FRAMAC MEETING HELD 23 JUNE 1972

TRANSCRIPTION OF FRAMAC MEETING HELD 23 JUNE 72 1

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(DCE) ... I can't remember the details of last week. We went through this list and we spent most of the two hours talking about the nature of services that could be centrally supplied to a community of users and I generally just talked about a discipline oriented community of users. I'd like to spend some more time going back and forth through this just to be sure that some of the basic ideas did get across. Before I start I'd like to point out what in my formulations that I'm trying to get ready for various kinds of readers. I'll generally say it's either a discipline oriented or mission oriented group of people. And, assuming that the group could be either a distributed community or a local team, that there are differences in the nature of the way some of the services and some of the organizations will work depending on whether the people we are talking about are closely coupled or widely separated and at the outset there is sort of an opportunity thrust to pursue to get involved and pursue both ends and so far we have done so. The mission oriented localized team and also the distributed community of people. 3

(DCE) I'd like to open it up for some discussion first. If there are some of these things that people would say well, they've got some ideas or would like to hear a little more about, ask more about what might be cool in those categories. Ken, you asked something about intelligence systems. 4

(KEV) Well, you had a list that said research intelligence, or something in that room? Disciplin "X" Intelligence service and I wasn't quite clear what you meant by that. 5

(DCE) Well, I would really like it if we would start talking about that. I'd like someone else to talk to Ken awhile and give him this picture of what intelligence service for what we'd have to do or what we could do. Who would like to spend a few minutes? I want some dialogue. 6

(CHI) OK, I'll see what I can do about that. It seems to me that given any discipline that a group of people in that discipline would profit from a data based and retrieval system

kind of facility that would provide them with up-to-date information about their particular interests, their particular discipline. That's what I thought that was. It seems to basically have two components. One a group of people that's constantly updating, and varifying and checking that data base and the retrieval system itself. Is that accurate? 7

(DVN) Well, in some things that are prototypes of that exist. For instance, the chemical abstracting system is a start in that directory. 8

(xxx) Several medical systems? 9

(DVN) Several medical systems exist. Catalogues maintained semi-automatically by various equipment makers. For instance, auto parts catalogs that are on a micro-fiche retrieved automatically are a start towards a similar kind of thing , starting from very different angles. 10

(RWW) Shell had a file here when you get newspaper clippings and articles out of trade journals and the New York Times for example, has this huge data base where they take everything that has been published in the New York Times the last twenty years and they take every article and categorized it and indexed it and organized it in fifteen different ways and it's all there since 1880 or something . Most of that's going to be online . There was some group down at UCLA that's cutting stuff out of newspapers about diplomatic things and they categorize it according to which country said what about what country and they are trying to correlate to see if there is any relationship between their words and their actions. There's a lot of work going on. The CIA must have something . 11

(DCE) There's a certain kind of distinguishing feature here here that so far I haven't heard. A young community can abstract one is an internal thing within a community. It's saying that here's what's all publications and all things. It's that community's internal material. It's the sort of knowledge of of stats that I kind of see integrated into saying here's the state of our science and discipline. There's something else that every entity and organism needs is to know what's going outside himself that's important to it. And that's my somehow interpretation of what an intelligence system is or corporation for a company, country. That's a little bit of what I meant here. Saying here there may be lots of research guys who'd like to know what's going on in the industry that they are affecting or the kind of users that they may be aiming for. What are the kinds of things that are really going outside their own closed

domain outside the domain that they can affect that has the bearing upon the strategies and tactics the mark upthe available tools and techniques that they could xxx 12

(xxx) Are you saying that then the Handbook would be more a representation of the internal thing than the intelligence service. 13

(DCE) It's more like that than... 14

(RWW) Except that I don't really see that now. Because my picture of the Handbook is that it is's not just a collection of all the internal stuff. It's a collection of that sub set of the stuff which is considered to be highly relevant and descriptive of where you are right now. It doesn't contain all the historical trials, failures and stuff. It's sort of like a, it's a snapshot of sub set and stuff. So that all the other stuff that's in the Journal for example, I don't know where that fits. But it's some place more in the intelligence survey. It's not the Handbook. 15

(DCE) The Intelligence is what's being specially being prepared etc, to base your work on. It's something different from all the grist and the memos and the papers that you've been publishing within your discipline for years. There are differentiating things and it's up to us if we want to name categories in here to put things in. We can say our intelligence system includes all the papers being written within your discipline and as well as all those things outside being conducted. That's .... But it's the one kind of thing that I'd least like to emphasize is that the generally conscious effort needed to develop and maintain a base and often you need specialists who are intelligence analysts and they go through and pull together all this information and try to put it in some kind of pre-digestive form that people within the community or discipline can find available. 16

(RWW) How would you get a .... like the kind of things Battelle does with their information. Where they also have chemists that study everything that goes on in chemistry and computer people who know everything that's going on in computers and computer people are writing summaries all the time,--what's happening. 17

(DCE) Every discipline-oriented community needs processes like that going on , integrative digestive... 18

(RWW)It seems that it would be useful to us to make a visit back to Mattel and really understand what they are doing and how they

are doing and where they are failing and what they are doing right. Because they're one of the most active groups that's doing this kind of thing. 19

(CHI) Which category does that fall under? 20

(RWW) I think it's the intelligence system. 21

(DCE) It's close to that. 22

(RWW) But it also has some overlap into the Handbook too. 23

(DCE) Within the discipline there's a lot going on and you say that publications within a discipline or within a community all kind of fit within their "term" dialogue. They are talking to themselves about what they are doing in their publications etc. And you need that coordinated. And you need to learn a lot about what's going on that you yourselves are not generating. There is a lot of digestion that goes on now and some place there's an integration into okay what's the status of our own discipline, where are we at? What do we know of all these theorems or hypotheses that have been published and dated lately. Where do all that put us? Where do we stand right now? Can a discipline need the place that just say we have integrated the best picture of where we're at now. 24

(DVN) So then the kind of thing that the CIA does in the clippings you know when some country's newspaper calls America a name, this is carefully recorded in Washington and catalogued and some kind of analytical procedure may go over it. That in fact, as the name implies is intelligence is a thing very much like what yours 25

(DCE) Every biological organism very definitely needs sensors and interpreters and memory and all associated with what's going on his outside world. 26

(DVN) So that an important distinction between the Handbook and the intelligence service or someone that's looking at them and thinking about planning them for himself, is what he considers the outside world. 27

(DCE) Exactly. That's, very much label it a .... discipline. 28

(DVN) If you're a parts manufacturer, then your catalog is part of your handbook. But if you are somebody who, if you are at a car repair shop, your catalog might be a part of your intelligence system or some part to the catalog. 29

(MDK) I think I have a problem understanding the difference between the Handbook and the intelligence service. From what I gather, it sounds like the Handbook is the union of all the intelligence services. Is that ....? 30

(DCE) You say what's the current status of my discipline "X". I don't want to know what all the theories have ever been or something. But, where do we stand right now? Maybe the two theories about this that are in competition but, okay, that's their status. We'd like something that just says where we're at. In our own discipline. 31

(RWW) There's a digestive quality about the handbook. It's not just all the raw stuff sitting in there. Someone has to throw his head in there. It's more like a textbook or one of these collection of papers that people put out as a field is getting started that says that these are the twenty key papers that we've found that you guys ought to know about. 32

(DCE) The discipline should have a better process than exists now for just saying, even terminology that things are cast in uniform terminology and kind of uniform framework. So that each person struggling around in there doesn't have all this bridge jumping that he has to do himself about realizing that this guy's publishing something in old terminology and is he up to date or not? Is it worth reading? 33

(RWW) You know that this has been a problem for the last three hundred and fifty years, at least. What are we going to do that will make it less of a problem? 34

(DCE) I'm talking about the openings for augmentation techniques that have a chance to make a real difference in the way a community can work. So we'll just say the kind of augmentation techniques we can offer can make a significant difference in the way a community could try to keep updated, big super document that says this represents the state of our discipline now. It'd be hard, but it's a tremendous challenge and to me it's one of the key places in which the challenge of augmentation and augmentating human intellect lies whether it's for an individualto say I've got to integrate all the notes, the memos written to me and my ideas. How do I today integrate all those to have something that represents where I'm at in my I understanding in the state of my design? 35

(DVN) Let me ask Marilyn a question, what is there now, is there now a mechanism for dropping things out of the present ....? 36

(MFA) There's no way, mechanism. Somebody goes through and says, hey that comes out and tells me. 37

(xxx) Has that really ever happened? 38

(MFA) Yeah. Some people have had .... The stuff needs looking at by everybody. 39

(xxx) You're never going to get rid of people looking at that stuff. There's no automatic, get some automatic stuff to help you sort of keep track of it a little better. It's got to have a human mind passing trough it. 40

(MFA) Yeah. I hope people use it. They'll notice, hey that's no longer valid. 41

(DCE) If there's ever a place it takes a matter of method and a great deal of coordination and approach from the community that's going to do it thats the handbook. And it's not only a set of tools that you can give them, a community needs a lot of help in knowing the kind of roles it takes to shape and maintain and what are the facets of it. You've got glossaries, you've got the matter of the structure, the organizational structure of this monolithic, supra document and that structure probably will be a mapping of the sort of the conceptual structure of the discipline in itself. And leaders will evolve a lot. It's a matter of direct concern to the leaders in the discipline as to the nature of the structure, how you begin to decide when, how to repartition specialties within it, to notice when terminologies are needing cleaning up. 42

There are processes in there that have gone on in sort of a primitive evolutionary way through all of our different intellectual discipline es that need to be facilitated in order for things to work faster and better. Towards evolving a discipline. So when I point to a lot of these things and you look at, we have certain amount of potential to make a start to facilitating those. There's a tremendous amount of development to be done. In the area of that Handbook alone, I should digress and start talking about when I first started writing my notes about the processes of Journal and dialogue support. They were hand in hand with the concept of a Handbook. That was just generalized and whether it's for an individual or small group or large group there's this process of a lot of things go on. You write notes, you write graphs and yesterday's draft when you sit down this morning to look at it is old already cause you have new things to think

about, new ways to integrate and you would like to shift that. 42a

(DCE) You may be getting lots of memos, you may suddenly remember that there's some data or now it's time to think that you're able to integrate ideas or problems from months ago. So you're active with a big base of historical entities in your notes and in your head and there's a process of working, and massaging and integrating those to present to try to reach something that says where I'm at today. And any guy that works out a design and sees that it evolves and produces a report .... He sort of knows that process. He lives in the middle of it all the time. If there's one key area in which really helping augment intellect is needed, it's in this one that I generally call integration. By which I mean that process of pulling together all these diverse things and making sure that's it's a self consistent thing that does the best in representing where you're at right now. 43

The process of doing that for a group of people building a .... or building a big thing, big anything like a ship, a computer system has very much that problem of trying to integrate, to represent the state right now of where we're all at. It's a design withwhat's the specifications, what's it look like, what are our estimates about it, what are the theories and plans and ideas. Somehow our hope is that what sits in all the people's minds and in all the people's miscellaneous notes and notebooks and blueprints that haven't been initialed yet and those that have been, etc. One hopes that there's a represent, you know that there's a relatively coherent set of goals and concepts and appreciations for the problem and hopefully everybody is using the metric system, using the same system measurements and that the terminology is roughly the same because people have been to similar mills or schools.... 43a

(DCE) There's just a big hope that generally works out by some process with everyone pitching in working by which in the end there actually is a ship that's built. But the process could be tremendously facilitated through a newer way so that there a much more unified integrated record of the state of expectations, the understandings, the designs that are there. It's that process of augmenting the intellectual thing which includes the communications, the analysis and the adjustment of terminology in lots of decision processes among the groups that are there. But they will shape upultimately this thing called monolithic representation. 44

(JBN) Doug, what you just described sounds more like what you touched on like maybe I missed part of what you were saying on it. That sounds more like a mission intelligence service. What made you feel strongly that this should be a discipline intelligence service instead of a mission intelligence service? 45

(DCE) I opened the meeting by just saying that various times I'll slip into both cause the processes aren't that much different from basic... 46

(JBN) I wonder, though, if this will be a mission intelligence service and a discipline Handbook. That would clear up some of the overlap that people see. I think that there are two different things there. 47

(PR) The difficulty with a discipline versus mission is the following: when you create an intelligence service you have lots of bits and pieces of information. You have to put on it a certain value. Now that's very hard to do. Because you don't have any criteria or any criterion to judge with. When you do have a mission you can establish a priority and consequently you can very easily value on your information and I think that makes a tremendous difference in all the magnitude of difficulty in establishing any one of the systems. 48

(DCE) Let's try to come closer to looking, maybe we could call a discipline I think that it's really is something with a mission, just some kind of mission. 49

(RWW) Yeah, but if you take chemistry, for example, you know that's a pretty big discipline. There are so many branches and sub branches and so forth, I think Paul's point is a very good one. That each one has all these different value systems and they conflict and so forth so that each one would put different value on different information and infact some of them might not see certain information because their values are so low to them that they you know just disappear and their... Whereas, if you've really got a mission like you are going to find the cure for cancer or you are going to go to the moon or whatever like that that your values are much sharper and it's much easier to decide which bits should become more visible. 50

(DCE) So what you are realy talking about is the matter of scale and diversity of ... 51

(RWW) You know what you could really get a hand on. It seems that it would be very hard for us to start out as a strategy to do much other than a discipline or.. I mean a mission oriented

thing. To try to get a huge discipline like a major field of study as traditionally defined we might just die. 52

(MDK) Are we a discipline or mission? 53

(RWW) Which? 54

(MDK) ARC. 55

(RWW) It's never clear. 56

(DVN) A Good question. 57

(DCE) As a matter of fact I have terms like that in the paper I'm going to talk about today. One knows in the end that if chemistry is going to have any sense of a thing called chemistry as a total discipline, they will want something covering that whole domain. One knows that there'd be a structure to that. There will be proper concern with saying is the structure organization and the sub discipline, etc. in some reasonable sense. It may be a harder problem and what I wasn't talking about in the definitions is in which order would we try to attempt to help or recommend people adopt. But it still is that if there is something called a discipline. It is generally composed of structure of sub discipline es and specialties. It may well be part of a larger one itself. But you can't deny that it needs these sorts of things. The problem of whether it's easier to supply them, well... 58

(JBN) Is there a danger that designing them for a specific discipline would not give you the universality that you would want. And therefore, we should try to be discipline-free in the design. Unless the discipline were measured as information science. 59

(DCE) Again, okay. We may as well, we slipped automatically into what our intentions in this regard .... There's a dual problem in what you introduced. One is if you pick a specific thing, discipline or mission that you are going to try to build support for, you will probably limit the scope and techniques and principles that may be involved in building them. But on the other hand, if you don't pick a real thing that you are going to try to build something for, you have, it's impossible for almost any human I know of to produce coherent really meaningful advances in the discipline es that you are talking about. Here's where discipline can come in fr us. We talk about one of our missions being to see what we can do to facilitate the emergence of a significant discipline in

augmentation systems. So a discipline could perhaps be established in theoretical augmentation systems that would drift around. I'm interested in the applied end of that thing in what would really make a difference to people for instance, in a cross-section of services such as this. And I can't imagine evolving other than trying to build coherent workable systems for coherent, workable groups of people. 60

(RWW) Yeah, I think that the fear that somehow by taking some partcular thing and doing it that we'll miss the universality or something. That's the kind of fear that the donkey in two haystacks. You'll never get off the ground unless you take your hand in somehhting. Yesturday in the NASA seminar that Hamming gave us a talk at, he made a very interesting point I thought which he was spending years of professor of statistics at Princeton I guess, last year, and it was the first time he had spent a lot of time looking at statistics and studying it, and the conclusion he came to was that statistics all the significant advances that he could see resulted from acturally trying to apply statistical techniques to concrete real applications. That statistics would not have gone ahead as well as it has if people had just sort of sat around in ivory towers thinking about universal theoretical statistics and hadn't actually gone out and tried to make it work in real cases. 61

(DCE) There's a duality of theoretical and applied or I don't know exactly how the name what we're tyrng to grapple with here. There's was some kind of duality. It really needs to work together. It's like saying there are innovative steps in given discipline es that would never occur if you just responded to the needs that are expressed by clientle or in that community. And there are perceptions of it. So that some place you've got to have a mixture of people who sort of stand back and say you know we need a step such as such and some kind and they may have to base it on reason and observations which aren't effective in that community. So there needs to be this step-wise process in the community, but at some place along the lines, that innovative thing has to be fitted in and introduced into the life of that community and evaluated within it. But there is always the problem that the evaluation process involving the subjective interpretation and framework of that community. 62

So the proper evaluation will often have to wait until that community's cultural evoluation proceeds to some reasonable point of their perception and innovation. If there's one thing that's said, it's a great deal of momentum, it's a matter that's cultural evolution. So in this duality, a thing like that one knows that innovative leading of

communities, often has to be done in the face of what kind of majority, of antipathy or even reactinary rejection of things that later they will find very valuable. 62a

So on the one hand, we can't evolve complex systems and disciplines such as this without having real people and real problems to get working in real ways and observe. It's like trying to engineer in the midst of using equipment phenomenons that we really don't understand and that we really don't expect to understand in our generation of professionals. So we have to do it as xxx So we have to put things together and learn how to make them work. And if we don't understand about the strength of a certain beam or something like that, we just make sure we build it three times as strong as we feel it might break at... 62b

(END SIDE ONE OF TAPE, BEGIN SIDE TWO) 63

(DCE) ...so the problems of the discipline evolving are really somewhat different from those of a mission oriented group evolving. And yet it's some of the discipline es in our world that are really important to have evolve before the techniques available to a lot of the missions they are going to be used by?? My feedback intuition says that I have probably relayed that topic easily well. 64

(xxx) What topic? (laughter) 65

(RWW) Could you say something, Doug, at some time about how you think that you are going to market all this. Actually make it concrete and real? I mean real to the people who are going to pay money to support it? 66

(DCE) Well, the first marketing job is to try to see how much of this sort of potential does seem real and of interest to some of those who have put money behind exploratory pursuit of it, pragmatic exploratory pursuit. And then other marketing is if you really want to actually want to go about it in this empirical way we speak of you have to enlist communities to start trying to live this way and buy this. So which level, if not both did you want... 67

(RWW) I'd like to hear both. 68

(DCE) Smokey? 69

(DCW) You know that comment comes up quite often around here and you know about who are you going to sell it to and who's

going to buy it. An observation of my picture of the real world is that selling things is very easy, performance is the thing that's difficult. 70

(DCE) He said marketing which probably should lump together the idea that you don't try to sell what you don't think you can perform well enough to 71

(DCW) You always sell N percent more than you think you can do right now. 72

(DCE) Well, that's certainly true. You always expect that you can do a lot more than you can. 73

(DCW) An underlying thing I felt was well, where are you going to get the money to do this kind of thing? 74

(DCE) Well, I don't take it as exactly as that but it needs covering. I didn't take it to be limited to that, to just where the money comes from. There are a chain of things that have to get to a certain state before the marketing can start to be successful. I was sitting here trying to figure out where on that chain to start talking. One of the chains is the group here. Get to the point where they could possibly say yes, to go out there and try to sell people the pursuit of this in the coming years will be an important mission for us to tackle. And there are, that would mean that they would buy the strategy that I'd lay out. I don't really mean to say that I'd lay out. I've got that personalized so far. There'd have to be a strategy that would include the role of this group the role of SRI, the role of sponsors, and the role of lots of participants in that. This group gets to the point of wanting to do that and SRI getting to the point of wanting to participate. 75

(RWW) What does SRI want to get participating in? 76

(DCE) Well, it can mean several things. It can just mean... 77

(RWW) They give us room space. 78

(DCE) Yeah. One thing is that they go ahead and say well, as long as you pay your way, we will keep arrangeing space and some services. But I think that there's both the need and opportunity to get much more help from them and that's just one of the possibilities thatSRI just sort of declare that it is a major interest to them to see over the long term distant goal. And as a corporation, as a institute they are publicly announcing that they'll get behind a long term pursuit.

