SRW 20-NOV-73 23:20 20427

Queries Regarding Copyright

Doug:
Peter and I went to the British Library on Monday. They are the ones who we hope will deal with some of our document distribution problems. One point which came up was that of copyright. I thought that you might be able to help on this one. Presumably any items in the NIC on-line collection cannot have copyright on them (none that I have seen in fact bear the copyright legend) since it is possible to reproduce them in full over the network. Or is it that there is tacit understanding that this is not 'unautorised' reproduction? I notice that some BBN documents do have copyright, notably an oldish TENEX users guide which we have, so presumably we cannot allow this to be ccopied in full? 1

I recently contacted Dean Meyer on programming ... he sounds a very helpful fellow 2

Regards .... Steve 3

20427 Distribution
Douglas C. Engelbart, Peter Kirstein,

Queries Regarding Copyright

(J20427) 20-NOV-73 23:20; Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /DCE PK(for info); Sub-Collections: NIC; Clerk: SRW;
Origin: <UK-ICS>MES.NLS;1, 20-NOV-73 22:55 SRW ;

SK 21-NOV-73 02:53 20428

ADVICE NEEDED BY LONDON RE IDENTS AND PASSWORDS.

MR. WHITE, THIS IS SYLVIA KENNEY (SK), UNIVERSITY OF LONDON.
MAY I PLEASE HAVE SOME ADVICE ON REMEDYING A MISTAKE I MADE WHEN ENTERING
A NEW IDENT FOR OUR ACCOUNT? BY USING A COMMAND TERMINATOR WHERE I SHOULDN'T, IENTERED AN IDENT 'BM2' FOR BRIAN MARSDEN AS AN INDIVIDUAL (ORGANISATION-IDENT=IND) RATHER THAN UNDER OUR ORGANISATION IDENT AND DIDN'T REALISE MY MISTAKE UNTIL TOO LATE.
I HAVE SINCE SUCCESSFULLY ENTERED HIM AS BM4 UNDER OUR ORGANISATION ID
BUT DO NOT KNOW HOW TO DELETE HIM AS BM2 FROM THE IDENTIFICATION FILE.
ALSO, WE ARE THINKING OF CHANGING OUR PASSWORD. IS THERE A MACHINE COMMAND TO DO THIS?
THANKING YOU IN ADVANCE FOR YOUR HELP, SYLVIA. 1

20428 Distribution
James E. (Jim) White,

SK 21-NOV-73 02:53 20428

ADVICE NEEDED BY LONDON RE IDENTS AND PASSWORDS.

(J20428) 21-NOV-73 02:53; Title: Author(s): Sylvia Kenney/SK;
Distribution: /JEW; Sub-Collections: NIC; Clerk: SK;

JI 21-NOV-73 06:09 20429

Response to NDM's (20417) suggestion for O[utput] N[ls]

Dean: Thank you for your consideration of the proposal on O[utput] N[ls]. I would like to offer the comment that, if at all possible, the ensueing file from the command should, in fact, have the structure specified by the output directives. If uni-leveling were effected, for example, this would destroy much of the envisioned power and utility of the proposed command.

An example of one way to do it, although certainly not recommended, would be to invoke output processor while taking a Telnet Typescript of the process and then re-injesting the ensuing file into NLS. You might find it an elightening experience, Dean, to attempt this and see what kind of problems you encounter in geting the file properly injested and edited. In having done this several times, I find that one rapidly develops a good insight into the more general NLS/TENEX file compatibility problem - which must be adequatelt addressed if NLS is to have greater utility to a broad community of network users.

On the whole, Dean, I think that your third alternative: "3) Formatted, taking directives as formatting instructions....." along with level preservation is what I would vote for.

Thanks again for your interest and response.....Jean 1

JI 21-NOV-73 06:09 20429

Response to NDM's (20417) suggestion for O[utput] N[ls]

(J20429) 21-NOV-73 06:09; Title: Author(s): Jean Iseli/JI;
Distribution: /DCE(it's beginning) RWW(loved your #20391) DHC(agree on
sussex) JCN NDM(Thanks Dean) JBP I; Keywords:
O[utput]N[ls]-response-to-ndm; Sub-Collections: I NIC MITRE-TIP; Clerk:
JI;

20429 Distribution

Douglas C. Engelbart, Richard W. Watson, David H. Crocker, James C. Norton, N. Dean Meyer, Jonathan B. Postel, Dave A. Gorka, John D. Day, Alan R. Hill, Clayton A. Greer, Jean Iseli, Jim O. Calvin, Mil E. Jernigan,

DLS 21-NOV-73 05:28 20430

Norton and Bair Visit RADC

Jim & Jim..please add, subtract, multiply or divide wherever you see fit.

DLS 21-NOV-73 05:28 20430

Norton and Bair Visit RADC

Summary of Jim Norton's and Jim Bair's visit to RADC, (as perceived by D Stone) 1

The visit was rather hectic on their part, since the local AKW group was involved in the RADCMIS pitch (and had been for some time, and hence were not prepared very well for the visit). 1a

Never-the-less, some important topics were discussed, which should be followed up in the near future. 1b

The internal money problem in funding the Utility was discussed. While Jim & Jim were here, decisions were being made in the front office on just how to scrape up the necessary coins. My basic view (which is reinforced by conversations with Tomaini & McNamara) is, that because we are tied to the ARPA contract, it would be just to embaressing to Center management at all levels to back out now. This is a poor reason for funding an effort, but it accomplishes the desired end, and gives us another year to influence people toward a more positive, favorable attitude...which I'm confident we can do. 1c

They talked to Col. Thayer, and received some (lots actually) of negative feedback. The concensous seemed to be that: 1d

1. his training in the use of TENEX and NLS has been less tha adequate..for whatever reason. 1d1

2. his terminal is not the best that we have available. Providing him with a TI could potentially remove some of the troublesome signing in procedures, along with directly connecting the TI into the TIP. 1d2

3. one or more of the secretaries in the front office should be trained in the rudiments of the system, so that they can act as his surrogate. 1d3

4. that an attitude of concern and of eagerness (to help him with his personal problems in mastering the system) is most important. 1d4

I have taken steps in this direction already, and will personally (if necessary) train Thayer and/or his secretaries. In view of his position in the organization and his current negative outlook on the system, it seems like an investment well worth the time. 1e

We talked briefly about the emerging role of the Architect. JCN left me a copy of his thoughts on the subject to date. This role is personally more interesing to me, and I will try to carve out more time to devote to thinking about it. This seems to be the

role that I was playing a couple of years ago, but now I have been reduced essentially to an all purpose handyman, paperpusher, and handholder. 1f

We talked at length about the RADC Management Information System proposal that was requested by Tomaini and has been pitched to Frank and subsequently to Thayer and Barnum. We have defined an MIS as consisting of two basic components, a "communications" system (to handle the preparation, storage and dissemination of unstructured, narrative text) and a Data Base Management system (to handle structured, formatted data). The proposal is basically to tie together NLS and a local Data Management system (DMS), into an intergrated MIS to serve center managment. The proposal itself will be finished in a week or so, and will be made available to interested parties at the ARC for critical review. This discussion led into one on the Forms Generator. 1g

The FORMS GENERATOR PACKAGE now being worked on by Elizebeth for us, is EXTREMELY IMPORTANT in our view. Not just because it will allow us to deal with a troublesome kind of text manipulation problem, but because we envision it as being the keystone to effectively interfacing NLS and a Data Management system at RADC or elsewhere on the ARPANET. 1h

One of the biggest problems in creating an operational MIS is collecting the data and getting it input correctly into the DMS. If it relys heavily on administrative people to copy key information from forms filled out by the working level troops, it will never work By not working I mean that the data will be out-of-date, erroneous, inconsistent, and misleading at best. A system like this is less than useful to management. 1h1

Most of the data that one might want in the DMS portion of an MIS, is currently generated by the engineer and first appears on a form. We would like to use the forms package to help the engineer fill out the necessary forms AND IN ADDITION would then like to collect these forms in common files. It should then be possible to run L-10 programs against these files on a periodic basis (maybe daily) and strip off the data necessary for input to the DMS. With perhaps some reformatting, we would the like to ship the data over the ARPANET and have the DMS file updating programs on the DMS host incorporate them into its data base. 1h2

Without the forms generating system, we have little chance of capturing the data at its source, and hence (I believe) would seriously jepordize our chances of ever creating an operational MIS for the branch, Center or anyone else. 1h3

Norton and Bair Visit RADC

I talked with Jim Bair about training. We just don't have the internal manpower (either amount or right kind) to mount the kind of training activity that appears to be necessary before an individual can become augmented rather than "demented". We concluded that there are two basic areas where we could use SRI's help in training. 1i

1. Advanced training for the current user population, who have for the most part learned the rudiments of NLS. This training might proceed by first giving an introductory talk or several, and then by sitting down for an hour or two with individuals and showing them features that are of specific interest to them. 1i1

2. The initial training of new NLS users in Nelson's section and at selected places in the Division. This would be the more standard NLS training, but I forsee a concentrated effort over perhaps a two week period. The regular 2-3 day "course" really only exposes people to the system, but does not leave them with the necessary skills to proceed on their own. In Bair's terms "longtensity = proficiency". 1i2

Norton and Bair Visit RADC

(J20430) 21-NOV-73 05:28; Title: Author(s): Duane L. Stone/DLS;
Distribution: /JCN JHB RWW DCE FJT EJK JLM; Sub-Collections: RADC;
Clerk: DLS;
Origin: <STONE>VISIT.NLS;1, 21-NOV-73 05:23 DLS ;

20430 Distribution

James C. Norton, James H. Bair, Richard W. Watson, Douglas C. Engelbart, Frank J. Tomaini, Edmund J. Kennedy, John L. McNamara,

RJC 21-NOV-73 05:41 20431

tickler

(nm3) 12 November - Monday 1

0830 hrs. Branch Chief's Meeting 1a

Supervisory Appraisal Form Briefing - for Supervisors Only - 0900 - 1030 hrs. - Auditorium in 106. 1b

Due Date - ISIM/Capt Daughtry - Settlement of Over-Advance Travel Allowance - Completed 1c

(nt3) 13 November - Tuesday 2

ESD/MITRE - Col Hill, Col Hill's Deputy etc. - Discuss Base Comm Study - Briefing of AHI and Tour of Facility - Ed Kennedy Focal Point - 1330 hrs. 2a

Annual Disaster Preparedness Indoctrination - ISIS/Capt Ives - 0930 hrs. - 1130 hrs. - Bldg. 106 - Auditorium - Attendance will be recorded. 2b

(nw3) 14 November - Wednesday 3

0830 hrs. - ISF Confessions 3a

Supervisory Appraisal Form Briefing - For Supervisors Only - 0900 - 1030 hrs. - Auditorium in 106. 3b

Center MIS Presentation to IS - E. Kennedy - Cancelled 3c

(nth3) 15 November - Thursday 4

0830 hrs. Branch Chief's Meeting 4a

1000 hrs. - QM-1 (John McLean et al) - Mtg with Col Thayer/Al Barnum 4b

Federal Employees Health Benefits Program - 1973 Open Season BEGINS - Ends 30 Nov 73. 4c

Laboratory Activity Reports due today: Bucciero must have them by 1000, ISM must have them by 1100, and DOT must have them by 1600. 4d

(nf3) 16 November - Friday 5

Supervisory Appriasal Form Briefing - For ADMINISTRATORS ONLY - 0900 - 1030 hrs. - Bldg. 106 - Room A-119 5a

Bobbie: Travel figures due by noon. 5b

tickler

R & T Selection of the Month is due in ISI. 5c

Due Date - ISIS/White - Revised Final Rpt - Contract F30602-73-C-0062 for technical review. Completed 5d

RJC 21-NOV-73 05:41 20431

tickler

(J20431) 21-NOV-73 05:41; Title: Author(s): Roberta J. Carrier/RJC;
Distribution: /JPC; Sub-Collections: NIC; Clerk: RJC;

20431 Distribution
Joe P. Cavano,

RJC 21-NOV-73 05:49 20432

tickler for the week of 26 Nov 73

(nm5) 26 November - Monday 1

0830 hrs. Branch Chief's Meeting 1a

Due Date - ISI/FJT - Management Support for RSD Program from DDR&E 1b

(nt5) 27 November - Tuesday 2

(nw5) 28 November - Wednesday 3

Representatives from AFDSC will visit RADC/Bergstrom (Focal Point) to begin testing of DM-1 System - Will be here through the 30th 3a

Due Date - ISIS/ISIM - Project Engineers Bimonthly Review of Tech Completions - due in ISM 29 Nov 3b

(nth5) 29 November - Thursday 4

0830 hrs. Branch Chief's Meeting 4a

Laboratory Activity Reports due today: Bucciero must have them by 1000, ISM must have them by 1100, and DOT must have them by 1600. 4b

Due Date - ISIM/Bergstrom - Joint Services Electronics Program (JSEP) Proposal Review. 4c

0900 - 1000 hrs. - Officer's Commanders Call - Bldg. 106 - Auditorium 4d

(nf5) 30 November - Friday 5

Form 2's (employee time expenditures) are due today. 5a

Form 6's (projected manpower) are due today. 5b

Bobbie: Travel figures due by noon. 5c

RJC 21-NOV-73 05:49 20432

tickler for the week of 26 Nov 73

(J20432) 21-NOV-73 05:49; Title: Author(s): Roberta J. Carrier/RJC; Distribution: /RADC; Sub-Collections: NIC RADC; Clerk: RJC;

20432 Distribution

Larry M. Lombardo, Anna A. Cafarelli, Roberta J. Carrier, Donna R. Robilotta, David L. Daughtry, Richard H. Thayer, Frank J. Tomaini, Mike A. Wingfield, Edmund J. Kennedy, Ray A. Liuzzi, John W. Johnson, Donald Van Alstine, Dean F. Bergstrom, Willian P. Bethke, Frank S. LaMonica, William E. Rzepka, Rocco F. Iuorno, Frank P. Sliwa, Thomas J. Bucciero, Robert E. Doane, David A. Luther, Roger B. Panara, John L. McNamara, Joe P. Cavano, Duane L. Stone, Marcelle D. Petell, Josephine R. Stellato, Robert K. Walker, Thomas F. Lawrence, James H. Bair,

MDK 21-NOV-73 11:37 20433

Applicantt for Systems Programmer

To: CFD/ CHI/ DSK/ HGL/ EKM/ KEV/ DCW /JEW/ RWW

Robert Stueland (referred to us by Diane Kaye)
WILL BE HERE WEDNESDAY NOV 28 9:00 AM
as applicant for Systems Programmer-

Mr. Stueland's resume states that he has twelve years' experience in systems programming including compiler design and development, information retrieval, computer simulation, and object time I/O and arithmetic routines. His experience is on CDC, IBM, Burroughs, and the
Fairchild Sprint 8 computers; languages programmed include PL1, Algol,
Fortran, and assembly lang.

