whatever time we set

we could implement use of a three-dimensional color TV display, what would we do next year in order to make .... be able to adopt a certain technique say a three-dimensional color TV. And in five, seven, ten, whatever we say. Is there a difference in how we go about our development which way we look at it? 125

(DCE) Even if you did that latter thing whch is in a sense saying consider making a long term .... In knowing that down there someplace we .... to be put in the integration of such a display part of the stages that need to be scheduled in between. Even though when you are to contemplate scheduling stages you have to go to that go to that first exercize of what do we do with it? When we got it in when do we want to be ready to try? 126

(JBN) But, I feel that that's different, or has different implications in our thinking when we're saying what if we had it next year? Which is the way we looked at it at first. And then immediately get the answer that I'd rather have a three foot screen next year is the idea. 127

(DCE) It was sort of a ..... question. 128

(RWW) It seems to me that there's a key philosophical point, though that's brought up here and that's there's a great big difference between us that are sitting up here introspectively, what would we do with a three foot screen or what would we do with a three-dimensional color display, and actually being in contact with sort of the real world out there in some sense in finding out that because of what's going on there that the logical conclusion is let's get a three-foot screen. It's a very different thing. So that's a part of the argument that I've been hearing over the Framac discussions. 129

(DCE) I have no argument with .... about it because if there isn't, the evolution has to be with real applications of people with resources and needs that want to do it. There may argument about which people and how much of the resources and what part of the things they'd like to do that we'd like to stir up and facilitate. There's isn't any question about .... have to be real work with good people . That's my ... 130

That's the thing where we start talking about the .... that expect to go into a lot. And I'm not sure that in the end I'll make it feel you'll be okay about it or not. It's be real people but whether real satisfies what we mean by real. I've not quite finished the thing about ... The size and sophistication of it sure and the fact that the very sophistication the way that the large repertoire fits into

the methods and procedures requiring a lot of studying in design principle means that it's not likely that each person's going to design his own repertoire. It is likely that groups and individuals will design and use temporary and extended vocabulary in their own directions. 130a

So there needs to be a facility that we use to call a higher level process or something general so that it makes it relatvely easy for a person to put together special transactional capabilities for his own use. Or that a group can do it which means that if that's the case then there has to be means that a group can easily sort of keep track and make available to its users, like a group, say a special interest group in a network supportive community. It's going to keep all its own set of tools and techniques. So there have to be means available so that it's easy for them to make a user guide and .... it up some kind of computer aid instruction system in which the characteristics they need to teach the use of these things. I can next go into, you know we are done for the day. But I can next go into a list of sort of specific things that are in the new dimensions like storage manipulations, communications, speech trainings or the sort of the same thing that with graphic, stored graphic frames, like photographic ones. 130b

That's what I propose unless other people have some questions and also I wanted to take a cut at the progression of things at a certain level sort of like our trust level that we have set up for LINAC. The progression of sort of services that can be provided in a service system and assuming the support of a system development team or suppose they are offered by an informatin center to the community. And it's a progression that I'm working out as a tentative think piece that I have to offer to SRI and NFS and other people if we start going out to get their interest in first stages in augmentation. I thought, I appreciated the more dialogue we had today. 130c

(JCN) Doug, what are the notes that you have?? Are they the kind of thing you are talking about. Are they the kind of thing that of thing you are talking about. Is there a possibility of using them as a syllabus and ... 131

(DCE) Yeah, there's a possibility I just didn't want to submit it. I almost did today but I got too big and bulky. If I can, say by Thursday make it look sensible like for the Journal people can look at it before we come in . 132

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