Sometimes such and such a kind of strategic stages or something. So whether or not they will do that makes a fair difference in the approach to the other parties in the chain. But I'm actually fumbling with a draft right now saying here's a statement I'd like the institute to consider being ready to issue. 79

(xxx) If you'd consider the institute everything outside of ARC. I mean there is ARC and then there's th institute. There's a relationship I feel I ought to mention and that's that one of the ways that ARC connects with the world is just because you have a system here that works with people in it and procedures and it can be demonstrated and we bring around the house of representatives, that committee that was here. They looked at your demonstration or maybe it was yours, Jim Norton's. They said that these guys really know how to build an information system. They are the world's experts and that's where we'll go. But they don't want that. They want something else. They want to start in a different way and so on. So we'll work with them in doing that. It may not be ARC that works with them in doing that. But, it's really...they'll use techniques that the people in information systems group or whatever group does that. 80

(xxx) They'll borrow techniques from ARC in doing this job. So one way I see that your stuff get marketed and out into the world is that you can demonstrate that this is in effect the way to go. That's the essential thing. Once the client is convinced to that, he knows he wants to go that way. And he'll go off and go that way. He may not come to SRI. He may go to AD Little to get his systems in. 81

(DCE) I understand, I don't reject that. But, it's a good topic to bring up and we sort of have a stack of topics now--one about the marketing and this topic here and the comment you made. I guess, there's a question as to the scale that I, there's a potential goal, a mission that I think that we might be able to swing. And I'm struggling for a formulation of it and to see if we can cast some kind of strategy and approach to it to get there. That's what I'm in the middle of doing right now. So I address what you say relative to that, it's an 82

(xxx) It's an eddie. 83

(DCE) No it's an important part but it's like saying sure, the normal course of the evolution of a discipline, you'd say the discipline of augmentation systems. Some day all these things we talk about of the kind of information systems and methods at

work and the skills and the knowledge that the users will have in it so that they really will be more effective in their pursuit of the problem. There will be essentially a discipline of that some day where people know how to design those systems and apply and analyze them. And some day there will be an industry that will become identifiable like an automobile industry. That will be the industry that supports you know the development implementation and maintainance of these systems. And the training of people how to use them. 84

(RWW) When you talk like that, I become very confused because I look out at the world and I see the entire computer industry and I see the entire education establishment, I see the... it seems to me that what you are talking about is everything that already exists. I'm having a hard time... it seems like that's what the computer business is all about. It maybe isn't centralized. But that's exactly what IBM is doing and what CBC are doing and MIT is doing and Stanford's doing. The entire conglomeration of business adminstration and education and science, almost everything is involved in trying to figure out better ways for people to solve problems or get a handle on things. At that level there's nothing there except everything and I can't get my hand on what you're talking about. 85

(DCE) Our push down stack grows deeper and slightly more branched and I'm just assuming to respond to all except the immediate ones and assume we can dig our way out from there. Sure there are times I wonder how expansive a guy's needs can get before he can be in a different kind of institution. But there are the observations I go through and I guarantee that I am not going to piece all this all together into some nice answer for everyone. But for instance, between ten and fifteen years ago I spent alot of energy trying to find the discipline or the place in which one said where can you go to contribute the most to this kind of support people. 86

There's a system, a system in which people sit and do their really tough, intellectual work. You soon can realize that yes, there is a system. It's kind of what I tried to cast in the old SRI befoe 1962. Yes, there is a system. Great. I would like to go and enlist in the discipline that is going to xxxxx that system. 86a

You find that there isn't one. It's an odd thing. There's a discipline for traffic. You go places to become a traffic engineer, you study economics and a whole bunch of facets of what makes a transportation system work. And it's an important part of our society. I look upon it as a thing of

making an individual and a team of people really effective in this kind of intellectual endeavor looks to me like there is probably is a bundle of factors that's involved in making them effective and the study of that bundle in some coherent sense is a system's study and by right there should be a discipline that tends to that. It seems to me hard to imagine a more importance than... And it isn't an identifiable, coherent systems sort of thing. 86b

(DCE) So when you say it looks like everything, I come back and say why isn't there a discipline? Why can't you go to a university someplace and get a Ph.D in the specific pursuit of human intellectual effectiveness since you call an augmentation? See in transportation, sure, there are people trying to make ball bearings better so that engines can run faster and without repair longer. There are people who studying all kinds of things. 87

(RWW) There are lots of people studying how to make people more effective. They may not have it all so complete. The whole thing may be so young yet that it hasn't integrated with maybe the role you're trying play by saying now the evolutionary moment has come when a guy can have in a project can begin to yell enough and show loud enough that hey, you guys ought to get together. But there are lots of people in psychology and sociology and anthropology and computer science and economics and stuff that are all coming together. Here's Hamming yesterday who's a mathematician talking about the need to get more behavioral research into how computers are being used, to try to evaluate their relative effectiveness of them meeting their goals of the institutions in which they are, you know, talking in a very different way than he talked, say, four or five years ago. You see a guy like xxx who Hamming was calling the "Genius of Menousha" beginning to look in some of these fields. So you can see people are coming and I can see that one project or a guy yelling loud enough you know saying hey you guys, come a little further and you'll come together. You know, Bacon did that, Descartes did that. 88

(DCE) In regards to role, the observation I was beginning with was saying you know that someday there really will be a discipline and there'll be an industry having to do with these kind of systems. So there already is an industry. You can't go and buy an augmentation system. You find that even with us. There's a tremendous array of energy in people building tools and I'm talking about a coherence there. Where in a society there's a coherent sort of institutional thing you can sort of find. There's no society of augmentation system that includes

all kinds of social, linguistic, mental, lots of the factors in it that have to be considered in a coordinated sense in order to go about designing that system. 89

(RWW) I don't deny that. But I'm just saying that there's lots going there. 90

(DCE) In no sense am I denying what's going on, the tremendous energy, potential interest, all the components I'm just saying there isn't a coherent discipline. And I was remarking that some day there will be. 91

(PR) The question here is isn't it premature to try to create this coherent discipline? 92

(DCE) There are lots of questions here and there may be (laugh), certainly. But try to again in the push down stack was talking about Dave Browns remark on the whole institute and people coming through and seeing our stuff has anyway. So I was beginning to say well, I guess I'll have to ...(interruption) 93

(RWW) Let bump, pop the stack cause I want to get out where I was. 94

(DCE) I just popped it. Thanks for.... (laughter) 95

(DCE) So I was just saying I think it would be the best and I had to stand up and kind of shift gears as a matter of fact, saying some day there's going to be a discipline where there will be a coherent set of studies and topics andrt people who identify themselves as augmentation systems people. And the scope in terms of today's identifiable disciplines and topics, that will be including in there are lots (more) than we see. But they will have to be brought in in the aspects of those brought in coherence. 96

Some day there will be a discipline and some day there will be an industry that you can look at the lastest version of an augmentation system that'll make your head swim now to think of. There isn't anybody, the people who, it's as though there are lots of people who'll sell you a cute little hammer or chisel or a screwdriver, but there isn't anybody who'll set you up with a coordinated shop. So we have a coordinated shop. We're in business to put that together. And it may come from many different toolmakers and many levels of people but there are that kind of architectural shops there are people that people can say we put together the shop for you and train you how to use it. And that'll be

an industry that has many kinds of people. There'll be many of today's industrial components in there in full swing producing and providing things but there isn't ye., It isn't pulled together yet. 96a

(DCE) Maybe all you need are the architects, a few more levels of architectural contraction. What software houses may evolve into or something people are accustomed to. So some day there will be a discipline that will be an industry . Jacques? 97

(JFV) It's not clear that things always evolve this way. Take in Physics for example, there is no discipline that addresses itself to the concept of Time; and there are about twelve or fifteen people who are in other fields of physics, but are very much interested in the idea of Time, so they get together informally once a year in Rome or Acupulco or in New York and talk about their "hobby". But it's still at the stage of a hobby. Until, someday maybe, in physics, there will be a central theme that'll put that together as a discipline. But, on the other hand, this may not happen for another two centuries, and in the mean time there's no place where you can really, you know get a degree in that as a branch of physics. Our problem here is: what is going to be our central theme? What is the unifying structure? Somebody at AFOSR for example, I think in 65, said, "If a thinking machine can be built, then it MUST be built." To some people that was at one point the unifying ideal, to build a thinking machine: "That may or may not be possible but let's work towards that, lets use that to unify the disciplin". Can you think of an analog in the field of augmentation? 98

(DCE) You mean a simple statement like: if one can be built, it must be built? Well, if there were I could say, "If an augmentation system is really possible then it really must be built". 99

(laughter) 100

(JFV) No, we need something anybody can see. Anybody can look at the moon in the sky, and we can say, "we want to go to the moon by that target date," That means, you know, lots of other things, but anybody can look at that and recognize it. 101

(DCE) But in a sense like the things you point out are very valid and I try and account for them, but I'd like to go on just trying to paint this picture that may really prove I'm in the wrong institution. There's a picture that's evolved in my head then that I make a series of observations then I can integrate

those that you make in there. They may effect the weight that one gives. It may effect the outcome as far as deciding a strategy. I backtracked in this thing that there will be a discipline and industry some day and until there are both there really aren't going to be a significantly coordinated widely used agmentation system. If the hand tool happens to ? thing with a mixture of hodge podge of principles and non-principles that would go together to put together something now that information system leaning towards supporting this would probably have little chance of propagating or being replicated or serving many people. 102

(RWW) Doug I have an aside here that is: back in 1715, okay I said to myself, I'm going to have a goal which is to go to the moon. A lot of people could look at me and say I kind of understand the idea. It would be interesting to see what's up there. I say, okay I'm going to pull together a group of people and begin to build a disciplines "how to go to the moon". And you could stop me cause you've got to get some propulsion and metelaurgy and it may have been that if that had happened in 1715, we might have been able to go to the moon in 1922 instead of 196... whatever . 103

(HGL) Maybe it did happen then. 104

(RWW) Maybe it did, yeah. But, if you say you're going , if you are going to set up this thing you say I going to go to the moon or whatever your mission is and in 1715 you're reasonably realistic. You realize that it might take 150 years to pull all together and make it happen. So your strategy will be quite different than if you decide to do that in 1943 or whatever. So at some point I would like to hear a comment from you on are we in 1715, do you think? Or are we in 1950? 105

(WLB) I'd like... Doug, I'd to address that with an aside having to do with discipline es, and time and prematureness. When I went through MIT, which hasn't been that many years ago, there was no discipline called computer science. You couldn't get a degree in computer science. And every semester I had to bullshit my advisor to get, be able to take the newest course in something that looked like computer science as a replacement for some ancient electrical engineering course. When I graduated, there may not be a department now, but there is sort of a discipline. You can specialize in computer science. But if there still isn't a department, that is indicative that sometimes that people are retarded, there's a cultural lag. And at anytime there has to be someone somewhere that's at the

forefront of any development and if you find yourself there and it starts feeling scarey . 106

(RWW) I'm basically in agreement with what Doug is trying to do. But I'm just trying to get a feeling now for like if (Babbage?) said I'm going to make a computer science discipline or George Forsythe said it. There is a difference in time. The strategy would be different in those times and (Babbage?) would try to keep himself out of a loony bin and Forsythe trying to get different things going. How do you feel about that? 107

(DCE) It's a valid question. Many of my instincts just say, Wow, it's probably more right than even I perceive, but the only to find out is to keep on making some next steps and they do scare me those steps. But I think before we lose track of our stack, there are some things in it that i'd like to deal with. 108

(RWW) Pop-up? 109

(DCE) No. That's what I mean by dialogue, that I want. Part of the thing back there when I start saying that I dream that there will be a discipline and so on, and I just quickly want to say I can't go out an make a discipline. And we can't . IT's a process that involves cultural lags that I've been perceiving over the years with ever greater respect for them. How important is the matter of a cultural lag and how complex and slow it is. But what I'm talking about is initially the strategy of saying that certainly there are things that can be done that will effect the rate at which the discipline of augmentation systems does emerge and is real. And in which there is the associated industry that can deliver and support systems like this. In my big dreams about them, the realization application of these, can hardly be realized until such things are on their way. So it's just like saying alright if I .... to get to the moon, we can't get there until the propulsion system can do it. And probably the navigational system. But you know, first the propulsion systems are okay. 110

What can we do about helping that? Now maybe all that I can do to satisfy myself is I'll go down and I'll work on fuels or something. Or I'll go to work for the NCA which was some years ago because there are problems in there that will contribute. But I spent some time on that thing and I'm just saying for whatever energy I can affect and control, there probably are different choices I have whose payoff in terms of their affect on emergence on the discipline would dffer. 110a

(DCE) So really, what are the possibilities? I spent years

thinking of that and it's really an investment question, you can just say which way can you invest the energies and re-invest them, etc. and look for a kind of compound interest and leverage that you can get in various ways to accelerate them. I could be dead wrong .... But it turns out that a lot of the guesses that I've made based on all that thinking are turning out to be right about the trends and about what people are becoming aware of. And this in a sense is giving me a lot more confidence in intuition and strategic thinking that I've been applying for twenty years. It doesn't do much to fortify the way my stomach feels when I think about launching some big new step because it's hard on the stomach and it takes a lot of energy. But, so my intuition says there really are a few things that need formulating that look good. So what it needs is for the formulation to get tied down further expanded empathetically by good people and see if they get launched. So I'll proceed along that formulation because we are a fairly good place with what's on the board. 111

(PR) Doug, if I understand well, these topics you have on the board, you view them as being communities in groups of communities. Is that right? 112

(RWW) There are services to offer communities. 113

(DCE) There's some truth to what he's saying, though. At a different level, though. 114

(PR) How do you see the community . Do you see them...The other day when I talked with you, you told me your thinking in terms of discipline oriented community. Is that right? And are these examples of your discipline oriented community, Doug? 115

(DCE) Well, not in the present point in my story. But. chapter seven... yes. 116

(PR) May I ask you another question? Which one of all these discipline es do you consider as being the most important? 117

(End of side 2, begin side 3) 118

(DCE) ... so that someday discipline--you know, twenty years the sophmores the graduate students and things may very well never hear of us or of NLS or anything like that. And that really isn't an issue at all. What happens to the products we make right now in the evolution. If you are really talking about trying to facilitate the evolution in that. So what if you could do something that would really start things snow-balling

as far as the emergence of a discipline es and the acceleration with which it grew? So if you go to someone like National Science Foundation and say for various reasons you are interested in computer science, your interested into many fundamental kinds of issues, you have concern with trying to do research applied towards national needs in more dramatic and larger ways than done in the past. There are many ways in which you have concern for bettering the processes by which science gets done and gets applied to national needs. 119

So consider that one of the problems is how do discipline es, communities of people in serious endeavors such as yours become more effective. We have something here we would like to talk to you about. Already we know that they are interested in the concepts of this. If we tell them: look if one said he wanted to push an application of this and he would like to do it by being sure that included among the people being so supported with what ever primitive techniques you have here. Who are people who are also very much concerned in the structure and evolution of these things. It's a big problem. It takes a discipline and an industry to put it together. One of the things I've been trying snd I'll keep trying to do as we talk in here is to keep pointing out how big the problem really is of developing the first really full coordinated system of techniques and trainings and methods and all to accomplish this cross-section of things in a really nice balanced way. 119a

It's much more than we can handle. 119b

It's much more than Xerox will produce and market in the next decade. There are lots of components and a lot of people can comntribute to it. If there were enough support behind it there are a lot of things that could be put together, people could start working on it, there could be stages of evolution in that, that could make a big difference. So that's why... I ... what could could start snow-balling if you put the proper sort of challange to people with the resources, people who would like to contribute in certain ways? That's kind of what that boot-strap thing means is: is there a way to start all this going so that if this is more successful, I'tll not only start producing techoiques that need help with real people, but it will significately facilitate the emergence of the particular discipline . That we're talking about. Mike? 119c

(MDK) Suppose we assume that we've got that picture painted in such a way that NSF or somebody understands it completely. Established the goals, not called them mm its called

augmentation system in a very general sense. Where would you start? Once you've got that picture painted and we only have a set of people here that we can work with, we can't do everything. So to put Paul's question in another way, about what is most important, what would we start doing first, in your mind? 120

(DCE) What level first? I mean.. 121

(MDK) Well we'll have to do some... 122

(DCE) ... the best answer I can give you right now is where I'm at in trying to bring something out of that sort. I'm making trial stabs of that just to see how real it can become. So the starting place I pick has a number of trial components, some of which I mentioned last week. Like really trying to get more resources more energy behind the one thing we have now which is the prototype for central services mike that and thats the NIC. And if ARPA isn't interested in putting lore money into it, using the idea that it is really a prototype and test bed and that the more money that can go into developing a reasonably good cross section of these so it begins to be an effective experiment within a community--that this would be important to some of the people who do buy the idea. We would get more funds to put behind that. 123

It would be important then soon to start saying we would like, we would benefit more with communities that are more specialised than that which happens to have been brought under the ARPA network and which the current NIC is advised to serve. So I would want us to start to...doing some study, trying out the market, etc. Start staging emergence of a succession of communities that could be served like this with these emerging set of tools. And all these times there's looking for resources and people to keep improving, developing, evolving a lot of these. And it can't just be we who do it, at all. In no sencse is there enough manpower staff that we could pull (it) together. So just saying that if communities can be brought together to work like that, an early test is: can they be brought together to work in the - to support the evolution of some of these techniques. 123a

(PR) We do have examples in other fields that this can be done. Here within SRI we have long-range planning services which have organized a kind of boot-strapping community. All the long range, all the planning departments of many organizations, industry, and even poulyquant? none of them is conducting research in this area. But SRI (the way I understand it) offers

us salarys which are research salarys which are multi-client funded. And indeed it works. Varous published reports I do investigation in certain aspects of planning and methodology and long-term forcast and so-on. I dont see any reason why we could not organize something similar here to get this multi-client funding. 124

(DCE) I've got proposals I wrote in 1959 ... clients support of this work. So that's just to say I've been aware of those potentials all the time. So one can say if you are going to bring a bunch of clients together, what are you going to offer them, how much involvement you want, from which kind you get more payoff and all and it just evolves into using the term community to talk about them, in a general sense, rather than beginning by saying ... anyway, its consistant again, its just a matter of framework in which we inlist to draw them in, work with them and to me the framework is such that if you get participants of that sort who are really active participating in a community, we're very far ahead. But at least we need active communitees that are the test beds for these things to work in, from these other observations we've made. 125

So with some more planning, Mike's question is, what will you do? Suppose you get NSF interested? Well one thing I ask them for the money that will give us the chance to accelerate development here till there is some reasonable profile of development here, till we sort of feel there is a pretty balanced set of reasonable services and maybe we truncate it and leave out this ????? But we'd accelerate to the point that the service we could offer would be reasonably acceptable and that we'd learn how to introduce them in the community, we learn what it takes to teach them to use it, to support them,... 125a

(PR) Doug, but dont you think if we had something specific in mind, for instance we want to back education, then we could put priorety on the thing... 126

(DCE) Well I'm just talking, I'm just telling what I do an I just told the first step is priority would be to make NIC really work. But I mentioned also the fact that it is such a heterogenous bunch a people that it doesn't give us a good a sample as really want. So with a another hunk of money from a sponser like that, start studying and saying, what communities could we establish to help facilitate emergings that could be served like this from which there'd be a lot more payoff in the different senses of our longterm goals? So certainly the one that's doing computer based instruction is so right for this

that for instance, they're already exploring the possiblities of a network that ties in together. 127

(PR) You said something I'm not sure I understood well. Did you say you want to try to get funding from NSF with the specific goal in mind to study which community you should launch. Lets say a two step... 128

(DCE) Certainly, it's like Mike says, "What would I do?" so I say there may be... I don't know there are about four different things that would be about ready to go if you could get people who'd say, "Yeah, this is a good idea." So one of them is a big boost on NIC, a big boost on the development of these kind of things. In this boost of developments, I mean its development for those that could really apply and make work in there. 129