Robert Stueland WED Nov 28 9:00 AM
Michael Grimm THURS Nov 29 9:00 AM

1

Applicantt for Systems Programmer

(J20433) 21-NOV-73 11:37; Title: Author(s): Michael D. Kudlick/MDK; Distribution: /CFD CHI DSK HGL EKM KEV DCW JEW RWW; Sub-Collections: SRI-ARC; Clerk: MDK;

RWW 21-NOV-73 15:40 20434

Jim What Help do You Need From Analysis

Jim, as the date for coming up on the Utility approaches you probably want to consider what services you need from analysis to help see how it's performing. Inorder to help Analysis schedule its time they would probably appreciate early discussions, if you do plan to ask for help. Similarly I am concerned that we do not seem to be doing or planning analysis of the ARPA office needs. We should have Paul in contact with Connie so that she can begin to think about what should be done there and Paul can plan any help he can give. 1

RWW 21-NOV-73 15:40 20434

Jim What Help do You Need From Analysis

(J20434) 21-NOV-73 15:40; Title: Author(s): Richard W. Watson/RWW;
Distribution: /JCN PR SRL DCE; Sub-Collections: SRI-ARC; Clerk: RWW;

RWW 21-NOV-73 15:47 20435

Timecards

If you were not here Wed., please check with Jeanne to see if your time card represents what you would have put there. Thanks 1

Timecards

(J20435) 21-NOV-73 15:47; Title: Author(s): Richard W. Watson/RWW;
Distribution: /SRI-ARC; Sub-Collections: SRI-ARC SRI-ARC; Clerk: RWW;

VISIT OF Dr. HEYN and Mr. GRUNWALD of PHILIPS RESEARCH (NETHERLAND) 1

Date: November 21, 1973 1a

Visitors: Dr. Ir.H.J. Heyn (Deputy Manager Information Systems & Automation) & H. Grunwald (Manager Business Sciences & Operations Research) of N.V. Philips, Eindhoven, The Netherlands 1b

Company: N.V. Philips' Gloeilampenfabrieken, Eindhoven, The Netherlands
Telex 51121 PHTC NL 1c

Other SRI contacts: 1d

Michael M. Menke from Decision Analysis Group
Dieter H. Meun from Long Range Planning Department
David B. Rokasy from Industrial OR
David P. Herron from Industrial Operations Research Dept.
Dave R. Brown 1d1

References: 1e

Letter to B. Cox 9/28/73followed by a letter to Dave R. Brown dated 11/01/73 1e1

Topics of Interest to the Visitors: 1f

Both Dr. Heyn and Mr. Grunwald belong to the Research Division of Philips in Eindhoven in the Netherlannds. Dr. Heyn is the Manager of a large Management and Information Science Research Department (over 40 people). They are involved in business control research which is geared towards real applications in their company. 1f1

Some of the main areas of interest to them deal with centralization vs. decentralization and specialization vs. standardization. They are also interested in inventory control, material management and information systems. 1f2

They are interested in the following techniques: industrial engineering, OR, industrial dynamics, control theory and organizational theory. 1f3

Also interested in the evaluation and analysis of large systems. 1f4

Discussion at ARC with PR: 1g

PR 21-NOV-73 16:00 20436

Visit of Dr. Heyn and Mr. Grunwald of Philips, The Netherlands

I gave the visitors a demonstration of our system and we discussed in general terms its potential for business. 1g1

We discussed its implications on management science and operations research techniques and in particular on planning and forecasting techniques. The subject of decomposition of large scale planning models was also mentionned. 1g2

The visitors were quite interested by our evolutionary systems development concept based on the operation/analysis/development feedback loop. 1g3

I gave them (12445,) and (14724,) 1g4

PR 21-NOV-73 16:00 20436

Visit of Dr. Heyn and Mr. Grunwald of Philips, The Netherlands

(J20436) 21-NOV-73 16:00; Title: Author(s): Paul Rech/PR;
Distribution: /RWW DCE JCN; Sub-Collections: SRI-ARC; Clerk: PR;
Origin: <RECH>PHIL.NLS;4, 21-NOV-73 15:55 PR ;

Updated CML documentation

COMMAND META LANGUAGE -- CML 1

INTRODUCTION 1a

The command meta-language (CML) is a vehicle for describing the syntax and semantics of the user interface to the NLS system. The syntax is described through the tree-meta alternation and succession concepts. The semantics are introduced via built-in functions and semantic conventions. 1a1

No attempt is made to describe the full semantics of any command via CML, but it is hoped that the front-end interface (parsing and feedback operations) may be explicitly accomodated with these facilities. It will still be necessary, and desirable, to use execution functions to perform the low-level semantics of the command. The CML describes how the command "looks" to the user, rather than what it does in the system. 1a2

USE OF CML 1b

The user interface for the NLS command language is defined in the CML specification language. This "program" is then compiled by the CML compiler (written using ARC's tree-meta compiler compiler system) to produce an interpretive text which drives a command parser. The command parser is cognizant of the device dependent feedback and addressing characteristics of the user's i/o device. 1b1

ELEMENTS OF CML 1c

PROGRAM STRUCTURE 1c1

The basic compilation structure of a CML program is described by: 1c1a

```
file        = "FILE" .ID (dcls / rule)                    1c1a1
            #subsys "FINISH";                             1c1a2
subsys      = "SUBSYSTEM" .ID % subsystem handle %        1c1a3
            KEYWORD .SR  % recognition string %           1c1a4
             #(command / rule) "END.";                    1c1a5
command     = ("COMMAND"/ "INITIALIZATION" /              1c1a6
            "TERMINATION") rule ;                         1c1a7
```

```
rule                = .ID '= exp '; ;                                   1c1a8
```

The "file" construct brackets the definition of command language subsystems. 1c1b

Parsing rules and declarations may appear at this global level. 1c1c

The subsystem contruct brackets a set of rules or commands. Commands beginning with the keyword COMMAND are linked together to form a command language subsystem. 1c1d

The subsystem may include a rule preceded by the keywords INITIALIZATION or TERMINATION. If specified, these rules will be executed once upon subsystem initialization/termination respectively. 1c1e

The subsystem may include a rule preceded by the keyword RENTRY which will be upon rentry in the subsystem after leaving the subsystem via a GOTO or EXECUTE command. 1c1f

Each rule/command is named with an identifier. This name may be used as a term in any other rule, indicating that the named rule is to be invoked at that point in the parse. 1c1g

DECLARATIONS 1c2

Declarations are used to associate attributes with identifier names which are used in cml programs. If not declared, identifiers are defined by their first occurrence according to the following rules. 1c2a

1) Identifiers appearing on the left hand side of an assignment statement are defined as "VARIABLES". 1c2a1

2) Identifiers followed by a subscripted list are assumed to be of type "FUNCTION". 1c2a2

3) All other undefined identifiers are assumed to be names of parse rules or commands. 1c2a3

The syntax of the declare statement is given by: 1c2b

```
dcls        = ("DCL" / "DECLARE") [dclattr] #<',>
(.ID/.SR);                                                              1c2b1

dclattr     = ("VARIABLE" / "FUNCTION" / "PARSEFUNCTION"                1c2b2

            / "EXT-KEYWORD" / "EXTERNAL");                              1c2b3
```

If a declare attribute is not given, type VARIABLE is assumed. Identifiers which are implicitly defined as type variable are EXTERNAL symbols and will be linked by the loader to externally defined symbols with that name. 1c2c

Semantics of the declare attributes: 1c2d

VARIABLE: 1c2d1

a cell which holds pointers to CML records 1c2d1a

FUNCTION: 1c2d2

arbitrary L10 processing function 1c2d2a

PARSEFUNCTION: 1c2d3

an L10 function which processes input, and one which is called in "parsehelp" mode to supply a prompt string 1c2d3a

EXT-KEYWORD 1c2d4

precedes a list of keyword strings (#<',>.SR) and it indicated that the named keywords are globally defined elsewhere in the system. This declaration must be used for all keywords which are passed to the built-in selection functions (LSEL, SSEL, and DSEL) 1c2d4a

EXTERNAL 1c2d5

associates an external symbol with the named rule/variable permitting separately compiled CML/L10 programs to reference the named rule/variable 1c2d5a

RECOGNIZERS 1c3

Keyword Recognition 1c3a

The process of keyword recognition is independent of the description of the keywords for CML. In the CML description, each keyword is represented by the full text of the keyword. The algorithm used to match a user's typed input against any list of alternative keywords is known as keyword recognition, and is a function of the command interpreter and is independent of the CML description of the command. 1c3a1

Keywords are written in the meta language as upper-case

identifiers enclosed in double quote marks optionally followed by a set of keyword qualifiers. 1c3a2

```
keyword = .SR [ '  #qualifier '  ]                                  1c3a2a
```

The qualifiers serve to control the recognition process for the keywords and to supercede the system supplied internal identification for the keywords. 1c3a3

```
qualifier       = "NOTT"        % DNLS only keyword %               1c3a3a
                 /"NOTD"        % TNLS only keyword %               1c3a3b
                 /"L1"          % first level keyword
%                                                                   1c3a3c
                 /.NUM          % explicit value for
keyword %                                                           1c3a3d
```

Selection Recognition 1c3b

Three types of selections are built into CML. They are DSEL, SSEL, and LSEL (see -- <userguides,commands,1> for the explicit definition of the selections). Basically, they are recognizers which require some entity type as an argument and they return a pair of text pointers in the state record. The entity type is obtained either by some previous invocation of the recognition function for some list of keyword entities, or use of the VALUEOF built in function. 1c3b1

The DSEL, SSEL, and LSEL functions perform all evaluation and feedback operations associated with the selection operations. 1c3b2

```
selection       = ("SSEL"/ "DSEL"/ "LSEL") '( param ')              1c3b2a
```

Other Recognizers 1c3c

The processes of viewspec recognition, level adjust recognition and command confirmation recognition are represented in CML by built-in parameterless functions in the meta-language. 1c3c1

```
others          = "VIEWSPECS"   % viewspec collection
%                                                                   1c3c1a
                 /"LEVADJ"      % leveladj collection
%                                                                   1c3c1b
```

```
                    /"CONFIRM"      % command confirmation
        %                                                          1c3c1c
```

FUNCTION EXECUTION 1c4

Functions may be invoked at any point in the parse by writing a name of some routine and enclosing a parameter list in parentheses. All functions invoked by the interpreter must obey the groundrules set up for interpreter routines. The actual arguments are passed by address, rather than value, and two additional actual arguments are appended to the head of the argument list. 1c4a

```
control     = .ID % routine name % '( $<',> param ')              1c4a1

param       = factor            % expression element %             1c4a2

            / "VALUEOF" '( .SR )   % keyword value %              1c4a3

            / '# .SR            % same as VALUEOF %               1c4a4

            / "TRUE"            % boolean TRUE value "            1c4a5

            / "FALSE"           % boolean FALSE value "           1c4a6

            / "NULL"            % null pointer value %            1c4a7
```

PARSING FUNCTIONS 1c4b

Functions which are declared with the PARSEFUNCTION attribute are assumed to be parsing functions. They are called in "parsehelp" mode and when so called, are passed the address of a string as a third argument. The parsefunction routine then supplies a prompt string which tells what the parsing functon does. (see appendix 3 for example). Parse functions may appear as alternatives to non-failing recognizers and may themselves fail. Them must however, precede any non-failing recognizers in the list of alternatives. 1c4b1

FEEDBACK CONTROL 1c5

The feedback control elements of CML are used to provide feedback in addition to the normal feedback generated by the recognizers. This is used to implement additional "noise words" and help feedback. 1c5a

1) adding feedback to the command feedback line. 1c5a1

A string may be added to the current command feedback line by enclosing the quoted string in angle brackets. 1c5a1a

```
extra feedback = '< .SR '>                                  1c5a1a1
```

2) replacing the last word in the feedback line. 1c5a2

It is possible to replace the last string in the command feedback line by using the string replace facility. This is similar to (1) above except the previous word in the feedback line is deleted before adding the new string. 1c5a2a

```
replace extra feedback = '<"..." .SR '>                     1c5a2a1
```

A function is also provided to initialize the command feedback mechanisms and clear the command feedback line. 1c5b

```
clear cfl  = "CLEAR"                                        1c5b1
```

EXPRESSION DEFINITION 1c6

CML is an expression languge. Commands are defined to be a single expression and expressions are composed of successive/alternative expression factors. Alternative paths are indicated by the character '/ in the expression. 1c6a

The nesting of expressions may be explicitly defined with parenthesis and brackets are used to delimit optional expression elements. 1c6b

```
exp              = #<'/>alternative;                        1c6b1

alternative      = #factor;                                 1c6b2

factor           = term                                     1c6b3
                 / '( exp ')                                1c6b4
                 / '[ exp ']:   % optional element %        1c6b5

term             = subname      % id/ assign/ function
%                                                           1c6b6
                 / confirm      % command confirmation
%                                                           1c6b7
                 / feedback     % noise word feedback
%                                                           1c6b8
```

```
                        / recognition  % built-in recognizers
    %                                                          1c6b9

                        / loop;        % looping facility %   1c6b10
```