Thats just what I'm saying to NSF: Because NIC, and because that communitee out there, the heterogeneous character it has, there'd be communities that would pay out more to support. You see, ARPA is supporting the actual energies going out to do the work in NIC. And last week I mentioned that I'd even consider if we get a bunch of support from NSF for instance, that would facilitate the government work and other things here then OK, we just take the whole bundle of money that ARPA sends us and just consider putting all that into operating NIC. Because we are assuming we are getting oth...and that's an assumption we get...and more energy in developing it. So the experiment NIC represents gets a much better chance of being a high payoff experiment. 129a

Its in the middle of an extremely unique situation with a technological support community of which there may not be an equivalent emerging in some years, its a very, extremely new test bed if someone really believes that these things can emerge. So take advantage of that test bed of the framework that ARPA has already given us of sort of the way they are the matrix picture that we got our proposal on of saying its major thrust we can get other people to participate and we can get other jpeople to buy. Then the idea with this newly found sponser is to go on and say, "With special communities that have a lot of payoff." And here we we come in more with bootstrapping. 129b

We're saying that if you get other special communities built up, that are subscribing to these kind of services, you know so that makes more of an application experiment and other kind of benifits and is interested in of an application experiment for what other kind of benifits. NFS is

interested in for instance that some cut-they could guess right now that at some cut the things that NIC will certainly do, can do, will be able to do, will be things they would like to have provided for communities of their concern on their own network. 129c

Well what other communitees might be gotten going? If they like the idea of this sort of thing, of the impact it potentialy has on the way discipline es and communities can really start to collaborate and accelerate faster, theyd say "Well, gee, it just is a thing to sponcer, we'd like to do some more. So whyn't us do a study on the succession of communities that really ought to be promoted, to be brought in like this. This will include, you know, the considerations. The first place, you say, it pays off proably should be a community in which they tend to go this way anyway--they get on computer networks of some sort. It would consider the sources of income to support those communities. Some communities would be rich and some poor. Well we wouldn't actually support this study at all till we go in support, you know, that he'd support the committee we're talking about. 129d

So one of the studies is where can they get the support and what kinds of activity would go on in there and what kinds of people would get involved. What whould these people's interest be, and how much feedback in the way of technique and acceleration on all of these and especially in the emergence of a discipline and the stimulation of an industry would you get by choosing particular types of things. We would like to get money in there to go and start having meetings and collecting representatives from certain potential communities to say, "Hey, here's some wild ideas on everything. How does that get you where you guys happen to be right now in terms of problems, concerns, financial structure within your communities, etc.?", and end in here with sort of a picture of the succession of communities that could get facilitated...and the sort of a plan to say, "Hey, the orientation we'd like to have in there is that there'd be a bunch of communities like that start up that would have a lot of high value. 129e

So after we made this study, we'd like to actually, we'd probably be counting on a number of those getting started in one way or another. And you mister, whoever you were paying for this aren't necessarily going to have to pay for that. But were going to count on it. We are going to count on enough of those being in there for you that we would like to

say, "We're going to get ready to run another thing thats a spin-off like NIC. We're going run an information center or a community central service whose whole thing is its a center for centers sort of. Centers of communities, see? Its like saying some way, any one of these communities out there that's decided they want central services and they want to begin using this sort of thing. 129f

The developers and operators of those centralized kinds of facilities trying to improve the way their community works are each kind of a member of a special community that we'd like to say, "Hey, we'd like to set up a center and run it, and we'd like to be getting ready to do that and we'd like some funds to start being ready to train staff etc. and as a matter of fact, the plan may include phasing in a bunch of ARC people from NIC into that. Because someplace probably this thing that is going to run the big heterogeneous whatever ARPA network is becoming is something that we might not particularly want to do. So we face people over in this center of centers that ARPA itself, that NIC itself could come down here and this be one of the long list of kinds of central service activities that can subscribe to a service here, to get techniques, etc. coordination, support. We're not busy enough yet. 129g

(MDK) Is this list on the left, are each of the items in that list a candidate for one of these centers? I don't understand what you're going to be the center of in number four. 130

(DCE) OK, number three I was talking about making a study of the kinds of mission oriented or discipline oriented groups that would be good candidates to actually subscribe to the central services of the sort we're talking about doing, of the sort we are spending an accelerated amount of development here getting prototype work, aad we're shaking down an application. Where are a beautiful bunch of places where these can go to work? So, when you find them and say you do waat to go to work, who do they get a hold of techniques and experience so they indeed can establish and run the central sorts ofservices that provide their communities. Take for example the national center for atmospheric research. It's already an established thing, it gets money from a couple of hunks, a couple of places to the tune of fifteen to seventeen million dollars a year, it's coordinated in some kind of way I don't quite understand by some group of universities who have representatives on who are sort of the board of directors that govern it. 131

Now there is...say, suppose they are one in this study shows

that they're interested, their community is, the potentials of their, there could be a plan for the way they could go and their sensors sort of say, "OK, we'd like to start." What's the process by which they can get access to the fundamental augmentation service systems such as an NLS utility? What can they do to get access to the knowledge and understanding about the ways to run a center like that? Then they'd be the ones who would run it. Staff it, provide services. Run these services for their people. Coordinate it. So, number four is saying, we are getting ready to have center that can serve a lot of these people and know how to provide them with the knowledge they need to know to do their work. Provide them with communication among themselves for a lot of the problems they all meet. They can all work at, learn, collaborate at how to solve them and also really get to the brokerage business if we need to to support for a while the availability of things like this NLS utility service that's on a coordinated basis. 131a

(JFV) Doug ? The case of NCAR is a good one and I am reminded also of AURA, the "Associated Universities for Research in Astronomy": They did exactly that, they realized that there was a need and no single University in the group could satisfy that need, and they pooled their resources together to create Kitt Peak Observatory, In Arizona. No one University could create it. Now these people, like many other disciplines, are very much aware that they need this kind of thing. But it makes a big difference whether you go to sell them an information system , which they know they need, or whether you want to sell them the whole concept of augmentation. It's a question of level of semantics. It's not a question of the contents of... 132

(DCE) Sure. No one university could create that. 133

(JFV) ...its how you approach it. 134

(DCE) That's what I studied in here... What communities are ready? By what stages would they become ready? Suppose there is one center like that , they'll buy maybe this much or this much or something like that and get going. But people who somehow are there having the problem of designing and bringing in and supporting these things, they are aware there is a lot more to grow. And that their community will emerge and live and get more acceptance in this. So they would love to belong to a community themselves by which they can have dialog of their acts with other people with similar problems and.. thats right--thats an assumption...this whole thing is just response to Mike

saying, my current state of thinking, what would I do if I had the money to say: Go ahead. 135

(JFV) As you know, we were involved in an experiment with astronomers that involved creating a prototype network, to exactly that. The discussion that came out in which people from NCAR participated, showed that they look at this very much, as a tool. They know eventually they'll need it, but right now they have to decide if they want to put a million dollars in this or a million dollars in a new telescope, or a million dollars in a new type of satellite. Right now they wouldn't put a million dollars in augmentation research because they don't know what it is. 136

(DCE) That's right. 137

(JFV) Now if we sell them an information system that is outstanding, with respect to anything that any have seen before, anything that any can do internally, they might look at it seriously. 138

(DCE) Yeah, you're a level or so away. We've sold some people the idea of supporting these studies and all because their needed. In a study of all these communities it's obvious that you've got much of that cultural lag and everything when the study here includes: what's the approach? And you know very well when they get out there, their not interested in it. They're a discipline oriented thing. So what can you do for us? God, can you help us with this or that kind of thing? That's what you want to find out. Is there a market to start that gets to evolve. There would be a lot of disciplines out there that you know in due time they'll buy it that it would take energy to go sell, etc. And that's why you spend time in this study saying: What's the payoff to us on this bigger mission, see? They say well what are the strongest pay-offs. 139

If they're not interested in these techniques like that, they're a reluctant user. You've got to force it. And what do you learn by supporting it if you could find other communities that would whoop--pick them up and start saying, "Wow, you got (clap) you really..." That's what this study is for. And for instance, there is very ripe candidates in there like that. Like the one of the ARPA study from a different office from the one we get our money. Of looking at the research community and the actual training centers that the different services support that are all using computeer based instruction as research and as application. They are considering linking in together anyway because there

is high pay-off for them to share computational and data resources. And the guy who did that study--Thomas Allman--(who has been in the ARPA network enough to know about our's) came by and just saying "Boy, am I ever going to add what a couple of these things could do. 139a

They would be a kind where you would look at and say, "There are a lot of natural things right away including: Wow, look, the very thing they're dealing with is something that its important for us to find resources and ways to integrate that kind of know-how into the centrally supplied services that these communities are all taliking about, would like to be able to offer. So there really are a lot of strategic, a lot of pay-off kinds of things potential there if you look at the kinds of communities you can find. Talk about the dollars, the area they are going to work in, their interests, the things they do. An early question, what he was saying: Do these represent communitees? I'm not sure we're not touching the same thing. You realize that if you find a community of people that are in a publishing business or technical documentation or whatever, that are really interested in the pay-off points of this and really'd like to go, and there are a community of them that would get to gether to work on that; wow, a community like that to have subscribing in here there's a lot of pay-off. 139b

(CHI) Can I talk to Jacques for a minute? There's a level of indirection implied in this number fourthing that may be somewhat confusing. Lets just assume for a minute that that wasn't even mentioned. When Doug talks about setting up a community like the NCAR? thing he's talking about giving them an information system, an information service, maybe not a system, OK? but an information service requires people to run it. Knowlegable people to run it and he would assume that those people would come from the NCAR community. So, OK, and I think NCAR would be willing to do that. So what Doug's talking about in number four here is that those people running that information service have slightly different kinds of interests than the NCAR people themselves. Because they're interested in information. OK. And what Doug's proposing in number 4 is a community of that kind of people. I think that's somewhat confusing--or it has been. 140

(JFV) I understand that. What I don't--what is not clear to me is the strategy that we're using in approaching people like NCAR. 141

(RWW) Oh, yeah, well that... 142

(JFV) You know, what is the hat we're wearing when we approach them. 143

(DCW) Yes its clear by our study number 3 is that learning the linguistic transformations and those words that you have to use to be able to talk to people in different communities like if you go out and try to sell people slaughter-house wasts, you're not gonna have much business. If you try to sell them hot dogs though, you can sell a billion dollars worth a year. And so if augmentation system turns someone off, then information systmsystem turns them on, then you focus on that aspect of it. 144

(RWW) Its more than just changing the words though--I think Jacques is saying you gotta know what piece of all that is the thing that their head is ready to accept now and thats what we should push a little further out and that's where you launch it. 145

(End of side 3 of tape. Beginning of side 4). 146

(DCE) ...which we call a boot-strap community. We're interrested in one that will have the most payoff in the accelerating a discipline and an industry. 147

(RWW) Doug, If what I hear that would answer Jacques question, is if you look out there (assume we can get to number 3 here) you would like to find the guys that would take as big a range of that stuff as you could and support it and work with it, ok. Now, if there is nobody out there who is interested in all that, because they don't see it and they don't see how it applies, then you chop one off and say other guys will take four of them. Nobody takes four, you'll back down--all the way down--till you sell something to a guy who'll take half if that's what it takes to run. 148

(DCE) Well, the point is you need to optimize that. It may not be the one that takes the widest range, but if there is somebody like a publisher who is particular interested in one and ... 149

(RWW) But my feeling from listening to you talk is that you want to be very pragmatic. That first you're going to first try to sell to what your ideal would be and if you can't, you'll cut it down until you can finally sell what you can sell. 150

(PR) These steps: one, two, three, four. Are they consecutive steps and what is the time--when will that happen? 151

(DEC) Well, next week, I'm going to get the money from NSF and the week after that I'm going to reorganize the ... (Laughter)

... I really didn't mean to be...now it's OK to be funny but I didn't--I'm not trying to make it look that way at all, its. I think that these three...I think that I would really want to going on five things and I want to get the backing so we can launch them and I want to get the institute to say, "skwol so, boy." and I'd like to...this is what I'm trying on right now. 152

(PR) All at once. 153

(DCE) Yeah but it just means we're declared, we're getting funding and arrangements we're starting to get oriented for this and organizing and pursuit, sure, and we have to see some of these emerge at certain rates. But, I get caught in it--I look around and everybody is already over-stressed over-confused, you know, over-whatever. 154

(RWW) It doesn't seem it would die at once with our present status. 155

(MDK) What is number five? 156

(DCE) But it's like saying, "You know guys, weve be sitting here in our laboratory for quite a few years, we've sort of got a lot of basic technology, we really think we could go to the moon." You know and it will take a lot more development stuff but--its going to take a lot more activity. Then, what does it take? So someplace it takes turning some people on to some objectives and figureing out how to get going and yes it's going to take all our staff. And it just boggles my mind at a lot of those things. Yet somehow, I'm just committed you know about these two institutions. I'm committed but we uh... try and finish this picture and see just what it means and it just may mean boy, brothers and sisters, you know. Send him away for two years vacation and we'll get to...we'll be ready. Or it may mean...I don't know exactly.. how the details are working out, but what I'd like .. the place I'm at right now is I think we could get five things going and they may each be half a guy doing whats and start from there or what these others ... 157

(MDK What is the fifth one, please? 158

(DCE) And that's--I want to try--I want to get launched...and say--its all pretty well to have this big use prototype here...and this mess, and it's all very well to be planning and studying how there all going to go and maybe make a center, but I would like also to dive in and make one. Just intuitively pick one that I think will have the most pay off in a lot of ways

that are real internal discipline oriented, mission oriented community. 159

(MDK) Why does it differ from one? 160

(DCE) One's got a big bunch of things--we really worry about... 161

(???) Do they really care? 162

(DCE) ...thats a lot--you've got to take all comers that are on there. Its a dive in--you've got to assume that a large percentage of people are only casual users of our services--you have to make it easy to do a whole bunch--and here's a group that--the perspectus I'm cooking in my head to say I want 'em to join is--will not even listen to you if you're talking about joining to that extent. We want people who are going to try an experiment of a group of people who are going to pipe in DNLS service and really try to make themselves augmented software engineers as far as we are and then really roll up the aleeves and cooperate themselves about pushing them on. If I could(n't) get that off the ground ok I'd give up, but I think there's a chance to get it kicked off the ground. I think I could talk NSF into seeding it a fair amount. 163

I think there are a number of industries that we could talk about buying in and paying their way and I think if that NSF or different people could probably support various university people to join and suppose we get a community of some six to fifteen sites, that are each sort of cooking with that. But 3-4 DNLS terminals and a team of 3, 5, 6, 8 guys that are saying, "Where are wwe going to try it?" and they're working on their kinds of language--source code language aimed at programs in an operating system in their machine and their compairing notes like crazy around each other, and with each other in this community. Meetings and we just really see what we come up--and we say, "There is no question we are setting that up as though we are the central service for those people--we're the coordinator, etc. 163a

(RWW) I dont know if this applies to them, but it feels relevant to me. Yesterday Hamming said that his intuition and that of many of the people he's been rapping with lately says that if ten guys cant build it it will take a thousand. How does that apply to your picture here? 164

(DCE) To which one? 165

(RWW) The whole thing... 166

(DCE) Oh, well, I think that's indicative of the current state of my o people to collaborate. 167

(DCW) That's what we're attacking. 168

(RWW) Right 169

(DCW) And there's... 170

(?MDK) My number's three... 171

(DCE) The a--suppose a--you know there are problems that have to be solved some guys aren't enough. 172

(RWW) He didn't say only ten guys could build something, you just said that there is a big gap in there. 173

(DEC) When you start doing any--its just like--I could say, yeah, thats a perfectly acceptable observation and use it in our promotion. So, look at the nature of the problem. Over the years I've had--I keep trying to save little clippings and observations that people make and when these run out, I put in X-doc and then I loose faith in X-doc for two or three years, and ?remark back in and it just--I keep trying--but there's no end of gee, examples, observations, and sayings, and of facts that you can put together to sort of say if ever there is a real bottle-neck in the world it's how a bunch of people can seriously coordinate and go after something--and we're not--and what I want to do to people--I want--the approach I'm thinking when I'm trying to sell this to somebody is say, "I'm not trying to convince you at all that we have THE approach, I'm saying we have a reasonable approach, and we're farther ahead than any one else in the world on it and we can put together something that will start working, and how ever it works, its going to facilitate the communitees here to start evolving faster to turn their attentions to how the hell they really make communities and disciplines grow better." 174

You get some acceleration on this business of emerg--developing disciplines. Whether the techniques we begin with here or not are those that emerge and sustain is totally--it doesn't matter. What matters is getting communities who seriously are going to try to use some centralized functions who will seriously study the questions and problems of how communities then govern themselves because the idea of a center service carries with it the assumption that they are resources that are made available over the community. 174a

That means that community has some mechanism for acquiring resources and for making community decisions about them. That whole issue of which there are lots of examples out there now, is how can they work together towards making these decisions and planning them better. But they'll be struggling and doing these things and if they're as--some group that has just said, "We are committed to stay behind it."--all these people and just live with the struggling and just try to pull together the ideas and the knowledge and the resources and really constantly struggle towards that kind of function improving and working better and out of those different communitees trying in working this way--there will evolve ever more knowledge about how to make it work. 174b

The design and choice of how this community can be set up and run is that which we try to make that evolution most centrally applicable to the one of saying, "Do you really want to end up knowing how to augment and to stimulate a lot of this industry." There's a lot of ways you can choice--decide about some communities would be in there because, wow, they got turnedon , begin to perceive these possibilities, that would make a lot of impact. 174c

(RWW) Doug, just another aside with this thing from Hamming. It sort of scared me a little bit was that--here is a pretty preceptive guy who is been making very good observations--... 175

(DCE) He really is. In 1952 when IBM was generating its 701 they called its defence computer. Hamming calculated that ten of them would saturate the computational needs of our country. So... 176

(RWW) This may validate what you just said. His comment on the ARPA net his head was about where Larry Roberts is at--in another place, namely Larry can't see the need the ARPA net needs at the level your talking about of communities of human beings working together. We see it as this technology that sends bits from here to there. And Hamming couldn't see that either. His whole thing was well you don't an ARPA net because many computers are gonna be so cheap that you don't wanna share computers and he totally misses the whole point of networks tying together human beings and groups remotely working together. This just pointed out to me again that in the computer science community there is this enormous gap between where the leaders in that field are basically in the terms of their heads. What were trying to concieve and sell and get across to people. So I guess I just validated your observation. 177

(MDK) Not at all. I think what you just said was that none of us are capable of working down stream and we have many different points of view. I think we ought to respect his point of view of how many computers might be ... 178

(RWW) No, I'm not knocking his idea of mini-computers. Because I believe he is right from that point of view. What I'm saying is that he does not--his head at this point did not make the leap as to what the networks could do in other dimensions rather than as just resource sharing of computer cycles. I believe he is basically right in terms of computer power it may be cheaper to have mini-computers all over the place than to try to use the same bits in the network--I don't know. But in terms of what I believe ...--His basic conclusion was: he thought maybe the networks would disappear. as a result. That the cost of communications would be more expensive than the cost of computers--sites. 179

But from where I sit in a NIC point of view and in the kind of things Doug's talking about, to me the importance of networks isn't sharing of computational power. It is what groups of people will be able to do in working together in other dimensions and that he didn't see that or at least it didn't show up in the kinds of remarks that he was making so--I'm not knocking his observations about mini-computers, I just didn't see a reach in other dimensions of what networks are doing. 179a

(DCW) The classic case of my opening the computer business is: there isn't a system without a computer. 180

(RWW) What? 181

(DCW) The systems somehow--the whole computer game is that systems-- computer systems are systems and there aren't such things as human systems or communications systems that computers aren't integral parts of it and you get, you know its a set of blinders that people have and so you want to talk about a system, most of these systems that Doug was talking about, you know, don't necessarily have computers in them. They could be facilitated maybe better with computers, but the system study itself doesn't have anything to do with ... 182

(DCE) Well, what is generally termed computer science, is--doesn't very much cross over. Yes I've been talking about using the computers as a tool just where ever you can. By now I'm thoroughly convinced computers will pervade all of this. But the questions and problems with which you conventionaly

allocate computer science type people who are just scattered out in amongst that and are not a form recognizable by todays computer science department... 183

(RWW) He pointed out that--this I think was valid--that in general, computer people are what he was calling the ("nusha) people. They are wonderful at getting the bits right and getting all the if statements pointed in the right place and that kind of stuff and that as a result the field (helper) as the nature of what it takes to program a computer that many of the people who come into the field have--good very good, guys like (?Canute), down at that level--they aren't very good at steping back and and seeing ... 184

(DCE) I think one of the really exciting things that emerges for me is that we will begin to get in touch and asking of people who are outside that narrow kind of thing. Start to support us in other areas and that this will bring at sort of a cross road a lot of these different disciplines together over something that in the end will come defined as a common discipline. This will be a very exciting thing. 185

(WLB) Doug, in the context o... 186

(DCE) Just a minute, before I lose--talking about where Hamming was before this point of view changed the thirty man-two day seminar that the National Science Foundation held--there was this fella named Brooks? who was IBM 360 designer who was in that same place about what networks are for. And by the end he really started to think differently. There was an NCAR man whose picture was even more limited, but made a big change. The young guys on the ARPA network the ones that do star in the act anymore, start using them. They hear Hamming and they won't be able to fit together too and its kind of an evolution. 187

(RWW) Well we just may have to wait while the Hammings get old and retire. 188

(DCE) That's Jacques point of view, that --what is it?--that your ideas never get accepted the enemies just die or something? 189

(JFV) What are we going to do about the communities... 190

(RWW) Just a second Jacques. I have to interrupt first. 191

(DCE) Jacques has had his hand up for about ten minutes. 192

(RWW) So has Walter. 193

(DCE) Who said go ahead last? 194

(???) No that might open a new branch so its better to ... 195

(DCE) I'm afraid it is irrevocable, you must speak. 196

(JFV) What are we going to do about those communititees that know they need an information system, but don't want to communicate? Or think that they dont have to communicate to get it? 197

(DCE) Well, I dont know what we have to do. But in this study, and there are three here, I would say we would certainly consider that. Are they communities that we would particularly like to facilitate their emergence? ...and get involved with here? I see this being sort of an intentional thing here (draws on board), we look for members that we want to belong to that ... 198

(JFV) Well then should they go to Arthur D. Little? 199

(DCE) I dont know yet. 200

These are people who buy in a pretty loose affair, but it's earning money for the rest of the community. Alright, if it can be worked like tha, fine. If it is that we say to people like timeshare and so on, look, we've learned who to get our systems in there, and it's fine for you to go ahead and sell your sevices to them wwether we get a franchise or get a royalty or something like that pumps money into the other community, fine. But it would be a mistake if we let them die purposely. 200a

There is an advantage to having people out there doing things like this. It's the question, the real answers when you come and you look in there and say, "What's it cost us and what other alternatives are there? 200a1

'Cause the more people that you get started in the process of evolving that cultural evolution, the better. It would be interesting to watch. There are waves of recognition that can go through a given discipline very rapidly about a number of things. The kind of thing when we choose the kind of communities, there are some that are pacesetters for others. You can sell community A, you just know in two or three years you've got maybe six others that are going to want in. Or some of the communities you buy because there are people who are sort of the leadership of

them who are really turned on dynamic people that just getting them turned on, their are lots of aspects of pay-off to consider. 200a2

I'm not worrying too much about it, I just know that we couldn't start very many communities. If we started this one, and we really made that one work, and put a lot of energy into the development of this, we'd have plenty... So it takes us tiee to decide other communities, maybe a few weeks. Any waym we were making a lot of progress in extracting from me this framework of where I'm at about bootstrap community. There are a lot of associate questions questions for people to talk about. 200a3

(DCE) When you start looking at that. What part of our energy does it cost us to support them? Or is there some way in which they can buy in if they want and if they're not going to participate the price can be put high enough so it ends up benefiting us. So in that community we have these catagories of here are a bunch of people that it really pays us to pay attention to and interest in. 201

here are a lot of assiciate questions for people to talk about. How we're going to do it, or point out that it's really very sort of presumptive to act as though you're going to affect an indust-er discipline . It already has so many people with energetic vectors on their own etc. And I recognize all that and I'd like to come back to thes issues and talk about them. Because I need to digest or you know, I need the interactions. From thoughts about those things in ,, things in the past come a lot of the sort of intuitive principals about the low profile that this has to take. It has to say, "We want to facilitate what communities can do. We dont want to tell them what substantive thing we can do. 201a

Our impact comes from the choice of who we provide the mmmserve like this to make impact. But the day comes when we say, "Oh, we are going to make a discipline that you can join." Thats..What I'M just saying is what we want to do is point out the discipline es--undoubtedly the future will find beter ways to evolve Lets just say that one way is to have augmented central services of this. Let us put them to work in key discipline es so they can start evolving better. Lets also start learning how to facilitate that process more. Mike? 201b

(MDK) What do you expect from the members of any given community besides money? 202

(DCE) Like in this community? 203

(MDK) mmmhuh. 204

(DCE) I expect that there will be a lot of development product ttatthat would feed back into the rest of the community. Its one of the big things that I expect. 205

(MDK) Isn't there not quite a risk involved? We spent an awful lot of time here being certain day to day of our direection direction and of the people that we have and hire etc. And there is no control if we are going to allow people out side to develope and yet if we're really counting on that as a integral part of the total system... how do you evaluate that risk? 206

(DCE) And the risk again is that they will work at things that wont pay-off or take directions that aren't so good? 207

(RWW) The Xerox maybe is a good example there of--we have no control over what direction they are going to go or something, but they seem like a reasonable risk to cooperate and work with because they may feedback to us not only a better kind of display, but maybe a simplified version of NLS that's cheaper, they might not...but I think that's the kind of risk that... 208

(DCE) That's what the whole topic of... 209

(MDK) I know. 210

(DCE) It just comes down to the issue of how does a discipline grow. There are people who say they're ARC. They represent a sort of discipline oriented bunch of guys who are trying to attack a discipline called being software engineers. 211

(???) It comes back to a topic that I would like to suggest that we address at some time--we touched upon it several weeks ago--and that is: With all the pros we're talking about, we ought to talk about the cons and understand them. 212

(DCE) So you mean literal dangers in some sense that ... 213

(???) All the aspects of the risks of what you are outlining. 214

(DCE) If I could pick for instance a sample like this and really talk through how it might get formed that if there are considerations, what would happen and etc. and look at that, thats good, sure. Walter? 215

FRAMAC MEETING HELD 23 JUNE 1972

(WLB) I'd just like to say that in the context of communication and cooperation and change, I'd like to renew an announcement. Which is that Oak POD has invited Stewart Emery and some other people from EST to come down this afternoon and their going to bring a video tape of a seminar that they gave at the Wells Fargo Bank and everyone is invited to join us for that meeting if they like. It will be from two until four probably right here. 216

(???) What time is it now? 217

(WLB) 12:15 218

(???) Time to go eat. 219

(DCE) ok, lets split for today. 220

DCE 2-OCT-72 19:50 12037

FRAMAC MEETING HELD 23 JUNE 1972

(J12037) 2-OCT-72 19:50; Title: Author(s): Engelbart, Douglas C./DCE ; Distribution: Michael, Elizabeth K., Dornbush, Charles F., Matzorkis, Gus, ARC, Guest O., Feinler, Elizabeth J., 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., Limuti, Don, 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, Nouhuys, Dirk H. van, Victor, Kenneth E. (Ken), Wallace, Smokey C., Watson, Richard W., Andrews, Don I./SRI-ARC ; Sub-Collections: SRI-ARC; Clerk: KIRK; Origin: <KELLEY>SEV.NLS;28, 2-OCT-72 19:41 KIRK ;

DVN 2-OCT-72 15:53 12038

On setting plex numbers

You need to put the level where you want numbering to act in square brackets after pxn, ie pxn[1]=101....see (auerbach,testearnie,) 1

DVN 2-OCT-72 15:53 12038

On setting plex numbers

(J12038) 2-OCT-72 15:53; Title: Author(s): Nouhuys, Dirk H. van/DVN; Distribution: Forman, Ernest H./EHF; Sub-Collections: SRI-ARC; Clerk: DVN;

WPJ 2-OCT-72 18:46 12039

ames-ucsb

Message for John Pickens: 1

WPJ 2-OCT-72 18:46 12039

ames-ucsb

(J12039) 2-OCT-72 18:46; Title: Author(s): Jones, William P./WPJ;
Sub-Collections: AMES-TIP; Clerk: WPJ;

CHI 3-OCT-72 10:08 12040

This is a test

this is a test 1

CHI 3-OCT-72 10:08 12040

This is a test

(J12040) 3-OCT-72 10:08; Title: Author(s): Irby, Charles H./CHI ;
Distribution: Paxton, William H./WHP ; Sub-Collections: SRI-ARC;
Clerk: CHI ;

CHI 3-OCT-72 10:39 12041

IMLAC DNLS Policy (until after ICCC)

BOB and BUZZ,
Our policy on supporting imlacs and Display NLS over the net (at least until after the ICCC) is as follows: If you have an imlac(s) which has the same configuration of hardware as some IMLAC which is already running DNLS, then you may run DNLS also and should get loading instructions from the people who are already using the one like yours. If you have a new configuration (like maybe a light pen), then if you are willing to invest the time and energy to make the changes necessary to support your new cnfiguration. then fine. The problem is that we do not have any manpower available at present to help anyone with changes to that program. we will be glad to talk about it with you and advise you. we will also send you a preliminary user's guide for DNLS. If you wish to contribute a person to help us, we would greatly appreciate it. 1

CHI 3-OCT-72 10:39 12041

IMLAC DNLS Policy (until after ICCC)

(J12041) 3-OCT-72 10:39; Title: Author(s): Irby, Charles H./CHI ;
Distribution: Bressler, Robert D. (Bob), Owen, A. D. (Buz)/RDB2 ADO ;
Sub-Collections: SRI-ARC; Clerk: CHI ;

DVN 3-OCT-72 15:06 12042

John Alderete's request for (jjournal,10872,)

John Alderete of Hewlett Packard was here asking for evaluatory information on NLS. I refered him to you among other sources and I know he has trid to get in touch with you. Do you have any objection to my giving him a copy of (jjournal,10872,)...If I don't hear from you I will go ahead on Thursday. 1

DVN 3-OCT-72 15:06 12042

John Alderete's request for (jjournal,10872,)

(J12042) 3-OCT-72 15:06; Title: Author(s): Nouhuys, Dirk H. van/DVN; Distribution: Bair, James H./JHB; Sub-Collections: SRI-ARC; Clerk: DVN;

JCN 3-OCT-72 10:22 12043

fl dls rww jew dvn jhb mfa

Thanks for the quick action breaking connections between RADC and ARC that were evidently left up by accident.
The idea of putting a reminder to all RADC users at each terminal to break connections after loging out seems advisable.
The use of netstat CR s [ockets] should help in cases where you wonder, although we will also be looking.
We plan to change our system so that such connections do not interfere with other Net users trying to get into us, but even then, it is really better to have users trained to really break connections when they are through.
Thanks again. Jim N.

1

JCN 3-OCT-72 10:22 12043

fl dls rww jew dvn jhb mfa

(J12043) 3-OCT-72 10:22; Title: Author(s): Norton, James C./JCN; Distribution: Norton, James C./JCN; Sub-Collections: SRI-ARC; Clerk: JCN;

JCN 5 OCT 72 4:56AM XXXXX";

JCN 3-OCT-72 17:01 12044
Change Order to Cover DEC Maintenance: PO B13477

For action by BER; info to others

JCN 3-OCT-72 17:01 12044
Change Order to Cover DEC Maintenance: PO B13477

Please issue a requisition for a CHANGE ORDER to P.O. B13477 covering DEC maintenance of the ARC PDP-10 computer facility as follows: 1

The Augmentation Research Center (ARC) requests the following hours of DEC maintenance coverage: 2

10pm to 6am (Prime shift) and
6am to 5pm (Second shift) each weekday 2a

Shifts for the week are assumed to start Sunday at 10pm. 2a1

8am to 5pm on Saturday and Sunday 2b

We expect that PM would be performed on two consecutive nights, preferably Wednesday and Thursday, with changes in the schedule to be negotiated several days in advance. 3

On PM nights, ARC expects the system to be up and running at 4am for special processes and for 5am Eastern Network user availability. 4

Estimated costs are: $ 5147 per month (as per quote outlined in D. McNamara memo of 29 August 1972). 5

JCN 3-OCT-72 17:01 12044

Change Order to Cover DEC Maintenance: PO B13477

(J12044) 3-OCT-72 17:01; Title: Author(s): Norton, James C./JCN;
Distribution: Row, Barbara E., Hardy, Martin E., Riet, Ed K. Van De,
Wallace, Smokey C., Irby, Charles H., Watson, Richard W./BER MEH EKV
DCW CHI RWW ; Sub-Collections: SRI-ARC; Clerk: JCN;
Origin: <NORTON>DECCO.NLS;1, 3-OCT-72 16:22 JCN ; HJOURNAL="

JCN 3-OCT-72 17:16 12045

Breaking Connections to ARC After Logout

Thanks for the quick action breaking connections between RADC and ARC that were evidently left up by accident. 1

The idea of putting a reminder to all RADC users at each terminal to break connections after loging out seems advisable. 1a

The use of netstat CR s [ockets] should help in cases where you wonder, although we will also be looking. 1b

We plan to change our system so that such connections do not interfere with other Net users trying to get into us, but even then, it is really better to have users trained to really break connections when they are through. 1c

Thanks again. Jim N. 1d

JCN 3-OCT-72 17:16 12045

Breaking Connections to ARC After Logout

(J12045) 3-OCT-72 17:16; Title: Author(s): Norton, James C./JCN ;
Distribution: Stone, Duane L., Lawrence, Thomas F., Bair, James H.,
Nouhuys, Dirk H. van, Watson, Richard W., Irby, Charles H., Auerbach,
Marilyn F./DLS TFL JHB DVN RWW CHI MFA ; Sub-Collections:
SRI-ARC; Clerk: JCN ;
Origin: <NORTON>TOTFL.NLS;1, 3-OCT-72 10:31 JCN ;
To: Tom Lawrence, RADC cc: RWW JEW MFA DVN JHB DLS

Ckecklist for ICCC

(INTRO) INTRODUCTION 1

General 1a

There are several unique features of the NLS system which this file is intended to help us demonstrate. 1a1

Text Editing 1b

The first feature is a text editor that is designed primarily to be used with CRT terminals, with two special keyboard attachments. See (TEXT:xh) 1b1

The text editing features allow for all the common functions of inserting, deleting, copying, moving, and rearranging characters, words, and arbitrary strings, and entities such as links, invisibles, visibles, and numbers, which will be shown later. 1b1a

Structure Editing 1c

The text may be structured into chapters, sections, paragraphs, subparagraphs, etc. with headings, indentations, etc. See (STRUCTURE:xh) 1c1

The structure can be manipulated freely, for example by rearranging paragraphs, sorting whole sections or chapters, subordinating one part to another, as well as by inserting, deleting, breaking apart, and appending such entities. 1c1a

Viewing Text 1d

The text may be viewed with a kind of "zoom lens" effect. This feature enables one to see just the chapter headings, or chapter and section headings, or deeper levels of the text structure, merely by setting certain parameters called "viewspecs". We will demonstrate this. 1d1

Simultaneously with viewing the structure in these abbreviated forms, one can control the number of lines one wishes to see within paragraphs. 1d1a

The net effect, of course, is to allow easy scanning of textual information by capturing the essence of a document on the limited space of a CRT . 1d1b

File Space 1e

There is a capability to work in an information space which is made up of a large number of private and public files. 1e1

There are easy-to-use commands for bringing the user to any point in this information space. 1e1a

There are sophisticated tools for allowing the user to consolidate and extract information that already exists, and to communicate with any number of other users through the file system. 1e1b

There are subsystems for producing hardcopy of any document or subset of a document, with comprehensive formatting options. 1e1c

(TEXT) TEXT MANIPULATION 2

Terminology 2a

Names have been given to various different combinations of characters in a text string, in order to facilitate certain often occurring operations. These definitions are: 2a1

character - any eight-bit byte defined in the ASCII 128-character set 2a1a

```
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 a b c d e f g h i j k l m n o p q r s t u v w x y z
  " # $ % & ' ( ) @ * =
 1 2 3 4 5 6 7 8 9 0
: - ↑ + ← < > ?
 [ ; ] , . /
```

2a1a1

number - any occurrence of consecutive numerals 0, 1, ..., 9 that is preceded and followed by a non-numeric character 2a1b

```
abcd 1234 efgh
wxyz3456aceg
qrst 1357ijkl
3.141596
$100,000.00
```

2a1b1

word - any occurrence of consecutive visibles terminated at each end by a non-alphanumeric character. 2a1c

1234word#$%&
1234 word #$%&
1234word #$%&
1234 word#$%& 2a1c1

visible - any occurrence of consecutive characters that can be seen on the CRT under normal operations. A visible is terminated on each end by an invisible character, such as a blank. 2a1d

Several peaceful brown oxen gazed harmlessly at the jungle quagmire. 2a1d1

The US GNP of 1972 is expected to exceed that of Afghanistan, Bolivia, ..., and Sumatra. 2a1d2

invisible - any occurrence of consecutive characters which are not normally seen on the CRT. These include tabs, blanks, and carriage returns. An invisible is terminated on each end by a visible. 2a1e

carriage return
space (blank)
tab 2a1e1

link - a specially formatted string of characters, readable by the NLS system and by the user of NLS, that designates the location of a piece of information in the file space accessible by the user of NLS. 2a1f

(KUDLICK, DEMO, TEXT:xg)
(DEMO, TEXT:xg)
(TEXT:xg) 2a1f1

text - any string of consecutive characters. 2a1g

Operations 2b

Text editing operations include insert, delete, copy, move, and replace, and may be directed at any of the entities defined above. For example, 2b1

COPY CHARACTER
MOVE LINK
DELETE NUMBER
REPLACE INVISIBLE

INSERT WORD
etc. 2b1a

Special Features 2c

The orientation of the NLS system to a CRT terminal has many aspects, some of which are illustrated by use of the mouse to point at textual and structual entities. 2c1

(STRUCTURE) STRUCTURE MANIPULATION 3

Terminology 3a

In order to understand the terminology, you only have to understand the concept of hierarchy of statements. 3a1

A statement is the basic structural entity. 3a1a

It may be an English sentence, or paragraph, or just a word or a character. 3a1a1

It gets the name "statement" because of the manner in which it was entered into a file. 3a1a2

Namely it was entered as a unit of text bounded on the front end by the command "INSERT STATEMENT" and on the back end by the special delimiter character, "command accept". 3a1a2a

A hierarchy of statements is a structure in which some statements are subordinate to other statements. 3a1b

This is the father-son concept of directed tree graphs, and closely resembles the familiar structure of a book: chapter, section, paragraph, sub-paragraph, etc. 3a1b1

For example, consider the following hierarchy of statements: 3a1b2

1 3a1b2a

1a 3a1b2a1

1a1 3a1b2a1a

1a2 3a1b2a1b

1a3 3a1b2a1c

1b 3a1b2a2

1b1 3a1b2a2a

1b1a 3a1b2a2a1

1b1b 3a1b2a2a2

2 3a1b2b

2a 3a1b2b1

2b 3a1b2b2

2c 3a1b2b3

In this hierarchy, statements 1 and 2 are at the same level. So are statements 1a and 2a, statements 1a1, 1a2, 1a3, and so forth. 3a1b3

The terminology introduced to handle such a hierarchy is the following: 3a1b4

all statements at the same level belong to a "PLEX" 3a1b4a

a statement and all its subordinate statements constitute a "BRANCH" 3a1b4b

any number of consecutive statements at the same level constitute a "GROUP" 3a1b4c