The looping facility permits repetition of a parse rule until an exit condition is met. 1c6c

```
    loop                = "PERFORM" .ID "UNTIL" '( exp ');     1c6c1
```

The .ID following the keyword PERFORM is a name of a parsing rule which is to be repeated. This rule is evaluated and then the expression following the UNTIL keyword is evaluated. If the expression returns TRUE, then the loop is exited and the next factor in the rule is evaluated. If the expression returns FALSE, then the parse is backed up to the head of the PERFORM, and the named rule is invoked once again. 1c6c2

COMPLETE FORMAL SYNTAX OF CML 1d

```
file                = "FILE" .ID $(rule/ dcls)                 1d1

                    #subsys "FINISH";                          1d2

subsys              = "SUBSYSTEM" .ID % subsystem handle %     1d3

                    "KEYWORD" .SR % recognition name %         1d4

                     #(command / rule) "END.";                 1d5

command             = ("COMMAND" / "INITIALIZATION" /
"TERMINATION"                                                  1d6

                    / "RENTRY") rule ;                         1d7

rule                = .ID '=  exp '; ;                         1d8

dcls                = ("DCL" / "DECLARE") [declattr] #<',>
(.ID/.SR);                                                     1d9

declattr            = ("VARIABLE" / "FUNCTION" / "PARSEFUNCTION"  1d10

                    / "EXT-KEYWORD" / "EXTERNAL");             1d11

exp                 = #<'/>alternative;                        1d12

alternative         = #factor;                                 1d13
```

```
factor          = term/ '( exp ')/ '[ exp '];                          1d14

term            = subname/ confirm/ feedback/ recognition/
loop;                                                                  1d15

subname         = .ID  [ '← param/ '( $<',>param ')];                  1d16

confirm         = "CONFIRM"; % call routine to terminate cmd %         1d17

recognition     = keyword/ builtinrec;                                 1d18

keyword         = .SR [ '  #qualifier '  ];                           1d19

qualifier       = "NOTT"/ "NOTD"/ "L1"/ .NUM;                          1d20

builtinrec      = (("SSEL"/ "DSEL"/ "LSEL") '( param '))               1d21

                / "VIEWSPECS"/ "LEVADJ";                               1d22

feedback        = "CLEAR"/ '< ["..."] .SR '>;                          1d23

control         = .ID '( $<',>param ');                                1d24

param           = factor/ ("VALUEOF" '( .SR ') / '# .SR)               1d25

                /"TRUE"/ "FALSE"/ "NULL";                              1d26

loop            = "PERFORM" .ID "UNTIL" '( exp ');                     1d27
```

THE INTERPRETIVE TEXT 2

Each instruction of the interpretive text contains a structure word at least one function execution word. The structure word defines the alternation and successor paths of the grammar for the command language. The function execution words perform the actions of the interpreter. 2a

The structure words 2b

Each structure word consists of two pointers. The right half of the word defines the alternative node to the current node. The left half of the word points to the successor to the current node. Null paths are indicated by 0 valued pointers. 2b1

The executable function word formats 2c

Format 1: [OP CTL MODIFIER ADDR] 2c1

This is the only interpreter instruction word format

presently defined. OP is an operation code. CTL contains control bits used by the keyword regognition function. MODIFIER may contain an additional value. ADDR is the address or principal value for the function. 2c1a

The functions of the interpreter. 2d

RECOGNIZERS 2d1

KEYOP -- keyword recognition. 2d1a

CTL = control bits for level 1 commands, DNLS commands, and TNLS commands. 2d1a1

ADDR = address of keyword literal string 2d1a2

The current input text is matched against the keyword string specified by the current node and all alternatives of the current node. This function performs keyword recognition on all of the alternative nodes of the current node simultaneously. 2d1a3

This function cannot fail. Control remains in the keyword recognition function until appropriate input is recognized or until the control is abnormally wrested via backup or command delete functions. 2d1a4

The value returned in the argument record is a single word containing the address of the string corresponding to the keyword actually recognized. 2d1a5

CONFIRM -- process command confirmation characters 2d1b

This function interrogates the input text for one of the command confirmation characters. Control remains in this routine until a proper confirmation is recognized, and command termination state is appropriately set. This function always returns TRUE. 2d1b1

The value returned is a single word containing a command completion code which identifies the completion mode. 2d1b2

SSEL -- get a source selection 2d1c

ADDR = not used 2d1c1

The sselect routine is invoked to process a source type selection. The return record generally contains two text pointers which delimit the selected entity (see the

appendix for detailed layout of the records returned by the selection recognizers). 2d1c2

DSEL -- get a destination selection 2d1d

ADDR = not used 2d1d1

The dselect routine is invoked to process a destination type selection. The return record generally contains two text pointers which delimit the selected entity (see the appendix for detailed layout of the records returned by the selection recognizers). 2d1d2

LSEL -- get a literal selection 2d1e

ADDR = not used 2d1e1

The lselect routine is invoked to process a literal type selection. The selection type is passed as an actual argument. The return record generally contains two text pointers which delimit the selected entity (see the appendix for detailed layout of the records returned by the selection recognizers). 2d1e2

VIEWSPECS -- process viewspecs information 2d1f

The viewspec input routine is called to process the input stream for viewspec characters. The return record contains the two updated viewspec control words. This function always returns TRUE. 2d1f1

LEVADJ -- process level adjust information 2d1g

The level adjust input routine is called to process the input stream for level adjust characters. The return record contains a single word which indicates the relative level adjust value (u = +1, d = -1, etc). This function always returns TRUE. 2d1g1

CONTROL FUNCTIONS 2d2

EXECUTE -- transfer of control to another point in the tree. 2d2a

ADDR = address of root of tree for transfer of control 2d2a1

The current point in the tree is marked and control is transferred to the node pointed to by the address field. Control remains in the descendent node until it has been

completely parsed, at which time control returns to the successor of the EXECUTE node. 2d2a2

CALL -- subroutine invocation 2d2b

MODIFIER = number of actual parameters 2d2b1

2d2b2

ADDR = address of the subroutine 2d2b3

The appropriate number of actual arguments are popped off of the evaluation stack and passed to the routine whose address is contained in ADDR. 2d2b4

The resultptr from this routine is pushed onto the eval stack if it returns TRUE. 2d2b5

PFCALL -- parsing function invocation 2d2c

MODIFIER = number of actual parameters 2d2c1

2d2c2

ADDR = address of the subroutine 2d2c3

The appropriate number of actual arguments are popped off of the evaluation stack and passed to the routine whose address is contained in ADDR. 2d2c4

The resultptr from this routine is pushed onto the eval stack if it returns TRUE. 2d2c5

This function is also called in "parsehelp" mode to find out what it does. 2d2c6

OPTION -- test for an optional construct. 2d2d

If the next input character is the OPTION select character, then it is read and control is transferred to the node at address ADDR. If the next character is not the OPTION character, then control passes to the successor path of the current node. 2d2d1

FEEDBACK ELEMENTS 2d3

FBCLEAR -- clear the contents of the feedback buffers. 2d3a

The feedback state information and command feedback line are set to their initial or empty position. 2d3a1

ECHO -- appends a noise-word string to the command feedback link 2d3b

ADDR = address of the text string to be appened 2d3b1

RECHO -- replaces the last noise-word string in the command feedback line 2d3c

ADDR = address of the text string which is to replace the last item in the command feedback buffer 2d3c1

VALUE MANIPULATIONS 2d4

LOAD -- loads a pointer to an argument record into the top of the eval stck. 2d4a

ADDR = address of the variable containing the pointer to the argument record. 2d4a1

The pointer value contained in the variable whose address is contained in ADDR is pushed onto the top of the eval stack. 2d4a2

STORE -- saves a pointer to an argument record in a variable 2d4b

ADDR -- address of the variable 2d4b1

The address of an argument record is fetched from the top of the eval stack and is saved in the variable at address ADDR. 2d4b2

ENTER -- enters a constant value into the argument record pointed to by the top of the eval stack. 2d4c

ADDR -- value to be entered (18 BITS only) 2d4c1

The value is taken from the ADDR field of the instruction and is entered into the argument record for the ENTER node in the path stack (whose address is at the top of the eval stack). 2d4c2

FLOW OF CONTROL IN THE INTERPRETER 3

At any point in the process of parsing, the control pointer for the interpreter points to a structure word in the grammar. A path stack also exists which shows the nodes from which TRUE returns

have been achieved. Some operations mark the path stack for halting the backup process. The parser has 4 distinct control states defined as follows: 3a

1) parsing: recognition state where input text is compared with gramatical constructs to determine the parsing path in the parse tree. 3a1

2) backup: A FALSE return has been obtained from some execution/recognition function. The path stack is backed up until a non-NULL alternative path is found, at which time the parse mode is set to parsing, and recognition of the alternative path is attempted. If no non-NULL alternative path is found, then the parse fails and the interpreter returns FALSE. 3a2

3) cleanup: A terminal parse has been achieved and control is passed to each execution routine to reset any state informations set by the routine. 3a3

4) parsehelp: (used only with parsefunctions) Before calling a parsefunction in "parsing" mode, the function is called in "parsehelp" mode to solicit a user prompt string. 3a4

The general flow of control is: 3b

1) An initial path stack entry is constructed, and the parse mode is set to parsing. The execution function for the current node is evaluated. A pointer to the "function state record" is passed to the routine. The state record contains the return values for the function as well as a record of any state information saved by the function (for backup purposes). 3b1

2) If the function returns TRUE, then the successor to the current node becomes the current node. If this is NULL, then the ptrstk stack is backed up until a non-NULL successor path is found. If none is located before the bottom of the current parse state is reached, then the root of a parse tree has been reached, and a command has been successfully executed. In this case the command reset operation is performed and the interpreter is set to "parsing" mode once more. 3b2

3) If the function returns FALSE then the parser mode is set to "backup" and a non-NULL alternative path is sought. 3b3

After a command has been executed, the parsing path for the tree is re-evaluated in "reverse order" beginning with the terminal node of the path. Each execution function is re-invoked, in "cleanup" mode, and is passed the handle for the state

information record which it generated on the forward pass through the grammar. Each execution routine has the responsibility of resetting any state information which it wishes to do at the termination of a command. Cleanup continues until a "starting point" is reached in the parse. This is generally the beginning of the command. At this point, the interpreter "shifts gears" and goes into forward or recognition mode and begins back down the grammar for the language. 3c

The same backup mechanism is also used during command specification in order to back up the parse to allow the respecification of all or part of the command. The command delete function backs out of the parse tree until the beginning of the command is reached. 3d

The same backup mechanism may be adapted to control the partial backup required for executing commands in "repeat mode" where at least one of the alternatives are defaulted to their current values. The process of marking some nodes in the execution path as defaulted is as yet undefined. It seems that it should be possible to identify those execution functions which need not be re-evaluated in subsequent invocations of the command. The interpreter would then be smart enough to skip over defaulted parameters when in the forward or specification phase of the command and would not invoke backup for defaulted parammeters. 3e

APPENDIX 1: USING THE CML SYSTEM 4

WRITING CML PROGRAMS 4a

Source programs for the CML compiler are free form NLS files. Comments may be used wherever a blank is permitted and the structural nesting of the source file is ignored by the compiler. 4a1

COMPILING CML PROGRAMS 4b

CML source programs are compiled into REL files with the Compile File command in the PROGRAMS subsystem. CML is the compiler name for the CML compiler. 4b1

RUNNING CML PROGRAMS 4c

A complete interactive subsystem usually consists of three distinct parts: (1) The syntactic description for the subsystem command language. (2) The parser interface routines ("X" level parsing support routines). (3) Core execution functions. 4c1

If a CML subsystem is to be run as a user program, then the rel

files for the syntax, parsing support, and execution functions are loaded into the user programs buffer with the Load Program command. 4c2

After loading the rel-files the user's subsystem is connected to the set of available subsystems with the Attach Subsystem command. The name specified in this command is the name of handle for the subsystem (the .ID appearing on the SUBSYSTEM statement of the CML program). 4c3

The user's subsystem may then be invoked by using the GOTO command, as the system will now know about the new subsystem. 4c4

FUNCTION INTERFACE PROTOCAL 4d

The syntax of the function call in the CML meta-language is similar to that of most programming languuages: the name of the function is followed by a list of expressions enclosed in parenthesis. In the CML system however, there are some strict rules which apply to all execution functions invoked by the interpreter. These rules are enumerated below: 4d1

1) Additional actual arguments 4d1a

Preceeding any actual arguments which appear in a function reference in CML, the interpreter supplies two additional actual arguments. These are: 4d1a1

1) a pointer to the "function state record" 4d1a1a

2) an integer which defines a parsing mode 4d1a1b

= parsing: normal execution mode 4d1a1b1

= backup: backup after a FALSE path is taken 4d1a1b2

= cleanup: resetting of state after completion 4d1a1b3

of command 4d1a1b4

= parsehelp: soliciting prompts string (parse 4d1a1b5

functions only) 4d1a1b6

These addtional arguments must be used by all execution functions to determine what they are to do. The pointer to the "function state record" is used to return values from the function and to save state information associated with a particular invocation of the function.

The length of the function state record is presently 10 words and this record may be formatted in any manner appropriate to the function. 4d1a2

If 10 words is not sufficient space to record all of the state associated with a particular invocation of a function, then the function must use a storage allocator to allocate the additional storage and record the handles to the allocated storage in the function state record. Note that if this additional "local state" storage is required, then it is the responsibility of the execution function to de-allocaate the local state storage when called in backup or cleanup modes. 4d1a3

2) Returning parse failure 4d1b

All execution functions are passed a pointer to their function state record. If the function processes normally, then it returns the same pointer as its only return value. If the function decides that the parse should fail at a given point, then it returns FALSE. 4d1b1

3) Passing arguments by address 4d1c

All of the actual arguments in a function call on an execution function are passed by address rather than by value. The values actually passed are pointers to the function state records corresponding to the actual arguments. The format of the function state records are defined by the execution functions which manipulated them, and thus the location of parameter values in these records is determined by convention, the caller and callee having previously agreed to a particular layout for the function state record. The layout of the records for the built-in interpreter functions in given elsewhere in this appendix. 4d1c1

4) Order of control 4d1d

An execution function will always be called in parsing mode before it is called in backup or cleanup modes. 4d1d1

A function routine which saves state information in the function state record must initialize its state record to some consistent state before it calls any subroutines which may cause SIGNALS or otherwise cause control to abnormally pass above the execution funtion. 4d1d2

Format of the function state records for the built-in CML recognizers. 4d2

Each of the functions of the CML parser utilitzes the function state records in a locally defined way summarized below. 4d2a

REGOGNIZER	RECORD FORMAT	# WORDS USED	
			4d2b
keyword	word 1: address of keyword str	1	4d2c
viewspecs	word1: updated vs word 1	7	4d2d
	word2: updated vs word 2		4d2e
	words 3-7: vs collection string		4d2f
levajd	word1: level adjust count	7	4d2g
	(u = +1, d = -1, etc)		4d2h
	words 2-7: vs collection string		4d2i
ssel	words 1-2: txt ptr to start of entity	4	4d2j
	words 3-4: txt ptr to end of entity		4d2k
	for type "WINDOW"		4d2l
	word 1: address of display area		4d2m
	word2: x and y screen coordinates		4d2n
dsel	same as ssel		4d2o
lsel	same as ssel		4d2p
confirm	word 1: confirmation code	1	4d2q

APPENDIX 2: SAMPLE CML PROGRAM 5

% the following sample program should help illustrate the use of the CML language for describing NLS commands. % 5a

% the grammar is taken from observation of a hypothetical first grade class in the process of receiving art instruction % 5b

% for a more exhauative example, take a look at (nls,syntax,) % 5c

```
FILE sampleprogram   % CML to sample.rel %                              5d
   SUBSYSTEM sample KEYWORD "SAMPLE"                                    5d1
      objects =                                                         5d1a
         "GLUE" L1                                                      5d1a1
       / "PASTE" L1                                                     5d1a2
       / writingthings;                                                 5d1a3
      writingthings =                                                   5d1b
         "CRAYONS" L1                                                   5d1b1
       / "PENS"                                                         5d1b2
       / "PENCILS";                                                     5d1b3
      COMMAND zuse =                                                    5d1c
       "USE" L1   what ← writingthings                                  5d1c1
         <"to draw a pretty">                                           5d1c1a
           ( whom ← "PICTURE" L1  <"of Aunt Mary">                      5d1c1a1
           / whom ← "SKETCH" L1  <"of your dog"> )                      5d1c1a2
         CONFIRM                                                        5d1c1b
         % call execution routine process the USE command               5d1c1c
           *** commented out for now ***                                5d1c1c1
           xuse( what, whom)                                            5d1c1c2
           ***    *** % ;                                               5d1c1c3
                                                                        5d1c1d
      COMMAND ztake =                                                   5d1d
       "TAKE" L1  what ← objects                                        5d1d1
       <"out of your">                                                  5d1d2
         where ← ("EARS" L1  / "NOSE" L1  / "MOUTH" L1 )                5d1d2a
```

```
        <"PLEASE "> CONFIRM;                                    5d1d3

    END.                                                        5d2

FINISH                                                          5e
```

APPENDIX 3: SAMPLE INTERPRETER PARSEFUNCTION ROUTINE 6

Assume that in some command we want the typein of a number to appear as an alternative of some set of keywords. We can accomplish this by defining a parsefunction (call it looknum) which looks at the next input character and succeeds if the next character is a digit and fails otherwise. If we write this function as the first alternative in some command, then control will pass from the interpreter to the parsefunction before it passes to the keyword interpreter. 6a

Suppose our command looks like: 6b

```
COMMAND sample =                                                6b1

    "INSERT" L1                                                 6b1a

        ( looknum( ) <"number">  ent ← #"NUMBER"                6b1a1

        / ( ent ← ( "TEXT" L1  / "LINK" L1 ) ))                 6b1a2

        % entity now contains an entity type ( NUMBER, TEXT, or
        LINK ).  We now use the LSEL function to get a selection
        of this type %                                          6b1a3

            source ← LSEL( entity)                              6b1a3a

        % get a command confirmation %                          6b1a4

            CONFIRM                                             6b1a4a

        % now invoke the insert execution function passing as
        arguments the entity type and the selection of that type
        %                                                       6b1a5

            xinsert( entity, source);                           6b1a5a
```

Now take a look at the parsefunction looknum which is called by the interpreter both when prompting the user and also during the actual parse of the command . 6c

```
    % LOOK FOR A NUMBER %                                       6c1
```

```
(looknum) PROC(                                                    6c1a

   % looknum looks at the next input character, if it is a
   digit, then a true return is taken else FALSE is returned
   %                                                               6c1a1

   % FORMAL ARGUMENTS %                                           6c1a2

      resultptr,       % ptr to the function state record %       6c1a2a

      parsemode,       % parsing mode for the interpreter %       6c1a2b

      string);         % ptr to prompting string %                6c1a2c

   REF resultptr, string;                                          6c1a3

   %------------%                                                 6c1a4

   CASE parsemode OF                                               6c1a5

      = parsing:                                                   6c1a5a

         CASE lookc( ) OF                                          6c1a5a1

            IN ['0, '9]:                                           6c1a5a1a

               NULL;                                               6c1a5a1a1

         ENDCASE RETURN (FALSE);                                   6c1a5a2

      = parsehelp:                                                 6c1a5b

         *string* ← "NUM:";                                        6c1a5b1

   ENDCASE;                                                        6c1a6

   RETURN (&resultptr);                                            6c1a7

   END.
                                                                   6c1a8

                                                                   6c1a9
```

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Network Information Center: Goals, Problems, Requirements

ABSTRACT 1

This paper discusses my views on the short-term and long-term future of the NIC as an information service organization for network users: 1a

what are the premises about the NIC's existence,
what should be the overall framework for the NIC,
what are the consequences of the present ARC/NIC relationship,
what courses of action are recommended to improve the quality of the NIC, its relationship to ARC, and its services. 1a1

It is my hope and intention that the reader will view this as a kind of "white paper": I believe I am raising issues which are in the best interests of ARC and the NIC to have raised at this time. 1b

The primary purposes of this paper are 1) to be a catalyst for further discussions on these issues, and 2) to result in decisions being made on these issues, which are central to the Network Information Center's short-term and long-term future. 1c

For background information, please read: 1d

Framework for NIC Evolution:
(RWW --KJOURNAL,11005,1:wy) 1d1

NIC Proposal to ARPA No. ISU 73-128:
(MDK --KJOURNAL,18369,1:wy) 1d2

On ARC/NIC Relationships:
(RWW --LJOURNAL,19870,1:wy)
(JAKE --LJOURNAL,19874,1:wy) 1d3

CONTENTS 2

1) The Network Information Center exists to serve users of the ARPA Network. 3a1

Overall direction and guidance for the Network Information Center is assumed to come directly from ARPA, or whomever they designate, and indirectly from the ARPA Network user community. (Whether this is true in practice is debatable.) 3a1a

2) There are two main reasons that ARC volunteered to provide NIC services: 3a2

a) ARC views NIC as prototypical of community-oriented, network-based information services of the future, and 3a2a

b) ARC believes that benefits accrue to it (ARC) from the cycle of "creation/ development/ operations/ feedback" that providing these facilities to the Network community entails. 3a2b

3) There are both positive and negative aspects to the NIC's presence within ARC. 3a3

These aspects must be fully understood and accepted by everyone involved in the NIC's management, or else changes

acceptable to everyone have to be made within the present setup, in order that the NIC may continue its existence at ARC with benefit to the Network community. 3a3a

4) The questions that seem most important to me are: 3a4

a) What are the goals and objectives of the NIC, and what problems exist to hinder attainment of these ? 3a4a

b) What will make the ARC/NIC relationship more satisfactory? what alternatives are there to NIC staying within ARC, and what are the implications of these alternatives? 3a4b

RECOMMENDATIONS 3b

Actions that I believe are required to make the Network Information Center a more viable instrument of ARC and of the Network management than it can possibly be under the present arrangements, are these: 3b1

1) Define a working relationship among ARPA, ARC, and the NIC that will enable goals, objectives, services, and schedules to be set, supported, implemented, and reviewed in a timely manner. 3b2

a) NIC's basic services must be diminished in scope, and special-interest communities must be provided with services tailored to their needs (these services to be provided initially both by the NIC and by the ARPA Community Information Service, or ACIS, an outgrowth of the NIC); 3b2a

b) NIC and ACIS must be made a primary aspect of ARC, and declared and recognized as such in ARC. This entails, for example, that NIC problems and needs with respect to NLS software limitations (as discussed in the body of this paper) must receive top priority for resolution and implementation within ARC. 3b2b

c) The NIC and ACIS budgets must be administered separately from ARC's, with separate account numbers and separate manpower and expenditure reports prepared monthly for the NIC manager. 3b2c

d) We should explore with ARPA how best to fund individuals at other sites who are part-time working members of the NIC and/or ACIS. 3b2d

2) The NIC and ACIS must acquire full-time high caliber staff

that will enable them to satisfy many of their own priorities and provide services in a more responsive, timely, and effective manner than possible under the present groundrules. 3b3

3) The NIC and ACIS must provide categories of services based both on anticipated and known user needs and user willingness to pay for the services. 3b4

4) The services of the NIC and ACIS must be made available on all Tenex systems, and eventually on all other hosts that are willing to make space for this. 3b5

5) ARC and NIC/ACIS must establish mechanisms for ensuring continued evolution of services based on user needs. 3b6

Part I: BACKGROUND 4

ARPANET 4a

The character of the ARPA Network and its planned future has significantly changed since it was initially conceived, and since SRI-ARC voluntered to run the Network Information Center. 4a1

The initial plan was for a small number of research sites (approximately 12) to be experimentally interconnected. The present number of sites is around 50, and is growing at an increasing rate. Use of the Network is no longer confined to independent research activities, but is broader in scope, in mission, and in degree of inter-connectedness among the users. 4a2

It appears certain from this growth that the ARPA Network will undergo a transition to a national computer network which will have many computers and terminals directly inter-connected, and which will have links to other networks. 4a3

In addition, use of the ARPA Network's facilities will no longer be directly subsidized by ARPA, but will be funded on a per-usage or subscription basis. Special interest communities of individuals and organizations will demand and obtain facilites tailored to their particular needs. 4a4

NIC and ACIS 4b

With all these changes evolving on the Network, the Network Information Center must evolve also. 4b1

The NIC's primary emphasis up till now has been to provide a uniform level of experimental services to the entire network community. We must now acknowledge and respond to the need to

become more service oriented towards special interest groups using the network, while still maintaining our evolutionary, experimental posture. 4b2

The NIC must be able to provide the services required by special interest communities, in a competitive market. To accomplish this, we have proposed to ARPA that a separate entity --- the ARPA Community Information Service (ACIS) -- be formally established and funded as an outgrowth of the NIC. 4b3

> There will be other information centers, on various scales of complexity, that will be competing with the ACIS for customers, funds, and prestige. Problems of service packaging, advertising, selling, reliability, responsiveness, evolution therefore will have to be dealt with by ACIS in a competitive environment to ensure survival. 4b3a

Correspondingly, the present NIC must reduce its basic services to a minimum, in order to provide indispensable, timely, yet inexpensive services for a large number of users, all of whom will be REQUIRED to pay for the basic services as part of the Network "overhead". 4b4

And simultaneously, the NIC and ACIS must continue to use and where necessary develop state of the art concepts and techniques, exploiting both network and computer technology in an innovative way. The penalty for not doing so is that others will fill the vacuum, and we would at best become a service-bureau type of operation. 4b5

> The problems of information interchange in a network environment, and of understanding and evolving what should constitute an information center in such an environment, would still exist and we would have failed to contribute towards their resolution. 4b5a

In my opinion, these general challenges --- namely, (a) competitive services tailored to the needs of special interest communities, (b) minimum but indispensable services to the Network at large, and (c) continued emphasis on innovative use and development of Network and computer technology for information centers --- require a change in the present framework of the Network Information Center. 4b6

It is the purpose of this paper to describe the changes I feel are necessary, and to describe those objectives, tasks, priorities, problems, and resource requirements of the NIC and ACIS that are necessary to meet the above challenges. 4b7

Part II: FRAMEWORK for the NIC and ACIS 5

PURPOSES 5a

There are four main purposes for an information center serving Network users: 5a1

1) to facilitate collaboration among special-interest user communities on the Network; 5a2

2) to provide Network users with a useful, usable set of dialogue support services; 5a3

3) to provide Network users with useful. usable reference information about Network resources; 5a4

4) to develop prototypical services for use in future, similar network-oriented information centers. 5a5

SERVICES 5b

In order to accomplish these purposes in a way that user acceptability and response can best be monitored, we have decided that the services should be offered in two distinct modules: 5b1

- The NIC Module: a "basic" service package which all user organizations would be required to subscribe to and would use as part of the overhead services of the Network; plus, one or more "optional" service packages available on a subscription basis to Network organizations. 5b2

- The ACIS module: one or more "optional" service packages which would be available only to those user organizations and communities that subscribe to these packages. 5b3

(These service packages are described in the next section. For each service package, a user organization or community would pay a fixed rate plus certain yet to be determined incremental charges to ARPA, and those funds would be transferred to the NIC or ACIS operating budget.) 5b4