NOTE that being at "the same level" means "the same level within a branch". 3a1b4c1

NOTE further that BY DEFINITION the highest level of statements, namely statements 1 and 2 in the above example, belong to a branch under an ever-present statement numbered "0", which by definition belongs to every file in NLS and is the highest level statement in that file. 3a1b4c2

Operations 3b

Given this structure, one can copy, move, insert, delete, replace, and interchange any of the structural entities. 3b1

The command repertoire includes such commands as INSERT STATEMENT, MOVE PLEX, DELETE GROUP, etc. 3b1a

Statement Naming 3c

Statements are normally designated by selecting them with the mouse "bug mark" on the screen. However, they may also be addressed with a statement "number" that is automatically assigned by the system. 3c1

Use of statement number is of limited utility, because whenever the structure is changed new statement numbers are assigned (the old ones being dropped) to conform with the new structure. 3c1a

Therefore, a method of naming statements is provided, the names being arbitrary alphanumeric strings enclosed in parenthese sand placed at the beginning of the statements. These names can then be used as statement addresses. Names enjoy the property of remaining with a statement no matter what changes are made to the structure of a file. 3c1b

(FILES) FILE SPACE 4

Journal System 4a

The Journal is a public read-only set of files. 4a1

Any user can put information into the Journal by using a subsystem designed for that purpose. 4a1a

Any user can read information that is in the Journal if he knows the address of that information. 4a1b

When information is put into the Journal, the person inserting the information is required to identify persons or groups of persons to whom the information is being addressed. The Journal subsystem then informs each addressee that he has a "message", and the addressee becomes aware of this message when he reads his private message file, which we call an "initial" file. 4a1c

To actually get to the message itself, the user invokes the link mechanism, described next. 4a1d

Link Mechanism 4b

Links may be inserted anywhere in a statement, following certain simple syntax rules. For example, the following link (KUDLICK, MDK, 1:xg) locates the first statement of the initial file of user Kudlick. 4b1

To use a link, the command "JUMP TO FILE LINK in statement XYZ" is used. 4b1a

The system then scans statement XYZ until it comes to the first link. It interprets the link, opens the file, and displays the information on the CRT (or other terminal). 4b1b

By this mechanism, any given file may have any number of links to other files in the system, forming a web of interlinked files that a user may traverse easily. 4b2

Split Screen 4c

On CRT's the user has the ability to display two or more files simultaneously, with independent control over the viewspecs, editing, and linking of each file that is displayed. 4c1

Assimilation 4d

Assimilation is the act of copying selected portions of one file to another file. This is particularly easy to do with the CRT version of NLS, and just a little bit more difficult with the typewriter-oriented version. 4d1

In selecting portions to be copied, the user can make use of the viewsppecs to copy just the depth of information that he wants. 4d1a

As many copies of information from one to another file can be made as are needed, and as many different selections of information within a file may be made as are wanted. 4d1b

Content Analysis 4e

MDK DCE 3-OCT-72 9:48 12046

Ckecklist for ICCC

(J12046) 3-OCT-72 9:48; Title: Author(s): Kudlick, Michael D., Engelbart, Douglas C./MDK DCE ; Distribution: Rech, Paul/PR ; Sub-Collections: SRI-ARC; Clerk: MDK;
Origin: <KUDLICK>DEMO.NLS;3, 28-SEP-72 9:43 MDK ;

NJN 3-OCT-72 13:22 12047

question

This is a message to myself. I am not sure how to read my mail. 1

NJN 3-OCT-72 13:22 12047

question

(J12047) 3-OCT-72 13:22; Title: Author(s): Neigus, Nancy J./NJN; Distribution: Neigus, Nancy J./NJN; Sub-Collections: NIC; Clerk: NJN;

NJN 3-OCT-72 8:15 12048

alpha

hi,dvn. My first try at journal system, frustrating on
a model 33. njn 1

NJN 3-OCT-72 8:15 12048

alpha

(J12048) 3-OCT-72 8:15; Title: Author(s): Neigus, Nancy J./NJN;
Distribution: Nouhuys, Dirk H. van, Nouhuys, Dirk H. van/DVN DVN;
Sub-Collections: NIC; Clerk: NJN;

RDB2 3-OCT-72 11:12 12049

hello from bob bressler.
i am trying to load my imlac (mit) with the right program for dnls.
can you suggest how to go about this?
all help gladly accepted.
tnx. bob.

1

(J12049) 3-OCT-72 11:12; Author(s): Bressler, Robert D. (Bob)/RDB2;
Distribution: Deutsch, L. Peter, Bressler, Robert D. (Bob)/LPD RDB2;
Sub-Collections: NIC; Clerk: RDB2;

VGC 3-OCT-72 9:56 12050

Response to pickens query on ucladoc

John, got your message. Will respond shortly. got a copy of ucladoc and listed it. Thanks very much. Vint. 1

VGC 3-OCT-72 9:56 12050

Response to pickens query on ucladoc

(J12050) 3-OCT-72 9:56; Title: Author(s): Cerf, Dr. Vinton G./VGC; Distribution: Pickens, John R./JRP; Sub-Collections: NIC; Clerk: VGC;

ADO 4-OCT-72 0:47 12051

Supporting DNLS for the SAAC IMLAC

Thanks for the note about DNLS. I expect that I will be able to support keyboard only software for SAAC's IMLAC; if I can find time, I will also be glad to make the extensions for the light pen, which appears to be the only non-supported feature of our machine. Since the UCLA Imlac appears to be almost the same as ours, I will get in touch with JBP. ..Buz 1

ADO 4-OCT-72 0:47 12051

Supporting DNLS for the SAAC IMLAC

(J12051) 4-OCT-72 0:47; Title: Author(s): Owen, A. D. (Buz)/ADO;
Distribution: Irby, Charles H./CHI; Sub-Collections: IIG; Clerk: ADO;

flipping out (sorry).

cindy; 1

JRP 4-OCT-72 10:13 12053

Message to CERF re. ICCC

I am now definitely attending ICCC conference, so I am interested in the details of transportation, boarding, expenses, schedules of conference events and demonstrations...etc. Did you schedule a demo time for UCSB? We are now in the process of evaluating the TEKTRONIX 4013 terminal and locating pertinent demonstration programs. John.

1

JRP 4-OCT-72 10:13 12053

Message to CERF re. ICCC

(J12053) 4-OCT-72 10:13; Title: Author(s): Pickens, John R./JRP; Distribution: Cerf, Dr. Vinton G./VGC; Sub-Collections: NIC; Clerk: JRP;

JRP 4-OCT-72 11:26 12054

Message from John Pickens to Jerry Powell re. ICCC

I don't know if Ed Faeh has talked to you yet, but I will be attending ICCC instead of him. Since there will be a TEKTRONIX 4013 terminal at the conference we are trying to gather any current demonstration programs for ICCC use. Do you want me to come to ICCC early as you requested Ed Faeh? (I haven't talked to him today, so I don't know what the reason was) Please contact me through NIC, (805) 961-3221, or (805) 961-3454. John Pickens UCSB CSL. 1

JRP 4-OCT-72 11:26 12054

Message from John Pickens to Jerry Powell re. ICCC

(J12054) 4-OCT-72 11:26; Title: Author(s): Pickens, John R./JRP; Distribution: Powell, Jerry J./JJP; Sub-Collections: NIC; Clerk: JRP;

KIRK 3-OCT-72 18:52 12055

The last FRAMAC meeting 27 July 1972 has been transcribed (KELLEY,TEN,1:w). Please make any changes, corrections, or edits before Friday October 6, 1972 when it will be joiurnalized. 1

(J12055) 3-OCT-72 18:52; Author(s): Kelley, Kirk E./KIRK;
Distribution: Auerbach, Marilyn F., Bass, Walt, Engelbart, Douglas C., Hopper, J. D., Irby, Charles H., Kaye, Diane S., Kudlick, Michael D., Lehtman, Harvey G., North, Jeanne B., Norton, James C., Paxton, William H., Rech, Paul, Vallee, Jacques F., Nouhuys, Dirk H. van, Victor, Kenneth E. (Ken), Wallace, Smokey C., Watson, Richard W., Andrews, Don I., White, James E. (Jim)/FRAMAC ; Sub-Collections: SRI-ARC FRAMAC;
Clerk: KIRK;

TRANSCRIPTION OF THE EIGHTH FRAMEWORK ACTIVITY (FRAMAC) MEETING.
13july72 1

This transcription is submitted to the Journal for record purposes. It has not been edited in detail by the participants and probably contains inacurate quotes due to problems encountered in transcribing from audio recordings. It should be read with the possible problems in mind, but it should give a pretty good idea of the discussion. 2

(DCE) Don didn't here about it. I really would like to have some people here, Mike. Anyone know where Mike is first? 3

(???) Where's Paul? 4

(DCE) He's on the phone, said he'd make it. It happens this thing I'm going to go through is the thing that the two of them were intagled with yesterday, and then Smoky... 5

(Everyone talking at once) 6

(DCE) We can start with miscellaneous. If you missed several FRAMAC meetings which is supposed to drop some momentum when you're going very nicely, is to bad. In trying to decide what activities to discuss and how to get something going for this one, I made a decision to sort of terminate the direction that we were going. I had planned a direction that would go deeper into augmentation systems for a number of reasons. Because I still feel there hasn't been enough dialog communication about a number of important perspectives about what is an augmentation system and what would a discipline looked like that was a mature discipline beginning with a mature--truely developed augmentation system. 7

The kind of considerations that I was weighing are: one, that after three more of these meetings, I'm going to essentially be gone a week and at least will probably be worked out. Two is that there are--quite a bit of our planning we seem to get mired waiting for the big beautiful plan to evolve, we get mired in the local problems of where do our developmental energy go and how do we pick and choose and set goals and priorities among them. The third factor is that there are--in developing a bigger plan, one needs to consider the different segments of dissipation of the plan. One being all of us here, one being SRI in its position, another being potential clients--sponsers, and another being potential participants in the bigger community outside. 7a

So details of quantitiy and exact form, etc-- what role we'll be in a couple of years from now--are pretty hard to start nailing down until more exploration is done with these different segments who would be involved in the bigger plan of the coming years. This just tells me that with caution, it's important to begin opening up dialog with these other segments of the society as soon as we sort of feel roughly that here are some directions that are worth exploring. As a problem of clearing the local situation of where here sits the captain of his troop of calvery and he's trying to figure out how to get over the mountain and the strategy of it. Meanwhile, people are milling around getting unsatisfied, etc. 7b

So, just to say, "Look, I'm pretty sure we're going to go through one of those two passes or something so lets organize for our goal and pack up and get to here. By the time we get to there we should be a lot clearer and that lies pretty comfortably within a cone of high probability of where we want to be anyway, so lets set these as symplifying goals, and get some action that seems coordinated. Otherwise, we loose resources that can get dissipated and people's tensions rise, and the output of even the discoordinated thing drops... So I felt responsible to quite a degree for the confusion and sagging over the spring, and really wanted to do something about it. There--beginning last week, I'm beginning before that I guess, I just urge for finding some simplifying goal structures that we can attach ourselves to for the time being. 7c

That's pretty much where I want to go through today is kind of where were at in trying to provide some kind of goal structure which will begin with a picture of what we we think we'll actually want to develope and some of the promotional strategic approaches to that, and then look here's a cut for next six months of how these resources evolve that general supports that emerging non-confliction. 7d

Let me just announce a few things we want to look at. One is: Bill Paxton is after years of struggling for a course book and everything got to the point where he has to do some research--some thesis work, and through a chain of understandable reasoning, he's selected to work in the speech understanding group. He'll be moving there totaly sometime in the next three or four months, but in the mean time will be working part time doing what he can. He will be available, on call, to fix plugs and things--Is that it?--or just help matters of design? 7e

(WHP) There's a difference? 8

(DCE) One thing this brings up is that we'll really have to accelerate our recruiting plan to bring in more software work and getting a picture from some of this of how much there is to do, etc., accelerates that. One thing he's going to do is help us a lot in the software field of these ... I might announce some of the particular sorts of events that have to do with beginning to make closer contact with potential sponser types and with some sort of promotional opportunities. So that the sort of forces that these events are beginning to happen--how do you capitalize on that opportunity? 9

For instance, a week from yesterday, in the morning, I--the man who heads the whole ARPA organization or DARPA as it's called now, Steve Lukasik. (He's Larry Robert's boss) He would be at the institute over half a day. Through lots of preparation they divided his time in a hierarchical fashion and we get thirty minutes. He was interviewed by one of our contacts men in Washington: why does he want to come and everything. An then went around and got statements from quite a few of the places here that seemed relevant to the case of his interest. So we may have a few paragraphs that he wants you to drop. I wrote a--I had to do it in about half an hour one day--... I got a letter with these lists of things he could look at. He put our work number two after some of basic AI work, and then there were some smatterings of AI things he put down the list from that. So AI people get forty minutes--fifty minutes, I guess. There going to do some understanding and robot training and quite a few things in there. 9a

What occured to me, I should have made a much more broken down list of the kind of topics. So anyway, he'll be here and I don't know...thirty minutes is a very hard time to take a guy who's busy and who's already got his head in a certain place and has heard about us in certain ways. I have to kind of design something for him to figure out who possibly to bring into that participation or whether the overhead of the thirty minutes can be dropped and started up with different kinds is too much. What is it we want to really get across and what combinations of on line demonstrations and chart and anything else it takes. It's the first time we've ever had an opportunity in all these years with ARPA to have the guy who decides how to apportion their quarter million dollars amongst the offices. It is one who closely goes over with Larry Roberts every year with budgeting, apportionment, and

sets up the strategies with which they approach the next levels up with the budget requests. 9b

So it seems like that we learned last December--Dick and I asked for a contractors meeting--a case of explaining and talking to us-- and it became apparent that little things like: generally people up the line which terminates with certain senators who review the budget review committee that's there year after year to give them hell in ARPA's kind of framework. Generaly those guys will just chip away. If a program gets started, they have to assume that they'll get it reduced about 10% a year just because if it is supposed to be advanced research, why isn't gone far enough that it got started someplace else? So, it's the only way the xxxx can survive is to start seething worns whose concepts, terminology, and approach they have to be busy selling for several years to get it on the boards. 9c

And then people like us who've stayed with them so long, have to get moved from one to another of these things. 9d

(???) Musical chairs: every year there is one lost chair. 10

(DCE) That's right. In the past what ARPA did when times got tight in other agencies were just cutting down on everybody, ARPA decided instead they would do it vertically and they would just say, "Well, sorry Michigan, your support's gone. And the University of Michigan disappears from the roster. So anyway, that's next week. The week after that, we have two visitors from NSF that are going to stay the afternoon. One of them is the--In NSF almost all of the things associated with computers directly are in what is called the officer computer activities. I'm working under the operating assumption that a man named John Paxton is the head of that but I've got to go back to the intelligence data to be sure. But he's coming. 11

Then, sort of temporarily one level but two levels below him is a man named Don Offencamp. He is a man that is heading NSF's design planning and pushing into the network with this. So they're just two beautifully primed people for us to make fish. In a sense, this approach today is a move to clear the air to give them a picture of what we want to do and have us having our organization of goals and things that we're doing sort of co-aligned so that there is a number of clean opportunities to respond to the opportunity of office. Then the NAVY, I mentioned once before, the last time I was in Washington they had an ONR branch on computer sciences and

all--very excited they told me, "The NAVY's feeling it in a big way. The Admiral's dreaming he's really on it." 11a

I called them up the other day and said, "How's all that going? I haven't heard from you." There was a pause at the end of the phone while the ... and first I though he was irritated by my call. But it turned out he's very embarrassed because Admiral Screen and gotten all excited and he had organized committees that were pouring in ideas but he hadn't gone farther to try to produce any action plans and proposals and ... would really like to have that done. So he's saying--you know I started repeating for him some of these observations. You got a network, there's much you can do besides computer work. We're really trying to make an assesment of those who are interested in sort of collaboratively using developed means. 11b

And, oh, he said, "Gosh, could come with me some time and we'll go talk to the Admirable?" So he's going to arrange that for a week before the ICCC conference which I'll have to be in Washington anyway. The reason I'm going to be in Washington any way is another sort of emerging oppertunity of assesing the community of sponsers now. Within the office of Computer Activities there are three divisions. One of them is computer science and engineering that sort of does the work on computer technology. The other two are sort of applications oriented. One is applications in education, the other is applications in research. These are the people that will support the places that want to set up a computer to do education--I don't know how much education research but support of educational institutions or the support of research activities. 11c

So this Computer Science and Engineering Division has an advisory panel that meets twice a year and helps review the policies and directions and the way they are going to set their goals. So they have ouside members and I got called the other day by Anita(?) to be a member. So I ended up accepting but first trying to see what kind of conflict of interest problems there are saying that I expect it to be probing NSF very hard about its policies and about its possibilities of investing in a bigger way in this information area that might be considered parallel to the way in which people have to invest in nuclear physics and getting a big accelerator that is shared by a bunch of people. Or in Astronomy in establishing a big observatory. Its a very hefty investment in centralized resource and can make a big difference in the way the whole community can run. Question? 11d

(HGL) NSF is as far as I can tell, is in the habit of financing large projects. Is that true? 12

(DCE) That's been a lot the custom. But they have in other than computers and information sciences, they have in the past done some fairly big things. And it looks as though for reasons I'm not sure of, but the indications are that they are really moving that way in computers to realize that there is much to lose by fiddling your money away on lots of little unrelated duplets. The example that ARPA set. This dramatic difference in the steps that made so much difference. The complexion of NSF has been changed a lot in the last couple of years by the establishment of a whole office that's called RANN. It means Reasearch Applied to National Needs. And that's the first--anything applied that they would consider. There the idea is to establish a number of relatively large programs that really try to get things rolling in applying science to national needs... 13

Within--I carefully read through a number of the discriptions of the scope and the nature of the activities of quite a few of the different NSF branches. And there is one in which you can just sort of--we can make a good argument about coming to them to talk about the way that the national need for large programs that are really coordinated and a national need to apply computer technology to the information center services we could that would make a big difference in the efficiency of these large programs. Even towards applying it to some of theirs. Asking them, "Why not bootstrap." and some ... 13a

(DVN) Doug, Science Magazine watches NSF quite carefully and there have been a long series of articles about RANN and other pressures on NSF: Political, and money, budget changes and so on, personnel changes which move it towards subject areas people are interested--and its all totally well accounted for in these issues of Science. 14

(DCE) I really wish ARPA would. It's one of the things I'd really like for AIS to do is start insuring that we start getting those things printed in our stock and having our NSC's so they're available to us to support these communities--I've run across a few and I've got Xerox's in and I've got a stack of EX-DOC things on NSF ... But it would be just great if someone could just start really developing them as a real intellegence activity with a background on a ... But it turns out that besides offspringing activities, theres the RANN program and then there is another one called Information Services Division which is not so much a research oriented thing as

providing--supporting information centers in special kinds of libraries information needs. Well the guys in OCA are trying to establish a closer liason there. When I start talking this, they say, "Oh boy, that's just the thing we've been looking for, we oughta start getting in good with those people. NSF right now is in a very right position. The dialog is open both from the visit from the emphasis Offencamp has told me about. Starting a net work and knowing were in a network that has to take care of something like this and all you need positions in it. 15

And the other things that having a chance to harrange twice a year and fight it out with a panel of guys ttat starts the thinking in the guys you cound. Thinking in other ways and a... Then the interest that's been raised in the Alance Morris visit in collaborating in various ways in potential i the SEAS participation and there after are going to do things in this question of Hemenez... These in a way of things emerging that we kind of need a framework in how we are moving in order to kind of deal with them to some legal profit. So I just sort of...today I'm going to go ahead with just the picture, you know, the fremework--to some legal profit. So I just sort of...today I'm going to go ahead with here's the picture, the framework -- you know, draft of the framework. For taking care of these things that are occuring during these next six months. Also, getting some real do-it projects. 15a