ACCESS 5c

Basic to a viable information center is that its facilities must be available and accessible by any user without restriction, provided only that the user is a bona fide "paid member" of the center's community, i.e., is entitled to the services he's using. 5c1

This goal is not satisfactorily realized under the present circumstances. 5c2

The information center's users cannot be limited to accessing only ARC's or the Utility's computer system. They must find NIC and ACIS facilities distributed and in most cases duplicated, on as many different Network hosts as practicable, in particular on all Tenex systems. Otherwise, these facilities will simply prove to be unusable, and alternatives (competitive information center facilities) will be sought and found. 5c3

COMMUNITIES 5d

As stated earlier, the emphasis of the NIC and ACIS, especially the latter, must shift to accommodate the needs of special-interest communities of research, development, and eventually application users of the Network. 5d1

Because of the prototypical nature of this concept, and the research and development needed to perfect the modes and services by which individuals in communities relate to one another, there is initially a need to establish and work closely with a community of information center builders who have problems and goals in common with those of the ACIS. 5d2

The NIC and ACIS must each cultivate the formation of such a community of information services. 5d3

They must take whatever reasonable steps are deemed necessary to collaborate with other information centers and research groups in the development of the services, techniques, etc. needed for network-oriented information centers. 5d4

And they must also systematically plan to have their functions and services distributed over the Network, so that no user is constrained to logging in to a single system to use these services. 5d5

LONG RANGE GOALS 5e

The evolution of a network-oriented information center should be directed towards the use of new techniques of providing and disseminating information, and towards the implementation of new services that are not practicable to provide without network and computer technology. 5e1

Among categories of service that are reasonable candidates for future information centers to provide, are 5e2

- private consumer services 5e2a

  such as storing and forwarding of private communications, and other collaborative interchanges of information (educational material, professional reports, advertising, etc) 5e2a1

- advanced high-quality document production facilities 5e2b

  to handle graphics, photographs, color, font varieties, xerox documents, microfiche and other micro storage forms 5e2b1

- facsimile transmission facilities 5e2c

  to allow for inexpensive, rapid transmission of documents over long distances 5e2c1

- educational CATV facilities 5e2d

  especially, information about what is available through the networks and how to use it 5e2d1

We anticipate that whole new classes of users will be attracted to the use of such services. Among such classes of users, a network-oriented information center should anticipate communities and users of sub-networks such as 5e3

AP, UP, ...
universities, research centers, ...
corporations, private industry, ...
educators, administrators, ... 5e3a

The present paper on NIC and ACIS evolution is of course but a small first step toward the evolution of an information center capable of providing these types of services to such broad user communities. Much research is needed to understand the economics, technically feasible solutions, and socio-psychological problems involved. 5e4

We don't understand these problems at this time, and our program isn't ambitious enough at this time to reach significant results in a short time. But we must emphasize that these longer-range goals are part of the evolutionary framework within which the present paper is offered. 5e5

EVOLUTION 5f

The NIC and its outgrowth, ACIS, must evolve to become users of ARC services (such as the Utility, Analysis, and Development)

by choice, not by default. They must be managed and funded in such a way that they can and do utiliize whatever network and computer facilties best suit their purposes. In many cases, the facilities used will no doubt be those of ARC, since those are clearly the most advanced, integrated information handling facilities available at this time. 5f1

The prevailing situation of the NIC as an extension of ARC is, however, basically an unhealthy one under the current ARC/NIC manpower and resource constraints. This is the source of considerable difficulty and inability to respond to users. It also constitutes a barrier to meeting the three challenges outlined above. 5f2

The reasons for this will be presented later. Here we want to point out that a better relationship among ARPA, ARC and NIC management must be developed, if the NIC and ACIS are to be able to recognize and respond to the information service needs of the network's users in a timely, effective way. 5f3

One goal of a plan for NIC's (and ACIS's) evolution is therefore to slowly make more explicit the separate nature of NIC from ARC, and to formalize and make clearer its boundaries and interface to ARC. 5f4

This plan should contain such steps as are needed for both NIC and ARC's growth and health. 5f4a

The key constraints that NIC must presently operate within --- 40% of ARC's computer resources, and 30% of ARC's other resources --- are too limited to accomplish the overall goals defined in this paper. 5f4b

In expansion beyond these resources NIC clearly has to obtain further funding from ARPA or other sources. Funding for operational support from other sources, namely from the users of ACIS and NIC services, is in the planning stages at the time this is being written. Funding for research and development should continue to come from ARPA (this subject will be covered in a subsequent paper). 5f4c

Part III: NIC and ACIS FUNCTIONS 6

The services offered and under development have as their basic objectives: 6a

1) To help people with needs find the people, system, or information associated with work going on over the network that can help them meet their needs. 6a1

2) To help a geographically distributed group collaborate with each other to meet common goals. 6a2

This implies aids to a flow of dialog, planning, documentation, training. 6a2a

3) To be a constantly innovating service. 6a3

4) To be an information service that meets high standards of ethics in its information handling and policies. 6a4

5) To cooperate and interface to other information services which come on the network or want to make contact with the network. 6a5

6) To have adequate capacity and reliability to provide a dependable, available service. 6a6

7) To move toward self-sufficiency financially. 6a7

NIC FUNCTIONS 6b

Basic Services 6b1

1) NIC Idents - A NIC ident and associated address information would be maintained for every individual belonging to a Network user organization. This would allow all individuals to use the facilities of the ARC Journal (as described in #2 below) and to be listed in the Network Directory. 6b1a

2) Journal Usage - Every individual who has a NIC ident would be allowed to use the Journal for un-recorded dialogue (the advantage of use over other mail systems being the Journal's more general distribution mechanisms). 6b1b

3) Network Directory - One copy (desk-sized) would be sent to every individual who has a NIC ident. Contents would be address and phone data on individuals and organizations, as well as brief summary tables of characteristics of servers, users, tips, and other resources available on the Network. 6b1c

4) Arpanet News - One copy would be sent to every individual who has a NIC ident. 6b1d

5) Network Protocols Notebook - One copy (with updates) would be sent to every Network user organization. 6b1e

Optional Services 6b2

1) Resource Information 6b2a

This service package would include the following facilities (listed in the order of priority in which these items would become available as ACIS services): 6b2a1

a) on-line access to the NIC/QUERY system for use of the Resource Notebook, the ARPANET News, and the dialogue indexes. 6b2a2

b) distribution of the comprehensive edition (more extensive in data coverage than the desk-sized edition) of the Resource Notebook to all members of subscribing organizations 6b2a3

c) use of the ACIS Resource Information Center for specific answers to specific individual queries about available resources, data banks, programs, etc. 6b2a4

d) access through the NIC/QUERY system (or in some other way through the NIC) to information data bases distributed around the Network, such as HELP systems 6b2a5

2) Document Subscriptions 6b2b

This service package would initially offer subscriptions on an annual basis for additional copies of general-interest NIC publications, such as
Arpanet News
Network Directory
Protocols Notebook
Resource Botebook
RFC's 6b2b1

ACIS FUNCTIONS (Optional Service Packages) 6c

Initially, the ACIS function would be to provide Dialogue Support for Special Interest Communities, including a community of "network-oriented information-centers". 6c1

This service package would include the following facilities (listed in the order of priority in which these items would become available as ACIS services): 6c2

1) use of the Journal for recorded dialogue, i.e. storage, indexing, and transmission of documents 6c3

2) on-line access to the NIC/QUERY system for use of the Resource Notebook, the ARPANET News, and the dialogue indexes. 6c4

3) maintenance and distribution of membership lists to all members of a subscribing community 6c5

4) preparation and distribution of community newsletters, such as the SIGART Newsletter 6c6

5) distribution of indexes for a subscribing community's dialogue to all members of that community 6c7

6) utilization of the community "architect" to assist in analyzing the community's information needs, and in determining how the ACIS may help satisfy these needs 6c8

7) abstracting, cataloguing, and distribution services for external documents of interest to a particular community 6c9

8) high-quality production of documents 6c10

FURTHER NIC and ACIS DEVELOPMENT 6d

In line with the purposes and goals listed earlier, I believe that the following additional capabilities should be added over the next five years. These items are listed in order of priority, as best as can be determined at this time. No attempt is made here to distinguish NIC needs from ACIS needs, as the needs of each overlap at this time to a great extent. 6d1

1) Resource Information 6d2

a) facilities for the staff to use any Network system (such as UCSB or the Data Computer) and not be fundamentally tied to NLS 6d2a

b) comprehensively indexed files (on-line and off-line) that describe both network and network-related resources. 6d2b

These files would be the evolutionary outgrowth of the "resource information center", or "reference desk", approach to satisfying user queries (a description of this approach is given in the Proposal to ARPA cited earlier). 6d2b1

For on-line access, there would be a user-oriented query language that evolved from the present language, based on experience gained through the "resource information center". 6d2b2

For off-line access, copies of the documents and indexes to them would be produced at the NIC and distributed

through a government center such as NTIS (National Technical Information Center). 6d2b3

c) more comprehensive user identification files, including: 6d2c

interest profiles to provide a basis for selective document dissemination 6d2c1

account, project, and billing information for Network resource billing algorithms 6d2c2

d) facilities to interconnect users to every computer system providing basic reference information. and to other networks that are accessible through the ARPA Network, for example to Lockheed's "DIALOG" system. These facilities should be based on a new high-level network protocol for compatibility with other resource sharing systems. Some proposed aspects of these facilities which would make it user-oriented are 6d2d

a high-level language for making these connections; 6d2d1

accessibility to the language from within other subsystems to facilitate resource sharing; 6d2d2

provisions in the language for user account, project, and billing information to be passed on and/or verified as connections are being made; 6d2d3

2) Dialogue Support 6d3

a) storage and retrieval systems distributed over the Network, for archival storage, document storage, storage of indexes, storage of user identification files. 6d3a

b) on-line access to high quality, human-engineered document production capabilities for formal Journal publication, and other professional publications. 6d3b

These facilities should be able to handle input from many text-handling systems, on-line or off-line (e.g., IBM MagCard, ATS, Multics, etc). 6d3b1

c) interfaces to other dialogue support systems, for example teleconferencing systems. 6d3c

3) Document Subscriptions to documents generated by other hosts. 6d4

Part IV: IMMEDIATE PROBLEMS and PRIORITIES 7

The problems are listed here in three main categories: Management Problems, Technical Problems, and ARC/NIC Problems. 7a

All the Management problems listed here are serious, and require immediate attention and solution. Without a solution acceptable to all concerned, the NIC and ACIS cannot fulfill the goals described in this paper. 7a1

All the Technical problems listed here present serious impediments to the NIC and ACIS getting their work done on the ARC (or Utility) computer system. The sooner these problems are resolved, the sooner will the goals described in this paper become realizable. 7a2

The problems stemming from the ARC/NIC Relationship can only be resolved if the ARC/NIC relationship is modified. Why this is so, and what I propose we do about it, is discussed in this section. 7a3

7b

MANAGEMENT PROBLEMS

One fundamental problem is to reach agreement among the NIC, ARC, and ARPA as to what the NIC and ACIS are: what their goals and objectives are; how they get support; how they are managed and coordinated within the context of the entire Network community. 7b1

ARPA must recognize that an undirected, uncoordinated NIC and ACIS is not in the Network's best interests, and take appropriate steps to correct the present situation; 7b1a

ARC must recognize that NIC and ACIS success is critical to ARC's success, and take steps necessary to significantly improve the present relationship between ARC and NIC (discussed further below). 7b1b

Another fundamental problem is the caliber and availability of the NIC and ACIS staffs. 7b2

During the past year, there have been various estimates of the number of people working for the NIC. 7b2a

The estimates always range from 8 to 10 or so. 7b2b

In fact, there are THREE full time people (MDK, EJF, MLK), together with lots of parts of others whose allegiance, availability, or caliber has often proved unsatisfactory. 7b2c

The NIC and ACIS must have a high-caliber, full-time staff

to carry out their goals. A nucleus of the type of staff required is discussed later more fully. 7b2d

A third fundamental problem which the NIC and ACIS face is to maintain a clearcut distinction between practicality and generality, and to identify and deliver, on a practical basis, a minimum level of needed services. 7b3

This does not say that R&D isn't needed; much is (see above). 7b3a

But there are some elementary service requirements which have to be delivered with utmost practicality. Examples of this currently are the Network Directory, the Resource Notebook, and the Catalogues to Journal dialogue and external documents. The current designs (which are being revised) are too general and, it seems to me, reach an audience which is too small for the effort involved. 7b3b

Other problems exist in these areas (discussed more in the subsection on the ARC/NIC relationship, below): 7b4

- Need for "pay-as-you-go" mechanisms coordinated with ARPA/RML. 7b4a

NIC and RML are just beginning to develop mechanisms for obtaining funding from users for the NIC's operational services. 7b4a1

- Lack of clear-cut responsibilities within ARC vis-a-vis NIC for funding and accounting. 7b4b

- Need for centralized physical space for hardcopy documents and indexes: something that LOOKS like an information center, and makes NIC and ACIS filing problems more manageable. 7b4c

TECHNICAL PROBLEMS 7c

Basic NLS Problems 7c1

There are a number of areas where improvements to the present NLS system are needed, in order to improve the augmentation facilities that are depended upon by the NIC and ACIS staffs. Among these (in order of priority) are: 7c1a

- bug-fixing in NLS (for example, the perennial problem of inconsistent results with "tabs") 7c1b

- programming needs in Ident system, for example: 7c1c

  more efficient handling of ident system deadwood, 7c1c1

  identfile inversion (especially, to show groups per individual; and liaison, station agent, and principal investigator per organization) 7c1c2

  expansion in the facilities for handling Organizations, for example there is a need for organization subcategories within the identfile: user, server, tip, associate, independent 7c1c3

- capabilities for files to be readable both on-line and off-line (i.e., making output processor and COM directives be invisible to the on-line viewer) 7c1d

- efficient output processing (with option to defer execution) 7c1e

- augmentation of the process of indexing documents 7c1f

- efficient handling of large files 7c1g

- efficient content-searching 7c1h

Problems Magnified by NIC and ACIS User Needs 7c2

There are several areas where additional (or significantly improved) facilities are needed within NLS. These areas, listed here in order of priority, include: 7c2a

- the availability of system resources, such as disk space for the Catalogue system, and login quotas commensurate with NIC budget and with NIC user and staff needs. 7c2b

  archiving and disk space management in general need to be improved, so that the present "eternally tight space" syndrome can be better controlled and managed 7c2b1

- access through the NIC/QUERY system to reference and dialogue support documents residing in NLS (and ultimately, other system) files 7c2c

  most NLS files are currently accessible only through the NLS command language 7c2c1

- the efficiency of certain critical NLS subsystems needs significant improvement, for example the Catalogue System,

Output Processor, Content Analyzer, and more generally the handling of large files. 7c2d

many NIC and ACIS processes must be run at night, simply because the above mentioned subsystems and processes place too much drain on the ARC system resources to allow daytime running; this places constraints on NIC staff processes which must be alleviated 7c2d1

- the Journal --- in which particularly outstanding needs are for 7c2e

file privacy, including a notation on the document so that the Catalogue system can respect the privacy wishes of the author; and 7c2e1

a "cross-referencing" or "back-linking" of each document, including notations available when reading the original document, so that the reader can tell that any given document has been "obsoleted", "updated", or simply "cited" by documents x, y, z, ..., (A suggestion for satisfying these requirements is in preparation, and will be journalized shortly.) 7c2e2

- more use of other Network systems in a resource sharing context, for distributed file storage as well as access to other files and data bases. 7c2f

- transportability of many of the NIC's data bases and of the Query language, so that they are available for use on other Network systems, both Tenex and (eventually) non-Tenex. 7c2g

PROBLEMS STEMMING from the ARC/NIC RELATIONSHIP 7d

In this section, the positive and negative aspects of the NIC's relationship with ARC are discussed. Though no mention is made of ACIS (primarily because it didn't exist at the time of this writing), all the comments would apply equally to ACIS, were it in the situation of the NIC for the past two years. 7d1

A concluding section gives recommendations which are strongly believed to be the minimum necessary to improve the relationship for the benefit of both ARC and NIC. 7d2

A. Negative Aspects of the present ARC/NIC Relationship 7d3

Demand 7d3a

ARC's computer, people, and terminal resources are taxed by the addition of the NIC users, who are not directly associated with the knowledge workshop R&D effort. 7d3a1

The NIC users need a reliable, stable, service-oriented system rather than an R&D system in which changes are relatively frequent, and in which the ARC staff is not oriented to interfacing with users' requests and complaints. (The use of the Utility should improve the present situation in this regard.) 7d3a2

In addition, the NIC staff, in carrying out its operational requirements, is less able to do so in an R&D environment than in a stable one. 7d3a3

Priorities 7d3b

Because it relies on the ARC system, the NIC is obliged to request changes that might not be high on ARC's priority list. Subsequent frustration sets in at ARC if its resources are diverted from its own priorities, and at the NIC if its priorities are not satisfied. 7d3b1

Yet, ARC's developmental priorities must include the needs of the NIC in a timely fashion, or else the credibility of the NIC is impaired, and with it that of ARC. 7d3b2

This can have the effect of "slowing down" the overall R&D effort at ARC, unless the NIC's priorities are recognized by ARC as being fundamentally important to its (ARC's) R&D effort. 7d3b3

Computer Facilities 7d3c

The computer facilities aren't always reliable or available (this situation has been steadily improving, however). They are subject to change and/or persisting errors; for example the problem of "tabs" and the continuing changes, some minor, some not, to the command language and some of the subsystems. 7d3c1

The NIC relies on the ARC system for its daily operational work, and the instabilities sometimes significantly hamper this work. 7d3c2

The slowness of ARC to commit resources to correct and/or change subsystems that the NIC depends upon has resulted in some unattractive, undesirable compromises, such as

doing some of the report formatting and record keeping by hand. 7d3c3

The basic problem is that NLS wasn't designed expressly to meet the NIC's needs, and solutions that were added on to do so have not been given the continuing attention that other ARC/NLS problems have received. 7d3c4

Working Environment 7d3d

The split in attitudes between the NIC staff and the ARC staff regarding the urgency of serving the NIC's user community has been less than satisfactory for the NIC. 7d3d1

This divergence of viewpoints and priorities has been felt especially in the Catalogue system. This system has not been assigned to any programmer (to my knowledge), and is therefore un-responsive to changing NIC needs. 7d3d2

(A separate document is being prepared to describe the shortcomings of the Catalogue system from the NIC's viewpoint. That document will also contain a description of design requirements for a Catalogue system that the NIC could utilize with much more effectiveness than it does the present one.) 7d3d2a

The divergence has also been felt through poor, and often nonexistant, interchanges between NIC and ARC in the areas of 7d3d3

- Group Allocation assignments for access to the computer system; 7d3d3a

- changes to the Journal system, the Output Processor, and some aspects of the command language; 7d3d3b

- loose accounting procedures, sometimes resulting in improper charges to the NIC or to ARC (e.g., phones, COM, NICPSO); 7d3d3c

- personnel assignments. 7d3d3d

Exposure 7d3e

The fact that the NIC has been used to expose non-NLS users to ARC's system is not always satisfactory, from the NIC's standpoint. 7d3e1

The main drawback is that the NIC/ARC distinction becomes

blurred, both within ARC and outside ARC. In fact, the NIC and ARC have been serving separate clientele, for basically separate reasons, with separate end products. Only the means, not the ends, have not been separate. 7d3e2

The use of the NIC to foster NLS results in undesireable conclusions among the ARC staff as to the urgency and legitimacy of NIC's needs. 7d3e3

And it results in undesireable conclusions among persons outside of ARC about the willingness of the NIC to provide the services its clientele needs. 7d3e4

B. Positive Aspects of the present ARC/NIC Relationship 7d4

Feedback 7d4a

NIC provides feedback that ARC needs in order to make appropriate decisions on issues critical to an applications environment. This feedback embraces at least the following areas: 7d4a1

- experience in design of NLS and its subsystems that are used by persons who are not committed to full-time NLS usage, for example: 7d4a2

what additional features are needed in the command language, 7d4a2a

what attributes the HELP subsystem should have, 7d4a2b

what provisions should be made for file privacy, for report production, for journal access, for user identification. 7d4a2c

multi-file processing (a need for a macro language that combines the NLS commands to provide high-level power in a natural, user-oriented way), 7d4a2d

accounting, 7d4a2e

human-engineering (especially in hardcopy output processing, file protection, and designing and invoking user programs), 7d4a2f

management of large files, and of large numbers of files. 7d4a2g

- experience in dealing with communities of users, for example: 7d4a3

  what services are required,
  which are desireable,
  which are not used,
  how to charge and bill users. 7d4a3a

Exposure 7d4b

The NIC has been used to expose non-NLS users, and non-Network users, to the fundamental ARC/NLS principles of a knowledge workshop: spectrum of facilities, organization of information, interface to other systems and subsystems. 7d4b1

This has lead to increased interaction with network and other research groups, and to incorporation of some of their ideas, as well as to interfacing with the facilities of others. 7d4b2

It has on occasion also provided useful feedback from non-NIC, non-ARC users of NLS. 7d4b3

And the hope has been (though not yet realized) that it would lead to new customers for the Utility. 7d4b4

Computer Facilities 7d4c

The availability of advanced, high-quality text entry and dissemination facilities makes ARC's system highly useful to the NIC staff needs. 7d4c1

Report production capabilities in the Output Processor and COM are the state of the art, and are flexible enough to accommodate most of the NIC's present needs, the main exceptions being 7d4c2

- the need for documents to be readable both on-line and off-line, i.e., the need to make "directives" invisible to the on-line viewer, and 7d4c2a

- the need for much better operational characteristics: the present design and constraints are extremely unsatisfactory (e.g., it uses intolerably large amounts of CPU time) for files of the size the NIC processes. 7d4c2b

The Journal system for dialogue support is a solid start towards satisfying the needs of the Network community. 7d4c3

Further development is needed in file privacy provisions, selectively disseminated correspondence, and in making recording and indexing for reference purposes be optional. 7d4c3a

Working Environment 7d4d

The environment of top-quality technical personnel and favorable working conditions, plus a feeling of "this is where it's at", is of significant benefit to the NIC's staff. 7d4d1

C. What will make the ARC/NIC relationship more satisfactory ? 7d5

a) NIC must be made a primary aspect of ARC, and declared and recognized as such in ARC. 7d5a

- ARC must adopt the policy that NIC operations must become a clearcut successful application of ARC technology and of Network technology. 7d5a1

- ARC development must be responsive to NIC's needs in a timely manner, with NIC needs taking at least equal priority with any other effort at ARC. 7d5a2

b) NIC's budget must be administered separately from ARC's. 7d5b

- The NIC manager must be able to set and carry out work according to the NIC's priority requirements, with minimal conflict with ARC. 7d5b1

He must have his own staff to handle the NIC operational problems and the short-term (two-year) NIC developmental problems. 7d5b1a

- Detailed monthly and quarterly progress reports should be provided to the NIC manager, showing NIC problems, expenditures, and accomplishments. 7d5b2

c) NLS should not be considered a facility that the NIC is offering its clients. 7d5c

- the NIC offers online access to its data bases through the NIC/QUERY system for browsing, not for text creation or manipulation. (The QUERY system is necessarily based on NLS at this time, but this doesn't preclude its being

adaptable to other systems elsewhere on the Network.) Files submitted to the Journal, and eventually to the Output Processor, should be done so via FTP, not via direct log-in to the ARC systems. 7d5c1

- use of NLS and directory space at the ARC and Utility systems should be considered an SRI-ARC administrative problem, not a NIC one. Users can negotiate with ARC or any other host on which they want facilities other than use of NIC/QUERY. 7d5c2

Part V: STAFFING REQUIREMENTS 8

GENERAL REMARKS 8a

Qualified persons are needed to fill the following functions within the NIC and ACIS: 8a1

Support of Network users: 8a1a

1) Stimulating the use of and interest in the ARPA Network; 8a1a1

2) Supporting dialog among selected Network user communities; 8a1a2

3) Providing reference information about Network resources and facilities; 8a1a3

4) Developing prototypical services for use in future, similar network-oriented information centers. 8a1a4

Technical Support within NIC 8a1b

for such things as File Design, Document Design and Layout, Programming for Document Production, and Interactive Systems Programming (Query, Locator, Ident) 8a1b1

Business Support within NIC 8a1c

for things like Subscription Handling, Document Production, Document Distribution, and Billing. 8a1c1

There are three main types of positions (a nucleus of at least 8 staff members) that I think are required to fill these functional needs within the NIC and ACIS: 8a2

One Community Architect,

Five Information Processing Analysts.
Two Programmers 8a2a

The qualifications of these persons, and specific types of duties they would perform, are given in the following paragraphs. 8a3

COMMUNITY ARCHITECT 8b

Required experience and capabilities: 8b1

Must have two or more years' experience in the use of computers for information processing problems. 8b1a

Must be mature enough to understand the needs of discipline- or mission-oriented research groups that use the ACIS (ARPA Community Information Service). 8b1b

Must be personable and tactful, as well as intelligent, in order deserve the trust and respect of many diversely motivated individuals. 8b1c

Must be able quickly to become thoroughly familiar with the capabilities, potentials, and limitations of NLS and the PDP-10. 8b1d

Must be curious and capable of understanding all other aspects of the work, including relevant aspects of 8b1e

- the ARPA Computer Network,
- its overall resources and key personnel,
- principal computer systems attached to the Network,
- and the uses that people make of the Network and its resources. 8b1e1

Responsibilities and duties: 8b2

The community architect will be responsible for analyzing the information support needs of the groups in the community, and for helping to design and to evolve feasible technical and contractual solutions. 8b2a

He must therefore be someone who is capable of analyzing and understanding the community's information needs, and understands the ways in which the ACIS can serve these needs. Two key aspects bearing on this function are: 8b2b

1) The community's members are distributed geographically,

working on common problems. They may require a wide variety of information services. 8b2c

2) The technology of NLS, SNDMSG, FORUM, other systems, and the ARPA network in general makes coordination and collaboration among the members of such a community much more effective than heretofore possible. Together, this technology provides a unique mechanism through which the appropriate information services can be delivered and further developed. 8b2d

Central to this role is the problem of transferring the technical ability to use this technology. Ideally, the technology should become an integrated tool in the routine procedures of the groups. 8b2e

INFORMATION PROCESSING ANALYSTS 8c

Senior Information Processing Analyst 8c1

Required experience and capabilities: 8c1a

Three or more years' experience in the use of computers (preferably time-shared computers) for information processing, including interfacing with users who have or need information. 8c1a1

One or more years' experience managing or supervising professional (i.e. degree-holding) individuals. 8c1a2

Responsibilities and duties: 8c1b

Primary area of responsibility is the Network Resource Information Center. Responsibility includes: 8c1b1

- defining the division of work among, and supervising the work of, two Information Processing Analysts; 8c1b2

- coordinating the design, production, publishing, and distribution of, and collection of fees for, bibliographic and reference reports; 8c1b3

- recommending changes in computer systems software and database design to satisfy the needs of the Network Information Center in its mission to provide telecommunications, dialogue, and reference support. 8c1b4

Information Processing Analysts 8c2

Required experience and capabilities: 8c2a

Must have two or more years' experience in the use of computers for information processing problems. 8c2a1

Must be pleasant, patient, responsive, and prompt when dealing with requests for information. 8c2a2

Must have a natural ability to organize and file large amounts of information for quick retrieval. 8c2a3

Must be curious and capable of understanding all aspects of the work, including relevant aspects of 8c2a4