(RWW) Doug, do you think it would be of any value in the framework activity we're going through on working with the graphics people and the administration who put together these flashy brochures for a lot of SRI programs to kind of focus on something we could hand to people and they could read in ten minutes to get a ... 16

(DCE) That's good. That'd be marvoulous... We had and may still have a sort of opportunity to have a few months of needle movement come in here. Living around here working part-time or full time for us if we clarified hhings enough to get them up on the other phone. My cut will think they'll come. In other words this talent... You know, if we're this far along a few months ago how was it, yeah, lets get in here and begin to help some rate.. I dont know quite who to fit all that in and it comes--we wont get tn that today. 17

(???) What? Niel Lundgrin? 18

(DCE) No the whole Idea of how we'd organize the promotion, etc. 19

(PR) Who is the innovation? 20

(DCE) Oh, he's the one that wrote that innovation article. 21

(???) Is he like the editor of "Innovation" ? 22

(DCE) No, he's what you call a staff writer. One of the senior staff writer. I gather he's looking for a way to try something more independant from that but just stay tight and this thing of wanting to come out here this summer is one of them. There was some talk of him with Xerox for a while... I couldn't see and any curious coordinate and loose him for the opportunity. Write down a list of some of the possibilities we could propose as far as getting more funds, help from different kinds of sponsers. Whether we could say we could do him all at once or start him in some order in the next year or two years is that somethings not clear yet. We have gotten up to this point in some of our earlier discussions. One thing we could say is there is a lot--we feel there is a lot to be done by basic information services. 23

We set up a list like this of the kinds of things you can do for a community, then we know that even in say the first four of them that make a very basic handy set of things for a community--we've got a lot of work to do. I dont know about our current--Our current energies we are sort of short on our the ability of doing--working in there if we think we'd really like to. With our current energies so short on being able to do our job of getting service out to the NIC people and getting people out there and stirring them up and hoping that they would like to too. 23a

So, in these first three, it's just that we need more resources to accelerate what we already are doing. Helping to establish NLS versitatlity if we're mayby a couple hundred Thousand dollars a year short, then we're three hundred to five hundred thousand shorter than what it takes to make that work well. We could be asking people for help on that. There is an amazing increase in NIC activity, and if we can get people to help us in here, this could ARPA money to accelerate our activity in NIC services ... We say, "Well, with IPT money we can start doing some initial exploration, etc. to get a NIC, to get a SEAS community started but, we really could use some explicit backing. How big, it's hard to tell. 23b

You could probably use quite a bit. Then we talked about the potential value of having a--if informaition center services

like this really are seen to be very useful in the ARPA networks, there are a lot of them that would like to get established, we don't want to get in the business of running them all. So the establishment of a center to really help these other centers get going and running is coming back a little and so, we need some important study in establishing that, and support in establishing a bootstrap community. They're kinds of thrusts we can get help and get launched on. It sort of depends on where sponsers' interests are and their kind of funding. In some of these communities things like that what kind of potential responsivenes we can find in participants who become the figure would be worth getting involved in. 23c

OK, so, given a picture something like this to start talking to sponsers and say, "Hey, we would like more support." And this list we can digest or modify. But what where I'm at right now is a pretty representative set. So if we go to this question of how do with our company of troops for the next six months while were getting more detailed about the targets far off? Lets pick a reasonably close target, and pack up and get moving towards it that were pretty sure is in that direction. 23d

(End of side one, begin side 2 of 4 sides) 24

(DCE) Suppost we set for ourselves symplifying goals. These are sort of directions more than targets. Start out that way. Invest our Energies in ???. So energies contained in this kind of thing and in contact with people exploring that. OK, that's one our pursuits. Then as far as developing our activites in here with the rest of the resources we have for development like that. We say, "Alright,... --while were telling people "Look, these are really important to get developed." So we come in and say, "That's just the way we're gearing all of our own development things that we have. There are a lot of key things we could develop, but we're really focussing on what it takes to establish basic services and make them work right." 25

Also we'd know that to make any of these things work, there has to be a NLS utility that has certain characteristics. We can talk about those a little later. We say, "Look, there's a prototype working right now." So we just say, "Alright, lets--we divide our energies and treat that as a prototype that we're really going to try to make work as well as we can. And any of the shifting that we can put down into here--IPT money because all of the other money is just great. In the mean time, we pick our targets like that so NIC we

just begin to really realize we take our IPT budget and a lot of it just pour into the DSS and DPCS kinds of developments will really support the gradual development of good order reasons. 25a

We want to invest also in making headway. Can I say prototype number one, that means the exp--you know you develop services and start telling people that's the business you're going to get in, then you really have to be in that business getting experience in it before it makes it, so NIC is prototype number one, we treat it like that and I put these proto-type number one and number two and sort of number three in here is that the kind of information center we're likely to want to specialize in is one that which serves a specific kind of community with a coherent sort of discipline or mission. And not just a big generalized hodge podge. Well NIC is the nearest thing we can come to right now. Out of NIC are likely to emerge lots of little special communities that NIC can serve well to stimulate. So it's our proto-type and lets get it going and where it's possible to stimulate and support the emergence of special communities, within there activity, that's good. 25b

A little later, we say those sort of fall into each one of them little community has the information sort of service that the way you get them going is saying, "Your community is should be responsible for the operational feeling of manageing people, getting human resources applied to do the writing, the coordinating, the editing, distributing. So they would become the kind of SEAS we would indicate here. 25c

Others of them that are particularly relevant would become sub-communities that we would like to spend special energies on integrating into the bootstrap community. As a real specific for a really a discipline oriented one and a kick off one for bootstrap community, this one is just a natural. There's a lot of payoff in that. So we say, "Alright, we'll actually start making--doing our own bit about helping get it going. So we don't sit here and wave our hands at sponsers and say it would be nice. We say, "Were trying to." We need to generate proposals, I'd like to get some going workshops. Pull some workshops here, people from the outside that might be interested in just comming together and talking over the idea. 25d

IC would have and is going, and it's a certain type of prototype too of a mission oriented group that wants support. ??? If we orient our different things falling in towards

towards this, they come into catagories here. Falls went out and inventory of all the kinds of things people are doing, or say we ought to do and think of. He and Dick and I set down and went from that things back and poked across the board, and some of this shaped up right then. We have a draft picture of how our goals are oriented. For the first NIC and SEAS and NLS utility kind of grow out, well, we already have NIC going and we've put DCPS and DSS things under that to say, "Those are the way DSS and DCPS will orient its goals just assuming its really in there to support NIC, really in there in this sence using NIC as a prototype. And SEAS gets a little bit more important role in a sense. 25e

than it had among the list of thrusts saying, "We do the work there that will seed a community if it can. Out of our thrust that was on the delivery, we say, well we just give it a bigger name as the kind of pursuit we're getting behind. What was delivery fits in there and what were the kinds of things that were making improvements in the structure and organization and flexibility of NLS. We're in there too. It's a goal in that direciion of making a utility that we can support. In the operational clean up was realizing a whole bunch of things fell into generally supporting most of those to taking care of the rough spots in our system. Maybe they rightfully should just go under the idea of the utility in the clean-up, but we weren't sure about that. And of course, there's an "other" over here. 25f

And the things like: What do we do with the calculator? or a baseline record system? or graphics? For instance, baseline record system really fits in in the kind of a basic IC service, but if were trying to symplify the way in which we invest our goals right now, I sort of take IPT money down to here and sort of slow down the rest a good deal just to symplify that we can't spread ourselves so thin--I mean, down through three. I say, "Alright, here's something, probably we wouldn't be ready to do to much to anything, but RADC is, good." For what falls into the scope of what they paid for and want to do that improves the baseline record system, great. And that trust stays there and gets tied to our ADC. And they're particualary interested in the calculator and they also expressed a lot of interest in graphics and for what they can sort of support to bring these special features out, that will be very lucky. 25g

So, we just put them there to say, we'll tie our priorities and the level of resource that we give to those particular developents into the pace and direction that RADC chooses to

go, Symplifying our decision and go process. There's always and "other". This one A is. Recruiting: were getting, must be low on good software talent. There are probably other kinds we'll need to start to be considering. So that has a high priorety for us to kick around. New display systems for ourselves. Well the best you can do in all of this is to say, "It would kind of come under here." Your bringing somebody by to promote some scheme and they look at our crappy screens, It doesn't go over. 25h

So you say, "Well, lets see, in that direction maybe the best thing would not be to replace all of ours, but to just get one good one that makes a good display. Well the same thing comes with the projection TV system. That kind of thing in the item seven here, where you have an assembly of people helping out in that presentation and workshops and conferences, that'd be a very important thing. But we can't spread ourselves that thin. And I wouldn't choose to start putting ITT money down there, but it would again make a big difference in promoting if someone would come up and, OH, here's a nice wall size thing that shows what your talking about and you can use your presentations and topics. It would have big impact. 25i

(???) Does that mean we're going to get to buy on overhead? 26

(DCE) Neah. 27

(DCE) I mean- it looks much more favorable now that were a laboratory. When you're at that level. Getting pictures like this that we can just show to Bart Cox and other people. The impact that involves--it really smart...case. 28

(???) Can we miss just a little bit of time and turn all these charts into the ???? 29

(DCE) You mean as a big wall thing that a lot of people help develope? 30

(???) Yeah 31

(DCE) It'd be a lot of fun. 32

(???) I mean, we had the start of it right here on the little mirror-- a little bit more developed. 33

(DCE) I'd like to just talk in descending levels and just get down to details if we want to here because most of the people

here are ones who are concerned with the specifics in here, but I want to be sure that why they're in that form and the criterion we'll use to end up putting priorities on some of those lists, etc., what that is. Much of that as we can get across in some consistant way that means a lot more of the decision making and good ideas can start out in the right reaction. Right being in some sense coordinated. One thing we need very badly is some kind of cript-chart mode of working. For years this is a problem. You start making charts, the updating them is so horrible, and you go over to NLS and start doing it and you can use links to show that linkages between the boxes of the flow chart, but we just don't have the next step to help make the portrayal of that very easy. Anyway, we badly need the sort of picture in the xxx capabilities of herding in the way of kind of xxx. 34

but what I'd like to do is: Charles gets to inherit from Bill, at least for a while, this role of development coordinator. So assuming that Bill is still available for some kinds of help, I'd really like that over the next days that a lot of you participate and give,Charles a lot of leadership in trying to make sense out of People assignments, potential orders of doing things, checking for completeness, consistancy, and so on. Until we get a draft that we all feel pretty good about as a plan. And it's something that's visible so that the rest of us who aren't software people to kind of see what our particular concerns--how their affected. 34a

To talk about NLS utility a bit, the reason there is that second grouping of things having to do a lot with the modular programming system, is in there, rests right back with the basic motivations by which I first started asking questions of Bill and find out that there are already possibilities he'd been thinking about. The consideration is if you want to have groups of people who are sharding a resource, some of these, and if you know that they fit in a particular discipline, you know there are special features they'd like to have. They'd like to have certain kind of graphic portrayals, ARPA processor techniques, or ... It would definately arise that if they got involved, they'd like other features. 34b

The idea that we would organize it such that there would be us masters controling NLS and anybody using it and these guys out here (drawing on board) cleaning us to make the changes that we make and keep up to date is possibly workable. But if you get a large active community it's going to reduce very much the kind of creative activity you're going to get

from all these people. So what could you do as a step there? It doesn't seem sensible to give them each the whole version of NLS, on which the times-haring systems will be expensive to have them all trans-off, in and out without sharing code. And also the control that you have there. If I took this whole copy of NLS and started changing some changing xxx, before you knew it he'd be reaching around all over to make his little purchase ... 34c

The divergence--the posibilities of integrating the steps that he makes, diminish very rapidly. The more they do of preaching all through there. So that the idea of coming to modules in there where if a person sort of passes a test as being qualified in this and wants to really go up and give it direction, you say, OK, sure. You take your copy of the module and you link that up with all our other standard modules and go do your thing. Meanwhile, everybody else can use the standard module of that sort for his graphics, say, and you've got your twitchy one. And anybody around here also wants to link your twitchy one in with the standard one, that's OK, that's where we'll sort of guarantee the support of a standard subset. When yours becomes of a lot of interest and potential value to us, we take the process of certifying it and making it part of the certified set, or perhaps of modifying it in ways to make it consistant in the users conceptual framework and skill framework etc. offered as the nearest thing we can do in a standard package. 34d

(WLB) Lets see, as I picture what your saying there, one thing that bothers me about that. Suddenly ARPA is playing IBM or somebody thats got a product, which is fine, but now we're telling our customers, "You have to pass certain qualifications before we'll let you do anything. And, like IBM would never try to do that to their customers. They control their customers basically by saying, "If you screw it up, well we wont maintain it if you changed it. But we're not going to tell you, ''you cant change it.''" You know in ways of that kind... 35

(RWW) That's exactly the opposite of what we're trying to do, we're trying to make it much easier for them to get in flexibly take out parts of the system and insert their own parts. But encourageing them and making it possible that those changes can be very nicely localized and can fit in nicely into an over-all system that we're maintaining. What Doug was getting at was that for us to try--if you have many people doing this, you're faced then with the problem of who you're going to integrate these changes that they've made. How can you start mapping them back in? Your helped somewhat with the notion of this clear form

of modularity where their really--their changes will be localized better. Doug was just saying that before we would, or at least the way I understand it, that before we try to integrate those changes back in, they'd have to be obviously considered very carefully and sterilized. 36

(WLB) But what I thought I heard was... 37

(DCE) Yeah, he picked up something that was ... 38

(WLB) I buy that. I mean, to me that's right. But what I thought I heard was Doug saying, "If they qualified, we'll let them write their own module." And that meant that we were passing judgement on whether they were qualified. And my comment is, "bull shit." 39

(DCE) Lets stop and go back and say, "I didn't say it right." OK? I agree and it's--what I was thinking doing this thinking of: there'd be people go make their own thing and get in their own trouble. 40

(RWW) As long as they don't hurt themselves, they should do anything they want to do. 41

(DCE) Right. Then the picture I was trying to build--the loop that was going to be integrating, evolving ones, see? And so, If someone is going to say he's going to build a module, and you really feel like he's in this community that's doing it seriously, you talk it over and stuff, and sort of the conditions about the way that module is written and stuff so that it really is going... 42

(???) If he wants to get it back--If he wants to have a--Its like us going to BBN. If we want BBN to integrate something we've done we have to meet certain standards, and certain things. And I can see that. But if he just wants to go off and he doesn't ever care whether we're ever integrated, he should go do anything he wants. 43

(DCE) Yeah, I agree, and I just--stumbling this... 44

(???) One big problem is how long you guarantee to support the environment in which that module would opperate. In other words, if a guy goes of and starts developing his own module of a certain thing like ?nabquit processor, how long are we going to guarantee that module will be compatable with the rest of the system. 45

(???) Well the way IBM does that is they just keep dropping new releases and if you've gotten so out of touch, you have to stop at D 17 by the time their at 30... 46

(???) I hope IBM isn't our prototype. 47

(???) I realize that. But I can see our same kinds of problems even though we've got an MPS and its not OS or something. 48

(???) Yeah the same problems are there, hopefully--obviously it's going to depend on what level they're making changes. If their going into... the system is not going to be evolving at the same rate. There will be certain areas of the system that are staying fairly stable. Like the file system, once its up, won't evolve very fast. And there'll be other parts of the system that are evolving faster. It will depend on where the dependencies are. The hope is, with MPL you'll have a better handle on really knowing where your dependancies are--having it much more explicit, getting help from the system in finding out when things have really changed, that you are dependant on. 49

(DCE) ... Thanks for stopping me on that one ... we hold it up as thats a topic along which there's a big shelflist of similar ones to digest further theres a thing to put on that shelf too that relates to it, and that is: that any time that you're going to talk about a discipline oriented community getting together, in which we're saying--you know, we're trying to aim here to tell people how to setup a center that can really help a discipline oriented community. And when that discipline oriented community gets involved with a common intellegence system that it's going to start developing among itself, or a handbook that's kind of gonna be it's discipline's structure, etc., its going to begin having to do a lot of this business of deciding among itselves what are the standards, and what's it going to handle and what's this and that. 50

So the ideas of how you organize a community and by what process you agree whats going to be a new version of the handbook say, this doesn't have to be a computer oriented bunch of people at all. It will be very similar though to what you'll have in here. A community of people that needs to have some process for saying what standard and how does this evlolve. And the outset--I called on my saying "We" too. Who's King We? At the outset, I want to get one that we DO run. And we don't start trying to solve the community social political, organizational problems the same time we're solving all the others. 50a

So in the SEAS community, that's this one in the picture, saying ... at the outset, we don't start out with some trial user group thing like that. We're gonna run it. That'd be my proposal. And if people didn't have the confidence to make that evolve well, OK. The general thing up here is you start talking about other communities and the general bootstrap community. Those begin to be places where you have a--assumedly enough people participating, that you really have to start getting the processes like: having a standards committee that this active bunch of people selects and appoints to set the new standards every year. You just have to have community processes that take care of a lot of the evolutionary administration and how the joint thing their doing evolve and get managed, and how the resources get set. 50b

There's a lot of work. One of the things that if you get other information centers going that have got communities, they're all going to be struggling with that problem. And a good bit of the dialogue that goes on among that community, supported by our information center, is about such processes and how you do it, etc. So here's the kind of problem, the one you'd like to hand off and say, "The bootstrap community, lets you guys start helping to work out an experiment and evolve the techniques by which communities do that. And that's one of the general kinds of things through this simplyfying things. I'm trying to take those things which you'd assume would be quite natural, for these other participants to be faced with and to want to solve and get active in participating in and say, "If we can prefer those, that's good, unless they happen to fall under what's really basic." Lets just let the communities get started working in the first place. 50c

So I say, We can get some communities that can work with autocratic--like NIC and this one--sort of autocratic, and we can start this one going pretty autocratic. The center we run is sort of autocratic about the way it evolves the services for all of these. And when these things get going, there'll get to be a lot of discussion about that. About the organization of... There's also the kind of thing Paul and Mike have brought up a couple of times in that when we first started talking to--time share came up. And that has to do with the early question that time share. Would you be willing to let us take NLS and start--we maintain it as a service to sell to our customers. And I was ready for them and all of this and the ins and outs are getting--In some point in time, we really would--but write--explicitly, definately, the

conditions would be that it would be our thing that we would get a franchise for the liscense to run. 50d

And we'd expect some dollars to come back from it like that. So yes, we'd be interrested in that. But other than that, so far NLS is government property and anyone who wants to make a copy and go into business for himself essentially has the right to do so. 50e

(DVN) Yeah, how could we legally get Tymeshare to give us anything? 51

(???) Maintenance. 52

(DCE) Yeah, so then this comes back to one of the things I'm trying to do at SRI, is here's a big organization called SRI, and down here in this line structure is ARC, but in this whole hiearchy in line like that we're just imbedded deeply in their financial, ego, administrative, contractual sort of mode of working with things. Can SRI consider of setting up something however it might be tied in, it has the feature that it can say it owns something. The continuing deals that we get with sponsers are saying this not for profit entity in here can own NLS. And its going to make the deals with these people out here like that such that you can count on--your making deals that extend over years. Not just the yearly contract things that SRI traditionally gets involved in. But its business deals. The equity that builds up in the networks in having an entity that can be liscensed like that and can get income is something that there is a legitimate business entity that can do. 53

And to some extent, I consider that this sort of a situation would strengthen our position as far as its attractiveness in our proposition to a number of kinds of sponsers. Well their saying, "Yeah we're donating to the building of all this and a fella on the network, but look, it's being plugged in and getting returned back, and that return is feeding right back into the kind of development we want to do. 53a

So this is a sort of a picture that someplace in due time. And I don't know whether due time--Paul feels ask questions, isn't due time first? To do that before worrying about generating communities etc. We can consider the communities that are performing bootstrapping that coordinate it away involve so many of the long term goals I have here, where as the generalized one here doesn't so much. It takes some shift for me to start thinking like that, but I'm going to try. But in a way, if you've got an NLS that you put out

like this, and if you're worried about sort of the operational feeling, what would you have to do before someone could offer service with a staff such as time share could put behind us to offer as a service. 53b