- the ARPA Computer Network,
- its overall resources and key personnel,
- principal computer systems attached to the Network,
- and the uses that people make of the Network and its resources. 8c2a4a

Must be willing and able to work in a research environment (with all the uncertainties and changes that entails) while doing work that depends on the availability and reliability of an often unstable research computer system. 8c2a5

Responsibilities and duties: 8c2b

1) Make and maintain contact with key persons at other Network related organizations. These contacts are responsible for and knowledgeable about computer-systems, information handling systems, people, and data, programs, and procedures that are of actual or potential use to users of the ARPA Network. 8c2b1

2) On the basis of information learned through these personal contacts, as well as through other sampling methods such as questionnaires, determine what should be contained in computer data bases relating to Network computer systems, information handling systems, people, and data, programs, and procedures. 8c2b2

3) Make extensive use of the SRI-ARC "NLS" computer system for most aspects of the work: for storing and retrieving information, for analyzing information in data-bases, for two-way communications with other persons via the ARPA Network. 8c2b3

4) Coordinate the design, production, publishing, and

distribution of bibliographic and other reference documents; 8c2b4

Junior Information Processing Analysts 8c3

Required experience and capabilities: 8c3a

Must have a clerical background. 8c3a1

Must be experienced in interfacing (i.e., obtaining information, answering questions and providing other services) to people who are both within and outside of the SRI-ARC organization. 8c3a2

Must be experienced in filing information and maintaining records for quick retrieval. 8c3a3

Must have willingness and ability to learn new skills, principally in the use of a computer system from a typewriter-like terminal. 8c3a4

Desireable to have experience in the use of computer systems for information processing problems. 8c3a5

Typing and shorthand skills not necessary, though useful. 8c3a6

Must be able to work under little supervision, and take responsibility for all aspects of the work. 8c3a7

Responsibilities and duties: 8c3b

operating a xerox machine, and collating, filing, and mailing reports and memoranda; 8c3b1

interfacing with other report production facilities; 8c3b2

communicating through a computer terminal to people and to computer systems; 8c3b3

assisting the information processing analysts in analyzing the needs of the NIC, and in justifying and making changes in procedures. 8c3b4

PROGRAMMERS 8d

Required experience and capabilities: 8d1

Systems programmer with at least two years' experience in the design and programming of either large-scale

applications systems, large-scale operating systems, or major subsystems of applications or operating systems. 8d1a

Responsibilities and duties: 8d2

Problems and assignments include these areas of information processing in a time-sharing system (in collaboration with others): 8d2a

1) design of files and data bases, and implementation of programs to process these files and data bases 8d2b

2) design and implementation of user-interfaces for on-line query and update functions 8d2c

3) design of reports and implementation of catalogue and other document production programs 8d2d

4) design and implementation of statistics-gathering routines to facilitate monitoring of NIC system usage 8d2e

5) design and implementation of accounting routines to enable resource usage to be billed 8d2f

Network Information Center: Goals, Problems, Requirements

(J20439) 21-NOV-73 17:09; Title: Author(s): Michael D. Kudlick/MDK;
Distribution: /SRI-ARC; Sub-Collections: SRI-ARC; Clerk: MDK;
Origin: <KUDLICK>P.NLS;5, 21-NOV-73 17:04 MDK ; #20262

I 21-NOV-73 18:58 20440

Linking while in E[xecute] J[ournal]

To be consistent with TENEX practices, might I suggest that you enable linking to occur while journal items are being sent, ie: please allow a ";" to mean to the system that a "linked" dialog is occuring and to ignore the ensuing text string. I believe that this suggestion merits your most considered attention.

Thanks, ...Jean

1

I 21-NOV-73 18:58 20440

Linking while in E[xecute] J[ournal]

(J20440) 21-NOV-73 18:58; Title: Author(s): Dave A. Gorka, John D. Day, Alan R. Hill, Clayton A. Greer, Jean Iseli, Jim O. Calvin, Mil E. Jernigan/I; Distribution: /DCE RWW CHI JCN I; Keywords: linking-nls-journal; Sub-Collections: I; Clerk: JI;

20440 Distribution

Douglas C. Engelbart, Richard W. Watson, Charles H. Irby, James C. Norton, Dave A. Gorka, John D. Day, Alan R. Hill, Clayton A. Greer, Jean Iseli, Jim O. Calvin, Mil E. Jernigan,

JI 21-NOV-73 18:10 20441

USING Membership

Dave: Would you consider Alan Hill for membership in USING, Alan is a member of I-Colony and is very dedicated to helping users. He is from SDAC in Alexandria and spends a reasonable amount of time interfacing with users at all levels....I think he would make a darn fine addition and would invite you to consider inviting him. He can be reached through SNDMSG to OWEN at ISI or through NIC Journal.

Dave, thanks for your consideration, and, see 'ya in January...also, hope you like the new newsletter format...Think it is much more direct than the old....see onlinedec in <help> for a preview, will unprotect it on saturday.....thanks Dave, ...Jean 1

USING Membership

(J20441) 21-NOV-73 18:10; Title: Author(s): Jean Iseli/JI;
Distribution: /DHC NJN(Nancy, look at onlindec- hope you like it too)
ARH(hope you don't mind Alan, though you would be great); Keywords:
USING-SDAC-representation; Sub-Collections: MITRE-TIP NIC I; Clerk: JI;

I-Colony NLS Dialog

(dialog) 1

Hey gang....before we had the I-Colony Group inserted into the NIC System, Ident=I, several suggestions were made relative to some possible enhancements of NLS. In many cases, these suggestions reflect our joint experience in using NLS as a vehicle for a human workshop collaboration. I am sending an index to the dialog so that (1) you may be aware of it, and (2) to encourage your participation if desired.

Thanks, ...Jean 1a

(nls) 1b

20028 3 Nov 73 G[oto] M[eta] N[ls] 1b1

Answered RWW 5 Nov 73 (20053) 1b1a

Answered JCN 3 Nov 73 (20031) 1b1b

20429 21 Nov 73 Response to NDM's (20417) 1b2

20027 2 Nov 73 O[utput] N[ls] : #20009:#20025 1b3

Answered NDM 20 Nov 73 (20417) 1b3a

Answered DVN 5 Nov 73 (20047) 1b3b

Answered MDK 5 Nov (20054) 1b3c

(user-progs) 1c

20009 2 Nov 73 OP Suggestions : User-prog subsystem 1c1

(journal) 1d

20156 10 Nov 73 Group Creation 1d1

20124 9 Nov 73 Journal Submission Category Tractability 1d2

19784 19 Oct 73 Automatic Prompting 1d3

Answered by JCN : Will be done. 1d3a

(general) 1e

19771 19 Oct 73 NLS Collaboration : Suggestion Response 1e1

JI 21-NOV-73 18:52 20442

I-Colony NLS Dialog

(J20442) 21-NOV-73 18:52; Title: Author(s): Jean Iseli/JI;
Distribution: /I DCE(as per your request) RWW(fyi) JCN(fyi); Keywords:
i-dialog-nls; Sub-Collections: I MITRE-TIP NIC; Clerk: JI;

20442 Distribution

Dave A. Gorka, John D. Day, Alan R. Hill, Clayton A. Greer, Jean Iseli, Jim O. Calvin, Mil E. Jernigan, Douglas C. Engelbart, Richard W. Watson, James C. Norton,

DDSI Raises Its Prices

November 12, 1973 1

Mr. Dirk van Nouhuys
Stanford Research Institute
333 Ravenswood Avenue
Bldg. 30
Menlo Park, Ca. 94025 2

Dear Dirk, 3

This letter will support a verbal conversation between Ernie Engle and yourself regarding a price increase which was to become effective September 1, 1973. 4

The new price schedule is as follows: 5

All initial programming of Photocomposition - negotiable*. 5a

1. Programming: 5a1

All initial programming of Photocomposition - negotiable*. 5a1a

Program modifications to existing applications will be billed on an hourly rate for both machine time and programming time. Upon request for changes, DDSI will supply SRI with a firm quote after evaluation of the effort required. 5a1b

Machine Time $350.00 per hour 5a1b1

Programming Time 25.00 per hour 5a1b2

2. Output: 5a2

A. Photocomposed page on 35mm film. 5a2a

Single font $ 2.20 page 5a2a1

Mixed fonts 2.60 page 5a2a2

Minimum amount 200.00 5a2a3

B. Copyflo bond proofs 8 1/2 x 11 5a2b

$.10 per page 5a2b1

Minimum amount $25.00 5a2b2

C. Camera ready copy - KP5 5a2c

$.60 per page 5a2c1

Minimum amount $25.00 5a2c2

Thank you for your continued support and interest in our services. 5a3

Sincerely, 5a4

Robert Spencer
Marketing Representative
Data Dissemination Systems Inc.
11161 West Pico Boulevard
Los Angeles, Ca. 90064 5a5

Upon receipt of each new application DDSI will provide a supplemental price quote based on programming analysis application requirements. 5b

DVN 21-NOV-73 20:52 20443

DDSI Raises Its Prices

(J20443) 21-NOV-73 20:52; Title: Author(s): Dirk H. Van Nouhuys/DVN;
Distribution: /COM MDK JAKE; Sub-Collections: SRI-ARC COM DPCS; Clerk:
DVN;
Origin: <VANNOUHUYS>SPENCER.NLS;2, 21-NOV-73 12:06 JML ;

SRW 22-NOV-73 05:08 20444

DEX-Two Queries

Hello:
I'm Steve Wilbur of university of London. I have recently been using DEX 1.5 to input a number of documents, and Doug suggested that I look at the spec of DEX 2 with a view to using it. I gather that there may still be a few bugs in it, and I would be grateful if you could let me know of any that might affect my work. 1

Also, I would be grateful if you could tell me how I access the program, as there are no instructions for running it in the manual. 2

Thanks .... Steve 3

DEX-Two Queries

(J20444) 22-NOV-73 05:08; Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /HGL; Sub-Collections: NIC; Clerk: SRW;
Origin: <UK-ICS>MES.NLS;1, 22-NOV-73 05:00 SRW ;

SRW 22-NOV-73 06:06 20445

Content Analyser Problems

Dean:

I sent a SNDMSG to you yesterday, but forgot that it would not be properly autographed. Basically, I have problems with my CA programs. Two attempts are (uk-ics,ca,1) ad (uk-ics,ca2,1). Any ideas what is wrong?

Cheers .. Steve

1

SRW 22-NOV-73 06:06 20445

Content Analyser Problems

(J20445) 22-NOV-73 06:06; Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /NDM; Sub-Collections: NIC; Clerk: SRW;

NDM 22-NOV-73 14:27 20446

Reply to (20098,) [JBN on OP cue card]

Jeanne: The idea of an Output Processor Primer is good. I'm sorry the Introduction to the Output Processor Users' Guide, which was intended to be just that, failed you so. I am also sorry that the organization of that document was such that COM directives got in the way; I had hoped that all directives would be equally easily acccessable. Perhaps, instead of suggesting a parallel document, you could help me upgrade the Output Processor Users' Guide by your (more detailed) suggestions. With that hope in mind, I am going on with developing an Output Processor que card, intended to fill a slightly different need. 1

You also suggest publicizing Kirk's copy of the old directives for the directories. After sending a number of hours implementing changes in the programs to adjust the format according to your wishes, I still have not seen the product of those new formats. It saddens me to see you totally ignoring what I consider to be a sincere and valuable effort when you suggest publicizing the old and do nothing with the new. 2

NDM 22-NOV-73 14:27 20446

Reply to (20098,) [JBN on OP cue card]

(J20446) 22-NOV-73 14:27; Title: Author(s): N. Dean Meyer/NDM;
Distribution: /JI SRI-ARC; Sub-Collections: SRI-ARC; Clerk: NDM;

NDM 22-NOV-73 15:07 20447

Content Analyzer Problems -- response to (20445,)

Steve: It look like your CA program "ca2" should work. It will only do the replacement if it finds 2 or more spaces at the very beginning of the statement. If you intended an unanchored scan, use [square bracktes]. You'll have to declare another text pointer, though (unless you want to replace everything up through the first occurance of multiple spaces). The other file was empty. Let me know how this answer strikes you. I expect to hear from you again soon.

--Dean

1

NDM 22-NOV-73 15:07 20447

Content Analyzer Problems -- response to (20445,)

(J20447) 22-NOV-73 15:07; Title: Author(s): N. Dean Meyer/NDM;
Distribution: /SRW; Sub-Collections: SRI-ARC; Clerk: NDM;

UC Personnel Contract

23-NOV-73 06:46 RJC ; 1

UTICA COLLEGE PERSONNEL - CONTRACT F30602-72-C-0326 2

FACULTY SUPERVISOR - Arlotto, Joseph J. (Bucciero)
Indefinite 3

STUDENTS 4

IR 4a

Ackerson, Elaine	(Kozak)	May 1975	4a1
Dietrich, Gabriele	(Bond)	May 1976	4a2
Dziok, Robert	(Maier)	May 1974	4a3
Eastwood, Fay	(Kozak)	May 1974	4a4
Florczyk, Gloria	(Langendorf)	May 1974	4a5
Gregorin, Dennis	(Bush)	May 1974	4a6
Johnston, Karyn	(Miullo)	May 1975	4a7
Matteson, Susan	(Kozak)	May 1975	4a8
Matuszewski, Richard	(Mincieli)	May 1974	4a9
Piaschyk, Drew	(Kozak)	May 1975	4a10
Wallace, Cheryl	(DeLucia)	May 1975	4a11

IS 4b

Ata, John	(Stinson)	May 1976	4b1
Bacher, Gail	(Robinson)	May 1976	4b2
Beer, Edward	(Robinson)	May 1976	4b3
Dzworkas, Suzanne	(Maynard)	May 1976	4b4
Hoffmeister, Thomas	(Stinson)	May 1975	4b5
Jerzak, Joseph	(Metzger)	May 1975	4b6
LoRusso, Stevenson	(Smith)	December 1973	4b7

UC Personnel Contract

Robilotta, Donna (Cavano) May 1975 4b8

UC Personnel Contract

(J20448) 23-NOV-73 07:15; Title: Author(s): Roberta J. Carrier/RJC;
Distribution: /FJT; Sub-Collections: NIC; Clerk: RJC;
Origin: <CARRIER>UCPERSONNEL.NLS;1,

20448 Distribution
Frank J. Tomaini,

KIRK 23-NOV-73 11:17 20449

Connecting to a directory in NLS

Connecting to a directory requires a CA followed by <↑U> in order to specify a password (instead of just <SP> as in Tenex). If Tenex-like syntax cannot be used, why can't the password be an alternative field without requireing <↑U>? The command could be: .COnnect (to) Directory USERNAME CA (Password) <PASSWORD OK / OK>. 1

Connecting to a directory in NLS

(J20449) 23-NOV-73 11:17; Title: Author(s): Kirk E. Kelley/KIRK; Distribution: /KEV CHI DCW DVN JMB; Sub-Collections: SRI-ARC; Clerk: KIRK;

this is the edited version of the fusion task for the fy74 pmp.