How much development, refinement, cleaning up and symplifying, etc. would need to be done before general marketing could be done like that as apposed to selected communities that we go after? The difference between the kind of a system that you could sensibly consider providing to get these communities going and the kind that you sense would sort of feel that you need to have here. I feel that there is quite a difference. Mike brings up quite often his concerns about how much has to be done before we have the offrontery to put something into a Tymeshare type of environment and call it a utility. I feel like in some ways, Mike's thinking in this sort of usage of it and I'm thinking of the kind that can really get in on the SEAS community or some of the specialized ARC communities where there are people that are really ready and willing to use it in it's current form... 53c

(End of side 2, begin side 3 of 4) 54

(DCE) ... is to support our being able to enlist selected communities to get going depending on that for our service. 55

(PR) Never the less, it would be available on time share. Is that the one you are talking about? 56

(DCE) This? So far, the only availability is to us is in the picture we have. See, we are wholesale and buying from Tymeshare and NLS and we are turning and offering that to various kinds of clients of ours. There is a big difference between that and saying it is available from time share as a utility in general. 57

(PR) If a group at Stanford wants to buy in, would you deny them or would you choose them? What's the criterion of acceptance or rejection? 58

(DCE) There are a number of things in these sorts of areas as we get our planning going and we look at the payoff and cost. What's the cost to us of getting involved and letting them try it. And what's the payoff of these goals. So that's the nearest answer I can get right now and a... 59

(PR) Doug, if we do have this thing on Tymeshare, they are

willing to pay just for getting a dyenet or two, why should we care? 60

(???) Because there are other costs that are potentially expensive. If it was just a matter of them getting the terminal, I dont thing we could care less probably, but there's educational costs and other things like that... 61

(PR) Charts??? are in the cost thats involved in the cost isn't it. 62

(RWW) Sure but energy from here would have to be spent setting something like that up seeing everybody expanded and ready to go. And of course, if they do that first or second or third or... 63

(DCE) If we've got the maximum rate in which we can take on staff and get them integrated, so that they could perform well, how could communities get going providing the kind of augmentation services back here etc. I'd just be willing to bet that we could just saturate that completley for quite a bit of time in those communities that we wouldn't have much trouble deciding among ourselves have high payoff in terms of the bootstrapping or there are a few other factors to consider. Bootstrapping... 64

(PR) Actually it's only a question of time. I mean, what you say... 65

(DCE) And at sometime if we get going enough and we get some people really interested in this, we say, Alright, where can we get some initial dollars to get that in shape. And we get a team of people to it in shape and keep it in shape in a business like this the dollars from this that come back into there. I just drool at the thought of saying, "Oh boy, that's what you can use to just keep moving in and starting it and all kinds of varieties of operating systems and computer configurations so that it just more and more becomes available." And you can consider what is the legal tie you really need to have on that NLS system to feel that you get people to pay for it rather than just taking if its say government free. 66

But you know if there is an activity community contributing to its sensible coherent evolution, then what someone gains by buying in to the product of that is much more than what they gain if they have some small software house just take a copy and install it for them and they work. Are going to get to evolve? If you have things like that franchises and stuff

they can't call it our system if they don't try to get leading services and things like--someplace in there I feel like we could make it public property in a way, but there is a lot just letting buy a lot if you buy into an evolving debugging maintenance. 66a

(PR) When we talk about this in the comming ten years in my opinion, when we talk about users we talk still about the R & D communities. I don't see any use of a guy who really has a problem using it five or six years starting to use it. Is that the way you see things? 67

You mean the business executive sitting up in his office... 68

(PR) No, no, no, any practical problem...in government or education or anything you want. 69

(DCE) Take a potential quick one like when could you see software engineers out there doing their assignment... 70

(PR) Well that's not what I call the communities here. 71

(DCE) No, no, they're software guys doing funky software work. They're not... Pardon? 72

(???) That's not practical work. 73

(DCE) That's what I'm trying to get from Paul... 74

(PR) Software engineer does do practical work doesn't he? 75

(DCE) Well, so, a manager develops plans. Really, the differentiation is what are they developing. Are they using their toos towards some other target rather than improving the tools. 76

(PR) Will any of this be available for the software engineer? 77

(DCE) Well lets just kind of hash that over just to make some guesses. Could you qualify first. It might not be far off if you start making yourself face realistic delays. For say, who would be a likely one? IBM? For somebody who says, "Alright, we're now outfitting this group of software engineers this way and they're not looking at augmentation systems they're looking on our operating system, or language or application there... This is the kind of thing that I think would be a really fun exercise for the SEAS interested people here to go through. In some ways, I would guess that... 78

(PR) Its not only that it would be done, would it done in concrete in ten years? Would it be cheap enough, that is my question. 79

(RWW) Its cheap enough now basically. I went through a big calculation at Shell to try to sell them on an NLS kind of like thing to do some of their COBALT programing and stuff. And you don't have to show much increase in productivity. You're talkin about...you don't have to show factors two and three. It's like 25% and so for forth to begin to show that it begins to pay off. At present costs. 80

(PR) Suppose what we have, we would put it on time share any one can buy in and if we would have a subsudy of 20% at the beginning, it could be popular to use it a system invarium. Is that what you're saying? 81

(RWW) Yeah, I'm saying that if your a... No, I didn't say that. I said that if you could show, OK And that's the question, IF, ok. If we could figure out some way to run an experiment to demonstrate to somebody that the design, coding, debugging, you know, all that productivity improved by something like twenty-five percent, OK? That you could begin to justify the cost of the terminal, and timesharing service and ... But I dont know, that's one of the marketing problems, is how to you know--Now we're sort of dependant on people walking in and going, "Gee whiz, yeah, I believe you." and you tell me it increases their productivity, you know. 82

(PR) None the less, if you talk about 20-25%, thats not far away. 83

(RWW) But its hard to prove. 84

(DVN) Is any information like that gonna come out of CIRAD? 85

(RWW) CIRAD? I don't know now. Harvey, what's going to come out of CIRAD? 86

(DCE) I think we may as well just go on to the next topic. 87

We've got the start up there like that but the interest that the IBM guys have are much more real and I could see that if you could get a working group of people like from the list here of places and just start with that challenge of saying, "Hey, asshole, If your company tentavely would be interested and you think it this is a cute area to work in, why don't we just take that as a poll saying, the earliest ways to apply

it bringing it up around the 25% area improvement in sometimes applications and sort of hash over together what kind of developmental improvements are needed and what kinds of tests... that would just be beautiful. 87a

(HGL) I think right now we're more interested in getting it out to software groups that could offer something in developing the tool to the point that we can give it out to people who would just buy in COBALT... 88

(PR) That's what I said, what you are geared is towards R&D both. 89

(DCE) Almost always in a bootstrap community, at least the R&D representatives of summary... 90

(PR) yeah, ... 91

(WLB) It seems that the closer you are to a quorum a community like that in any point in time, the more you're going to be emphasising R&D production. 92

(DCE) They're the guys who'd be really interested then in the product. They'd be ones who would really be studying some of their application areas and groups and be coming back inside this community and saying, "Hey, we need this kind of data or this kind of support or a little development in this kind of application to do some experimenting. I'm just saying it could make a very good target for a group of people like this that are practical oriented R&D guys who would like to see this thing start getting picked up and used is to just aim for what you have to do to get to that first stage of actual trial groups being settled like that. They then need to work on the problem of: where do they get the service to support them? So do they buy it out of this or do they map it into their own and then a lot of software guys turn to get involved in some of these same questions and begin to sort of feedback and help. 93

So if many clusters in here to serve each group brings a time sharing service out here or whether it doesn't matter--it's not so efficient to use time share, hell, we can get going and to save a year is worth it. But that's the kind of thing we really start getting people that can really help us. Good smart-active, motivated people that can start turning tension and energy towards the same kinds of problems that we were trying to be concerned with, but we're too few. 93a

(WLB) That we don't have to integrate into our staff. 94

(DCE) So someplace, there's a controling, manageing nucleus for that community that's planted in ARC at the outset. Maybe it's only one guy-- some like Jim Mitchel at Xerox, I could picture him really work out so that he could be one of the three people or something that really just feel like he's oriented enough so ... Lance Miller seems like the kind of a guy who the orientation that very soon you could invite him in and you just start--towards pretty soon the distributed directing of the evolution community. But the outset, you've got to tell people who are investing in that you're buying faith that we can guide and push that in the right directions and that's what you have to buy. 95

(WLB) Make your offer. 96

(DCE) Well, I think it would be very interesting for us to draw on someone in this SEAS community thing that was a kind of a specific. For instance, if you want our money that you've been getting, the thing we've been promising to do is to pull together an actual working base that we just get the experience of an entelligence service on a small scale. Using dialog support and the XDOC and the indexing can do for both, and so I sort of said, well, in our simplified goals here, is it natural to stick it in one of the NIC and say, "You know, in our thing." and make it support that. Charles pointed out that gee, it would be much more directed and neat to aim for that which is right. It seemed sort of to say, OK, lets in this symplifying sense, lets just take that ONR money in consistant with all that, we sould just say, "Plug it in there and make it start doing this trial applicaton developement kind of thing that would be of most value to software engineers as an intelligence source. 97

And so it limits the scope of such a matter. It helps our own group who's trying to get going in it collect papers and documents in it and folklore and it could reach out and integrate the bibliography that Balser is trying to put together for his automatic programming, because it looks like right there is probably a lot of good stuff. But, among--so many people here are software people and software oriented, I would really like in the remaining hour and half of our meeting. I'd like to spend time digging into that. Are we sort of at peace with where we got to up to this point? 97a

If not, we could spend some time--no more than ten minutes, I mean twenty minutes for SEAS trying to clarify anything we might have covered up at this point. We still forgot questions of how much to put into these different boxes.

That's becomes a lot easier when we start ordering their natural order in sense of a sequence of development prioreties within the boxes. And then, start saying, "Who are the guys who would probably do those. Which often might cause a reordering so that they've got some sequence and load that's reasonable and then you take a look at and say, "How's that shapeing up?" You've probably got various ways of shifting more or less resources between the columns to accelerate and so on down. So, I feel like that we'll probably come out with a pretty good picture for relative investment as we pursure this. You gonna have a software meeting ... Thursday? 97b

(CHI) Tuesday. 98

(DCE) Oh, I kinda think we should start hashing this over. And any of the rest of the people with different concerns to look over this andto say, "Hey, are things missing?" or to get a little more clarification in what some of the topics might mean. 99

(JBN) Can I ask: In tailoring, or at least using the software people as the community for which you design an intelligence service, I think yor saying. What kinds of controls are you going to put in to be sure that the intelligence service you are going to design for them is not too narrow or too special because their intelligence needs and means and uses are not atypical to the rest of the community. 100

(DCE) One looks at various choices the way we evolve the kind of intelligencee service generally we'd like to know how to provide to--for--and say, "Here community X--I mean, we've got the kind of services and we can teach you how to run one. (There are) various kinds of roots you can go to develope that so one would be to try to look ahead, be broad, and go in stages like that. But the problems there are: Do you have enough resources or are you spread too thin to go broad. And, until you have real live users of something that's a quite different kind of service, you go to great dangers of making bad assumptions on who's going to want what, etc. And this was sort of my reaction to the ideas of taking--doing some polling and surveying, is that if all the developers of the sort of interactive systems that were qualitatively quite different of what people have experience with, when you go talk to the clientelle and it's latter found-I mean--Zero if not sometimes negative value in the results as far as being a guide to the development. 101

So the approach I'd really much rather use is grow up with the actual communities we get going and so this is, has

ideosyncratic things built into it, at least these people are really getting experience the likes of which you'll get no other way. 101a

And you go to start serving the next community, you've got evolutionary things in mind anyway, plus the different scope. And I think that's the way with almost all of the aspects with the tools within an augmentation system is that we can't really concern ourselves very much right now with is our system just that which a doctor would want to use or something. Those evolutions would have to come later, and there'd be like when you got a community of centers going right here like this and they begin to learn really the problems and needs of their respective communities like that, they'd feed back a great deal among dialogue from themselves and potentially cllecting pooled resources from themselves to pay for better improvements in that more general one. And that's part of that business of sloughing off those later important tough things out into the communities who will be benefiting in this participating way. 101b

(DVN) Doug, well I guess that this is maybe a question for Jean. If the NIC is to become the center of centers, or is to evolve into the center of centers some time. Is it doing anything--one thing it could do is collect information about centers, information centers--is it doing anything with that? Is there and information sub-collection information center, so on? 102

(JBN) Yes, it's also... 103

(RWW) Your not going to find any informaioninformation in it though. 104

(JBN) Yeah, that's right, we know where it is, we don't have a system which allows you to use it. The same thing is true in this thing Doug was mentioning about collecting intelligence out of magazines which is relevant to other concerns in NIC. We are doing it, we just don't have the resources to do it right. 105

(DCE) You can just look, you can just pick up that point and come back and say, there are these three things that you can look at, or asking for." Or even some of the others that are are getting more resourses for doing some of these launching and establishing work like that, we could say, "Put your share in an SDIS to start establishing a data base to support this search and establishment. That's the way I'd sort of like to see it's

range going. But the one dangerous point we are in SDIS is now in these years of talking and seeing itput together and investing my head place, but not having any-- 106

the main criterion now is buying the data base for which there is a market of interested pack of users here soon to be here so that what ever we built soon will start getting used. Then put together a simple one with--sort of like with NIC we had to do is decide what kind of basic services, how we are going to appear there, get them out, start working int the community development and let us learn then, how wehave to reinforce, strengthen, improve different parts of it. I wouldn't know any other way that's not exploritory at all. 106a

(JBN) Well, it sounds to me like we're going the son who said that his father ought to go to agricultural school ad all this, and th father says, "I all ready know how to farm better than I can. That's somewhat of the case here. We already know more about what we're trying to do than we are able to do. That maybe the learning how do do it is not the big thing at this point, but the demonstrating what we DO know about it. 107

(DCE) Demonstrating it by ...? 108

(JBN) By actually doing a prototype. Or more than one prototype. 109

(DCE) Right, so there's just a question of picking, there's got to be a limiting domain of context because we don't have much money. And it should be one whose users are essentially have access now on the network or here someplace. So those are two criterion and we sort of labeled those and we took a couple of passes. Made some suggestions as I remember in the proposal. We went on saying, "Well most of the people out there in the ARPA network understood different kinds of consoles so we could establish a data base and service going having to do with terminals. But as far as I'm concerned, SDIS can come back and make proposals and interact like that and some area that looks like it would pay off in this framework. And actually a working prototype that we could get going, is what I've been expecting. Lets shift to the SEAS thing, and I'll slide back here so Harvey, and Bill, and Ken, I guess are you the official members of the SEAS? 110

(HGL) And Dick. 111

(DCE) ...and Dick. An then whoever else is interested and stuff, but I might keep tossing in things that have to do

withthe thoughts of promoting or getting a committee going, but you guys do what you can to with out me to start it. 112

(CHI) Give your pitch Harvey, you said you felt like talking today. 113

(HGL) I need someone to givetheir pitch first. 114

(DCW) Pshaw 115

(HGL) We'll pass the buck around... 116

(DCE) What would you do if somebody comes up and says everybody in my shop programs PL-1. So really what we're talking about here is how much can I gain by belonging to your community? Because we're not going to change the MTS in ourwhole shop. 117

(KEV) Well, we're more than just language oriented theory. There are lots of techniques there that are applicable to, across language boundaries. For example, documentation is irrelevant to which language you're programming in, you still need system documentation. And there are techniques of documentation. There are training techniques to integrate andbrainwash your people. (That's perhaps a bad word) For adopting new people in your community that we're concerned with. 118

(DCE) Well, are you going to do anything for me? Can I right my source code in NLS? 119

(KEV) Uh huh, and you can write your source code in you will be able to compile your source code underneath NLS just as L-10 is oompiled under NLS. 120

(DCW) In a PL-1 compiler? 121

(KEV) No, there will probably be something like a subroutine file capability to do that. 122

(DCE) How long will it take you to do that to make an example for my boss back here. Will that be two man-weeks, or six man-months to show them that you can write source code and stream it off into the network to a compiler. 123

(KEV) I think source code can be done now. Streaming it off...(Laughter) 124

(DCW) Well the protocall exists, just the same as in UCLA ... 125

(DCE) Ok, so can you, I just want to show my boss, gee, we've got this fast editor here, is that right? 126

(KEV) No it's far more than that... 127

(DCE) OK, if he's using PL-1...(Laughter) 128

(???) We always stay loyal. 129

(RWW) Well what I'd like to do, could you guys bring your source code and show me how you document it so I can show my boss what really well documented source code is? 130

(DCE) So this is why we are gonna see one of the possibilities between TENEX source code and... 131

(CHI) Yeah. 132

(DCW) I think there is a more fundamental problem to this thing of documentation, is nobody knows what documentation, or good documentation is. Documentation in general is the thing you can sell to your boss as being documented and that is what COBAL has done, although COBAL programs are no more and no worse documented than any other program, but there is this aura that COBAL is self documenting so you don't have to do anything other thanowrite the code. And you know, that has got management appeased. But you know good documentation is something that a good professional programmer can go in and read somebody elses code and figure out what the hell he's doing. And that has never been sold to management and people don't really know what that is. 133

(DCE) ...See I've still got this other hat on. When I was in a bar with whom I can't remember last time at some conference, I heard one of your men telling us you had some this top down way of doing your documents so that at the top you are reading English and down at the bottom you have code. Now, are you ready to show me something like that? 134

(HGL) In one or two of our files, yes. 135

(DCE) Will it work for PL-1? 136

(HGL) Certainly 137

(DCE) Will it work for my COBAL? 138

(HGL) ? 139

(DCE) So that's something different that I could ... 140

(HGL) It's a technique they could use. 141

(DCE) Sure thats the difference. 142

(DCW) How come we don't use it? 143

(HGL) How come we don't use it? 144

(RWW) How come we don't use it if it's so good? 145

(CHI) I do 146

(HGL) I do too on the new code, it's just that we have forty files of back code that we haven't had time to get to. 147

(KEV) Right now, SEAS is working on a proposal to get all the other forty files into that state as well. 148

(HGL) And for those who fix NLS bugs will attest to the fact that it is much easier to use level clipping on well commentated standardized code than it is on this stuff-- it's very hap-hazard. 149

(DCE) Could you imagine (this is back to Doug Englebart's hat now) If we were going to get some support for launching this from NSF to say, "Hey, how about good form as a way to show this community?" 150

(RRW) The problem is that we keep coming back to is that it seems like somebody is willing to pay us. That's something somehow we never ever do very well at like, man, you're responsible to help make that and not get sucked off into fifty other things, and that's what is really hard around here. 151

(DCE) Well one of the reasons that happens is just look, this is a trimmed down list... 152

(end of side three, begin side four of four sides) 153

(DCE) ...I'd like to just consider that and the SEAS group spend some time like that as a part of saying, alright, for a while, we are going to use a bit of IPT money to explore this. 154

(RWW) There's an ICCC conference coming up. One could prepare a SEAS demo of that kind. 155

(DCE) Oh, boy, wouldn't that be great? 156

(DVN) What's the date of that? 157

(RWW) It's the 24th to the 26th of October. 158

(RWW) We might even be able to gin up something not just for the ICCC conference but to get something through the network to compile at UCLA or someplace on PL-1 just to show that it can be done, even if it's just five statements or something. 159

(HGL) How long would it take to get it compiled? 160

(CHI) How long would it take to transfer it you mean? 161

(RWW) Oh, it wouldn't take very long. 162

(CHI) Oh, that's pretty insignificant. 163

(HGL) How about getting it into the compiler? 164

(DCW) You cue it up for a batch job. 165

(RWW) It's a batch job and they've got a protocall for how you get stuff into that. 166

(DCW) Who's gonna volunteer to learn (JCL?) (laughter) 167

(HGL) There are experts in the group... 168

(RWW) There is already on a TENEX, I guess at RANN, a protocall that allows guys on the RANN TENEX to get stuff into UCLA. And we can get that stuff up here and somehow interface that. 169

(HGL) Yeah, that'd be a good thing. I've been continueing what Doug was doing over there, and I've been asking myself questions that I have no answers to right now. It sounds as if the SEAS people can work on that maybe for a little bit or something. 170

(DCW) I have a question about the community aspect of SEAS. It seems as though it's a very closed group and it's us. How does it become a community and how do other people start participating in some sort of a ... 171

(HGL) Well, just as they're asking us questions, we can start asking them questions. Like, I understand you have a fantastic measurement system, how can we use that to evaluate what we're doing. Or we can say, I understand you're working on some new

graphics software, how can we integrate that into our system. Things like that. 172

(DCE) Well, you see, what you look for (are) people who would like to concentrate on experimenting with the development and evaluation of augmenting software people. They may have ideas of their own and things they want to do. And if they'd be willing to start with, moving in on NLS and using DSS to collaborate and talk about, and go from there on the different things that they want to experiment with and are interested in the idea of augmenting software engineers. Then they've got all kinds of questions in mind that they want to do. Some of them can be completely independant and some of them would probably call for cooperation and you begin having communities in effect. 173

So I think a lot of about other kinds of communities, that it would just pay-off so much t get a real one going that's kind of a prototype and we (can) get the experience with it. The SEAS looks like the ripest one you can start with, and the one with the most payoff. There are more software guys with access to the network and can live with our NLS the way it is and can adapt and all that stuff than any other category of people. 173a

So it's just taking the steps. And more scenarios about what would the community be like, and what would we do. Asking questons like: "What about a COBALT guy?" or may be maybe we want to mix, or maybe we would like to just limit it to PL-1 people to start with. Or PL-1 FORTRAN and COBOL that just about covers most of them. And then you say, "Hmmm, we've been talking about industrial groups. What about university groups?" What about a mix of those in which there were... In a university, what you try to do for support, is talk to NSF about granting under some kind of blanket program we get started, giving grants to those institutions which sort of are mutually satisfactory to NSF and us as participating in this and the grant might include moving in, putting in a couple of DNLS terminals and typewriters, and tying on utility, and paying for some students, and have maybe three or four students under some interested professor get in on the game. And then where those kids want to go is ... There would be a lot of stimulation coming up from that. 173b

I think I would be interested in a plan that involves at least a mix of industrial and university types. And I think that it would pay off for people who are sponsering either kind, it would make it a richer more attractive thing if the

other kind of participant were in. In fact, you might get some big industrialists excited enough about it to start sponsering groups in universities because it's a way to kind of be involved with them that's a lot more selective and concentrated than just to say, "Here's a hunk of money to do your thing on some topic you have proposed to us. 173c

Is IBM still giving R&D grants on specific things to universities even though it stopped giving them discounts on their computers? 173d

(HGL) I think, isn't that how theyy're dealing with their privacy? 174

(DCE) Yeah, ok,... 175

(WLB) There are still universities in business? 176

(HGL) I can't hear you Walter. 177

(DCE) When you look from the universities point of view, think of how many, probably a lot of good men in computer science type area, or at least software engineering area that don't happen to be located in one of the centers that ARPA's bestowed much riches on, that the idea of getting in on something like this would be a very unique opportunity because there are a lot of places where they just don't have the kind of up-to-date systems that provide on-line programming experience in this or that an(WLB) I sometimes get the feeling we're very provincial here.d so on. It would be a really unique opportunity for lots of places, for a team of people to get. 178

(WLB) I sometimes get the feeling that we're very provencial working here. 179

(DCE) Provential, yeah, I mean the ARPA community is getting provencial. 180

(RWW) The ARPA community is an incredably provencial community. It's like the ARPA community thinks, "If you're not in the ARPA community, you're nobody. And you know that's really absurd. 181

(DCE) It's just by accident that very bright young men show up at all kinds of universities. And for some reason, stay there instead of going to MIT or Carnegie or ... And you quite often find some really good dedicated staff that are there for some reason too. And I just think, Oregon State, University of Washington, we here of things out of Arizona State, boy at Ohio

State there is a big computer science group, big rich university. 182

(RWW) There aren't any rich universities. 183

(DCW) There aren't any poor universities. 184

(DCE) The big ten, I just feel.. I guess that it's because they all have to have brick and ivy covered... and you just... a huge array of acres ... but Purdue not on the Network, but Dick Garret is ... 185

(R?W) ...out of the network. 186

(DCE) Pardon? 187

(R?W) Out of the network and not in. 188

(DCE) Any way, I just feel like wow, there is tremendous potential. And it may be... 189

(WLB) You know the places that got by passed by the railroads, and then by the freeways? 190

(DCE) Yeah so the the freeways came in and the railroad ones are dying. They want to have a railroad. maybe this is the next... 191

(laughter) 192

(DCE) But you realize that, well NSF sits there and beginning to realize that here ARPA's got this community and other places they go in computer science they sort of get the effect of that's the best they c an. They want ot get in there and go too. So what you offer them is a really unique way tostart a kind of research activity in at least one important area of computer science. Say, not just any computer science at the outset. Later, there could be all kinds of things you could do to computer science departments, Just tremendous things. cooperatively support a course development presentations the kind of librarian intelligence systartments have. That's a discipline oriented thing, it would just be very exciting. 193

The step toward that that I'd like to offer to NSF is saying, "Pick a group that's just balanced software engineering and in fact, if you want to get more specific than that, maybe we can set some other criterion and say "here are some of the the kinds of things we'd be like to have the group be willing to work on in order to get a grant so that they as members of

this community would be pay offoto us the most in bootstrapping. Well... 193a

...anyway, I'm not sure what I'll tell Mr. Lucasic when he comes. I have images of trying to do this comparison between the manned space flight and the unmanned space flight: if you put all your eggs in the AI field, what are you doing about integrating the AI products as tools in a human environment? For an awful long time, it's going to be a manned vehicle that really does the design, and he may get more and more support from AI tools, but I dont know. Shake him up? Threaten him with competition from NSF? 193b

(xxx) ... Arizona State? 194

(CHI) Have a few heavies standing around. 195

(DCW) Corte Leone... 196

(xxx) A few unemployed, unaugmented engineers. 197

(DCE) Any way, when he's gonna be here next tuesday morning at 10:00 ... 198

(RWW) ...have the system up. 199

(DCE) Have the system up, have very good response at the terminal setting... 200

(HGL) What time is he coming? 201

(DCE) He hits us about 9:00. 202

(RWW) Let's have some people here working. 203

(CHI) There's a software meeting scheduled for ten. 204

(DVN) It should be rescheduled for nine to get those people here. 205

(xxx) ...or eight. 206

(RWW) That's (not) funny because Bob Conn was here friday and walking around and no body was doing anything. And he was scratching his head and saying where is everybody? 207

(WLB) Did you tell him we were out planning? 208

(RWW) I'm not going to lie to him. 209

(DCE) It has a tremendous positive impact when this place gets up to the hum level in there. You know the people are working at different consoles and somebody is set down next to someone working together, and things are buzzing and that has a beautiful impact on a visitor.. 210

(RWW) Not only that, it gets things done. 211

(DCE) The contrary is really kind of defeating. Especially to a guy who pours a lot of money in here and one who would listen to saying they need better displays, more core? What the hell for? So a general plea but particularly next Tuesday. 212

(WLB) We need some kind of communication link so we can sit down there humming, and yet when he's in here, we're sitting there but not humming. And then when he walks out the door, we're humming again. 213

(KEV) In POD meeting yesturday, we talked about sitting down and tape recording an active day, and then when (laughter). 214

(WLB) Even video tape, we can all sit and watch. 215

DCE 3-OCT-72 18:55 12056
KIRK 5 OCT 72 5:04AM

(J12056) 3-OCT-72 18:55; Title: Author(s): Engelbart, Douglas C./DCE ; Distribution: Michael, Elizabeth K., Dornbush, Charles F., Matzorkis, Gus, ARC, Guest O., Feinler, Elizabeth J., 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., Limuti, Don, Ferguson, Ferg P., 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, Nouhuys, Dirk H. van, Victor, Kenneth E. (Ken), Wallace, Smokey C., Watson, Richard W., Andrews, Don I./SRI-ARC ; Sub-Collections: SRI-ARC; Clerk: KIRK; Origin: <KELLEY>EIGHT.NLS;58, 3-OCT-72 14:42 KIRK ;

NJN 4-OCT-72 11:31 12057

Frustration

So far unsuccessful with journal system. Messages don't seem to be getting through. Tried to get documentation but you had the <nic>locator locked up. Will perservere. 1

NJN 4-OCT-72 11:31 12057

Frustration

(J12057) 4-OCT-72 11:31; Title: Author(s): Neigus, Nancy J./NJN; Distribution: Nouhuys, Dirk H. van/DVN; Sub-Collections: NIC; Clerk: NJN;

WEEKLY ANALYSIS NOTES

STATUS REPORT 1

We are presently in a position to begin to analyse in a consistent fashion the behavior of our system by comparing our available measurements against fairly steady weekly averages which provide the analytical background we needed 1a

For the past several weeks we have been able to monitor the system and detect the most significant deviations in overall system behavior. We believe that the tools and procedures are now ready to be implemented for routine operational control and we invite potential users to let us know what kind of data would be most significant to them. 1b

In order to provide ready accessibility to all key data, we shall maintain in special "Analysis" files, which will be located on our display shelves, all daily and weekly summmaries of the measurements we are continuously collecting. Furthermore, the more detailed statistical data are being stored on tape for subsequent special purpose analyses. For more information about all this data and its potential use please contact either D.I. Andrews or Paul Rech. 1c

Each week we shall publish analysis comments in which we shall review the system's performance during the previous week and report on the nature, cause and consequences of any major detectable change or any significant deviation of previously set patterns. This should allow us to recognize and evaluate all marginal improvements in our system and become aware of the main factors affecting its performance. Sensitivity analyses of these factors will be conducted later. 1d

We shall also continue to analyse other aspects of our system. In these weekly notes, I shall report upon my latest findings in order to provide a better analytical background for our decisions. 1e

WEEKLY ANALYSIS NOTES

ACTION ITEMS

At the request of Operations, we shall print out daily distributions of the CPU time used by each user of the system. We do not intend to analyse individual work patterns and we shall use this information exclusively to determine the relative CPU requirements of the various functions within ARC. If you have any question or reservation about this procedure I would be pleased to discuss this matter with you. 2

WEEKLY COMMENTS 3

During the week of September 18, the overall performance of our system was satisfactory. During normal working hours, i.e., from 8 am. to 5 pm,, the time spent running user jobs is up again to the 60% level (compared to 40% in August when the system had a bug). The total system overhead has stabilized around 27-28 %, including an average I/O wait time of approximately 7-8%, and a scheduler overhead time around 10%. This is a very significant improvement over the 48% average system overhead for the week of August 8 which had an average I/O wait of approximately 31%. Finally, it should be noted that the average idle time during the day remains around 10%. It seems that this indicates that the working load is well distributed over the day and that the log-in limitations based on the average load factor is not ineffective at all while still guaranteeing a minimal responsiveness of the system. 3a

SOME CONCLUSIONS 4

1) An immediate step which can be taken to increase system availability during normal working hours is to shift some more of the heavy user load to off hours periods,either early in the morning or late in the evening where the average idle time is usually well above 50%. Provided the question of convenience of schedule could be resolved satisfactorily, the pay-off would be immediate and at no cost. 4a

2) Given the present state of our software, the system is presently working near its optimal capacity insofar as we are essentially CPU bound during the day. 4b

3) In the long run, further software improvements could provide some very handsome pay-offs. Further streamlining is necessary if the basic costs of the services we are providing are to become economically attractive. Our next task will be to try to identify those areas with greatest potential pay-off.

4c

DISTRIBUTION OF AVAILABLE CPU TIME.

5

The following table illustrates how our available computer time is presently being spent during the normal working hours period, i.e., between 8am. and 5pm..

5a

	DATES					Weekly
% CPU TIME	9/18	9/19	9/20	9/21	9/22	Averages
I/O Wait	10.3	6.8	2.5	11.7	10.8	7.9
Scheduler	9.9	9.1	20.2	6.4	7.9	10.8
Clock	2.5	2.7	3.0	2.6	2.9	2.8
G.C.	1.7	1.8	1.4	1.6	1.9	1.7
Network Overhead	4.1	3.7	1.6	6.0	5.0	4.0
Total Overhead	28.5	24.1	28.7	28.3	28.5	27.2
Overhead	28.5	24.1	28.7	28.3	28.5	27.2
User Time	59.9	66.7	70.1	50.1	55.5	62.3
Idle Time	10.3	7.8	0.0	20.4	14.9	9.6
Total	98.7	98.6	98.1	98.8	98.9	99.1

5b

In the above table, it can be noted that a minor snag developed on Wednesday, September 20, when an unattended detached job ran for the whole day, using up all our normally available idle time, boosting the scheduler overhead to the 20% level, and running up the time spent in the Exec from the usual 16% to 26% of the time allocated to user subsystems. The detached job finally stopped when the system crashed at 5 p.m..

5c

DISTRIBUTION OF USER CPU TIME IN THE VARIOUS SUBSYSTEMS.

6

WEEKLY ANALYSIS NOTES

So far we have analysed where our computing power goes. In the following tables we show what percentages of the user time are spent in the various subsystems. In the future we shall keep track of all this data which will be available in the "Analysis" files to be found on our display shelves.

6a

1) NLS SUBSYSTEMS

	Dates					Weekly
SUBSYSTEMS	9/18	9/19	9/20	9/21	9/22	Average
NLS	1.0	1.1	.8	1.0	1.1	1.0
TNLS	11.1	18.2	16.2	2.5	4.5	14.0
DNLS	30.0	26.5	23.0	47.5	40.7	29.3
NTNLS	4.3	6.5	3.4	6.5	6.9	5.8
NDNLS	1.0	.0	.6	.0	.0	.5
NLSL10	1.9	1.4	.8	1.5	1.3	1.4
DEX						
CASSET						
TOTAL NLS	49.3	53.7	44.8	59.0	54.5	52.0

6b

2) SUBSYSTEMS ASSOCIATED WITH HARDCOPY OUTPUT

	Dates					Weekly
SUBSYSTEMS	9/18	9/19	9/20	9/21	9/22	Average
OUTPRC	4.3	4.4	7.6	2.3	11.9	6.6
SYSJOB	8.4	8.4	12.2	8.2	9.7	9.8
S360	1.2	.0	.0	.0	.0	.0
MTACPY	.0	.0	.0	.0	.o	.0
TOTAL PRINTER	13.9	12.8	19.8	10.5	21.6	16.4

6c

3) JOURNAL SUBSYSTEMS

6d

WEEKLY ANALYSIS NOTES

SUBSYSTEMS	Dates 9/18	9/19	9/20	9/21	9/22	Weekly Average
JOURNL	.4	.0	1.9	.9	.6	1.1
OLJDEL	.0	.0	.6	.0	.0	.1
RECOVF	.2	.0	.2	1.6	.6	.3
SLINKR	.0	.2	.2	.0	.0	.0
TOTAL JOURNAL	.6	.2	2.9	2.5	1.2	1.5

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4) NETWORK SUBSYSTEMS

SUBSYSTEMS	Dates 9/18	9/19	9/20	9/21	9/22	Weekly Average
TELNET	.0	.3	.4	.0	.2	.2
NETSA	.1	.1	.0	.1	.0	.0
CPYNET	.0	.0	.0	.0	.0	.0
TOTAL NETWORK	.1	.4	.4	.1	.2	.2

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5) SUPPORT SUBSYSTEMS

SUBSYSTEMS	Dates 9/18	9/19	9/20	9/21	9/22	Weekly Average
EXEC	16.0	17.5	26.5	16.1	16.2	18.0
BSYS	2.9	.2	.1	.2	.0	.7
DELD	.5	.0	.0	.7	.2	.3
SUPERWATCH	.3	.7	1.2	1.6	1.7	1.0
BIGBRO	.1	.1	.1	.1	.0	.1
ACCSRI	.0	1.0	.0	.0	.3	.2
NOTIFY	.0	.0	.1	.3	.0	.0
DUMPER	.0	.2	.0	.0	.0	.0
TOTAL SUPPORT	19.8	19.7	28.0	19.0	18.4	20.1

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WEEKLY ANALYSIS NOTES

6) SUBSYSTEMS FOR SYSTEMS DEVELOPMENT

SUBSYSTEMS	Dates 9/18	9/19	9/20	9/21	9/22	Weekly Average
PRIV	5.5	4.0	1.4	3.9	1.4	3.1
L10	3.6	.2	.2	3.7	2.2	1.6
TECO	.0	.3	.1	.2	.2	.2
LOADER	.5	.0	.0	.0	.0	.1
TENLDR	3.7	4.3	1.5	.0	.0	2.5
LIBNLS	.1	.0	.0	.1	.0	.0
UTILITY	.0	.5	.0	.0	.0	.0
SDDT	.0	1.2	.0	.0	.0	.2
TOTAL DEVELOPMENT	13.4	10.5	3.2	7.9	3.8	7.7

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7) SUMMARY

SUBSYSTEMS	Dates 9/18	9/19	9/20	9/21	9/22	Weekly Average
NLS	49.3	53.7	44.8	59.0	54.5	52.0
PRINTER	13.9	12.8	19.8	10.5	21.6	16.4
JOURNAL	.6	.2	2.9	2.5	1.2	1.5
NETWORK	.1	.4	.4	.1	.2	.2
SUPPORT	19.8	19.7	28.0	19.0	18.4	20.1
DEVELOPMENT	13.4	10.5	3.2	7.9	3.8	7.5
TOTAL	97.1	97.3	99.1	99.9	99.9	97.7

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WEEKLY ANALYSIS NOTES

(J12058) 4-OCT-72 9:06; Title: Author(s): Rech, Paul/PR;
Distribution: Michael, Elizabeth K., Dornbush, Charles F., Matzorkis, Gus, ARC, Guest O., Feinler, Elizabeth J., 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., Limuti, Don, 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, Nouhuys, Dirk H. van, Victor, Kenneth E. (Ken), Wallace, Smokey C., Watson, Richard W., Andrews, Don I./SRI-ARC; Sub-Collections: SRI-ARC; Clerk: PR;
Origin: <RECH>WEEKNOTE.NLS;17, 3-OCT-72 14:18 PR ;

Great. I thnkhat I have a familiar configuration. I have
a PDS-1 with mouse and keyset (your specs). The processor
does not have long vectors, hardware mult or div, or
carry between display regs. I am willing, if necessary
to make hardware mods to fix that last condition. I have
some manpower available, and considerable (or more) interest.
Can you tell me which people to contact who are now running
dnls over the net? If I knew how, I would try right now to
load my Imlac.
Thanks for all your help.
bob.

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(J12059) 4-OCT-72 8:06; Author(s): Bressler, Robert D. (Bob)/RDB2;
Distribution: Irby, Charles H./CHI; Sub-Collections: NIC; Clerk: RDB2;

WPJ 3-OCT-72 18:25 12060

wpj-to-jrp/10/

Message for John Pickens: I believe I hale learned to use Journal from a 2741
type terminal. It requires a control-v just prior to my CR/LF. NLS normally
supplies this to a full duplex terminal. Consequently you may see some funny
characters though I HOPE NOT.

I have copied AMESDOC. I will endeavor to use it tonight. I agree with you
about the proper channel for messages. But backup systems are nice too. Our
TIP is behaving much better so I plan to logon every night after I get home to
pick up messages.

John, how bout my title and speaking date??? Is that around in some file or
still cogitating? See you. Let me known if my 10/03/72 gets through.

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WPJ 3-OCT-72 18:25 12060

wpj-to-jrp/10/

(J12060) 3-OCT-72 18:25; Title: Author(s): Jones, William P./WPJ; Distribution: Pickens, John R./JRP; Sub-Collections: NIC; Clerk: WPJ;