13. MULTI-SOURCE DATA FUSION

1

13.1.1 Purpose & Goals: Multi-source data fusion is any process where data gathered from more than one independent source and pertaining to the same domain of interest is studied thoroughly to detect or identify features or patterns of change in that domain. In many Air Force Command and Control situations, processes of the multi-source data fusion type must be accomplished prior to major decision making. There are two primary reasons for this being the case. First, there is usually a super-abundance of data available from various sources--voice, text, radar, imagery, acoustic sensor data, etc.-- all pertaining to the same domain, i.e. for command and control a common domain would be the activities within a geographic region. Second, a complete and accurate description of the domain can only be determined by analyzing multiple sources since no single source provides complete coverage. The timely identification of significant changes in status is virtually impossible in these situations where large volumes and varieties of data types and formats are the rule and manual processing methods are the only means available.

2

Therefore, the purpose of this program is to identify types of Air Force data fusion processes and to develop for each, computer-based aids for assisting Air Force analysts in their performance of these processes. Through a fusion usage study, each type will be identified and fully characterized by the procedures currently performed by human analysts. Correlation, synthesis, and information generation are examples of information processing functions that may be identified as subprocesses of some types. The results of this study will be used to focus the development of automated aids on specific features and needs of each fusion process. It is our belief that through the development of effective aids significant improvements will be realized in command and control decision making.

3

13.1.2 Potential: A necessary prerequisite to effective Command and Control decision making is the requirement for access to accurate net assessments on foreign and domestic activities. If accurate, perhaps quantifiable, net assessments of a situation are determined, then models can be established for evaluating the effect of various actions taken and for assessing the risk involved in the selection of each alternative choice. Effective fusion aids will provide significant improvements to our net assessments and will begin to bridge the gap between net and risk assessment by providing means to optimize the transfer between them.

4

13.1.3 Related Programs: There are a number of current programs that are making positive contributions and providing partial solutions to multi-source data fusion problems. Many of these are supported by Air Force intelligence data handling research and development. The Program Assisted Console Evaluation and Review (PACER) system developed for the Strategic Air Command (SAC) is a prime example of a computer-based system that integrates data from different sources providing on-line interactive capabilities and application programs for analysts working on SAC targeting missions. The techniques and methods used in PACER for developing and implementing an integrated data base are crucial to the PACER operation and for any other multi-source fusion problem where formatted data of high value is easily identified. 5

The Integrated Event Analysis (IEA) System currently undergoing development at the Foreign Technology Division (FTD) will provide computer-based support for monitoring significant technological breakthroughs in foreign weapon systems. Elements of data collected through a variety of sensors on single weapons system events must be logically structured and interpreted to determine the values of key weapon system parameters. These key parameters signify or represent significant changes in the technological threat posed by the system. The logical relationships between collectable data elements and key parameters are completely specified in what are designated as "Threat Relevant Essential Elements" (TREE). Procedures similar to the IEA TREE's development are undoubtedly needed for other multi-based fusion problems. Work in computer networking and terminal oriented software also is contributing to progress in data fusion particularly where fusion data bases are too large for the secondary storage capacities. Recent advances indicate that by accessing networks of computers through a single interactive terminal, and by allowing distributed sensor data repositories to be individually maintained, updated, and accessed through its own dedicated computer, terminal independent software will allow direct access to those computers and hence logical access to the data as required by a user. This is possible without manual user intervention, or knowledge of the details of the sensor-dependent dedicated computers. 6

Relational data file techniques are currently being developed into experimental scientific and technical intelligence data handling systems. Their capability to directly support the creative analytic activities of inference-making and data manipulation will be tested. There are two major areas in which relational data techniques are likely to have payoffs for multi-source data fusion. First these techniques offer a more flexible means of representing data, and one better suited for handling varieties of data input through different sources. 7

Second, they will provide means of deriving new data elements and their values either directly by applying deductive rules or indirectly by using analyst-supplied definitions. Other systems, such as the SHOEBOX text handling system at MITRE Corp. and the Augumented Human Intellect System (AHI) at Stanford Research Institute (which is being implemented under Project 5550 Task 06) will make important contributions to multi-source fusion problems wherethe bulk of material to be processed is unformatted text. By allowing the user to establish his files as on-line working files, these systems enhance the user's capability to assimilate and correlate unformatted information. With these systems the user can organize and index materials in any way he chooses and then browse, retrieve or reorganize them to meet the needs of his immediate or long-term interests. 8

In addition, other techniques now being tested for applicability to Indications and Warning intelligence may also favorably impact data fusion capabilities. Data reduction and information screening techniques used to identify significant departures in normal activity patterns may be valuable aids along with new techniques for displaying event information via time compression displays. 9

These programs mentioned, the Tactical Information Processing and Interpretation (TIPI) system and other systems currently under development should provide a suitable framework into which advanced fusion techniques can be placed for test and evaluation. 10

13.2 ANALYSIS AND TECHNICAL APPROACH 11

13.2.1 Technical Background: Today's command and control data collection systems provide the data that will provide the means for effectively responding to most enemy actions. Our present difficulty centers around our inability to time-correlate available information in an efficient manner enabling decision-makers to make optium responses. This deficiency will be alleviated by developing better methods for fusing multi-source data. Currently, different sensor systems have been developed independently and the data they collect is reduced and entered into sensor-dependent data bases. 12

Each data base has been designed independent of the other, and each data collection system has been designed with minimal attention to how the data collected by that system is complemented by other data. Each data base resides on secondary storage accessed by its own dedicated computer. The usage of this data is by subject, not by source. At present, the different data bases are interrogated separately, and whatever fusion takes place occurs manually at data usage time. 13

In summary multi-source data fusion in the Air Force is presently handicapped for several reasons some of which would include: 14

a. No effective means of querying separate sensor-derived data bases. 14a

b. No effective means of drawing inferences or calculating new data values from collected data. 14b

c. No effective means of querying data bases stored on separate computer systems. 14c

d. No effective means of assimilating or correlating facts from disparate text files. 14d

e. No effective means of recognizing significant departures in normal activity patterns. 14e

Each of these areas is currently being addressed by state-of-the-art or advanced information processing work. Integrated data bases, relational data techniques, computer netting, text manipulation and information screening and display techniques are each attacking areas of deficiency. Therefore, what is needed and what this advanced development task calls for are: (1) a fuller characterization of Air Force data fusion processes, and (2) the development and assembling of techniques into systems tailored to solve common types of Air Force fusion problems. 15

13.2.2 TECHNICAL APPROACH SELECTED: The approach selected to accomplish this task's objective is a technique development and evaluation based on a fusion usage study. It is important to determine first what types of fusion processes are performed to support command and control functions and to fully characterize how they are performed, why they are performed, and by whom they are performed. In so doing, a better understanding will be acquired concerning data fusion difficulties and how they may be overcome. In particular, the problems involved in time correlating different data types, in integrating different data formats, and in assimilating information from different data sources must and will be better understood. This is the only approach that offers this advantage. 16

Then, by using this detailed understanding as a point of departure it will be possible to design systems or further develop techniques to handle specific types of fusion problems. For example, relational data techniques have now reached an experimental status but are constrained by factors such as data base size, complexity, and responsiveness required. From a fusion usage study, it will be determined whether or not some fusion problems can be handled within these constraints and which will require further technique development. Experimental systems can then be developed for testing these techniques on real Air Force data fusion problems. 17

13.2.3 Technical Achievements Planned: Under Phase I - Fusion Usage Study - various categories of Air Force fusion processes will be identified and fully characterized. This will be accomplished as a result of the following technical achievements: 18

a. Determination of data types, formats, and volumes by fusion category. 18a

b. Determination of product or output requirements by category. 18b

c. Determination of manual subprocesses and functions currently performed by category. 18c

d. Determination of data quality and security factors by category. 18d

e. Priority assignment of each Air Force fusion category by impact on Command and Control Missions. 18e

Under Phase II - Technique Developments for Specific Fusion Usage Categories - the following technical achievements will be accomplished: 19

a. Identification of techniques having relevancy to each fusion category. 19a

b. Priority assignment of technique development tasks by potential payoff, technical feasibility and development costs. 19b

c. Completion of technique developments or modification satisfying fusion category specifications. 19c

Under Phase III - Technique Integration Into Experimental Systems - The following technical achievements will be accomplished: 20

a. Determination of experimental system requirements including data base requirements and functional data flow. 20a

b. Detailed design of experimental systems including hardware/software requirements and man-machine interfaces. 20b

c. Design of man-machine experiments including evaluation criteria and measurement techniques. 20c

Under Phase IV - Man-Machine Experiments and Evaluation - The following technical achievements will be accomplished: 21

a. Review and final data gathering for experiments. 21a

b. Performance of man-machine experiments. 21b

c. Performance of comprehensive evaluation. 21c

13.3 DEVELOPMENT AND TEST PLAN 22

The Multi-Source Data Fusion Development and Test Plan consists of four (4) phases. 23

Phase I, Fusion Usage Study, will run 12 months and be completed in the third quarter of FY-75. The evaluation criteria used for this phase will be subjective in nature and will be applied to the early phases of data collection in order to verify the findings with those organizations participating in the study. 24

Phase II, Technique Developments for Specific Fusion Usage Categories, will develop a number of information processing techniques and algorithms and tailor or modify them to satisfy requirements of selected Air Force fusion problems. Technical efforts will include theareas of integrated data base development, relational data techniques, text manipulation, information screening and time-compression displays, probabilitic event prediction and analysis, and computer networking and distributive processing. This phase will run 24 months and be completed in the fourth quarter of FY-77. Evaluation criteria for this task will also be subjective in nature. Technique development priorties must be verified with Air Force users and technique developments must be measured according to their capabilities to satisfy preliminary design criteria. 25

Concurrently with Phase II, Phase III, Technique Integration into Experimental System, will begin during the first quarter of FY-77 and will be completed in the fourth quarter of FY-78, Phase III will provide for the integration of techniques into experimental capabilities that may be tested in real Air Force data fusion environments. This phase will also provide the test and evaluation plan. The test and evaluation plan will identify functional performance criteria for each experimental system. This will include system specifications for timeliness, completeness, validity, responsiveness, reliability and efficiency. Additionally, criteria will be established for measuring performance effectiveness on different tasks for varying conditions and loads. 26

Phase IV, Man-Machine Experiments and Evaluation, will be for conducting the test and evaluation effort. This phase is scheduled to run concurrently with Phase III beginning in the first quarter of FY-78 and terminating in the second quarter of FY-79. 27

13.4 MULTI-SOURCE DATA FUSION 28

13.4.1 There are four (4) phases to this task. The technical achievements to be accomplished in each phase are described in 13.2.3 while the schedule for each is described in 13.3 and the milestone chart. 29

Phase I - Fusion Usage Study 29a

Phase II - Technique Development for Specific Fusion Usage Categories. 29b

Phase III - Technique Integration into Experimental Systems 29c

Phase IV - Man-Machine Experiments and Evaluation 29d

13.4.2 Schedules within Master Schedule 30

13.4.2.1 Documentation Schedule 31

a. Contract Awards 31a

1. Fusion Usage Study	Feb 74	31a1
2. Techniques Development	Jul 75	31a2
3. Experimental System Integration	Jul 76	31a3
4. Evaluation	Jul 77	31a4

b. Report Dates 31b

1. Fusion Usage Study - Interim report	Aug 74	31b1
2. Fusion Usage Study - Final report	Feb 75	31b2
3. Techniques Development - Interim report	Jul 76	31b3
4. Technique Development - algorithmic document descriptions	Jul 77	31b4
5. Experimental System Design Specifications	Jul 77	31b5
6. Test and Evaluation Plan	Jan 78	31b6
7. Evaluation Results	Jan 79	31b7

13.4.2.2 KEY DECISION POINTS: 32

1. Fusion Usage Study Completion	Feb 75	32a
2 Preliminary Completion of Technique Developments	Jul 76	32b

3. Completion of Experimental System Design Specifications — Jul 77 — 32c

13.5 FINANCIAL FUNDS ($000)

	Prior	FY-74	FY-75	FY-76	FY77	FY-78	FY-79
Phase I		40	60	-			
Phase II			-	200	-		
Phase III				-	200	200	-
Phase IV				-	300	75	50
TOTAL	0	40	60	200	500	275	50

13.6 MANPOWER

Functional Title	Grade	FY-74	FY-75	FY-76	FY-77	FY-78	FY-79
Project Engineer (System Analyst)	GS-14		-	0.7	1.0	1.0	1.0
Project Engineer (Information Scientist)	GS-13	0.3	0.7	0.8	1.5	1.0	0.5
Senior Programmer	GS-12			-	1.5	1.5	-
Required Manpower		0.3	0.7	1.5	4.0	3.5	1.5

FY74 PMP TASK13 FUSION

(J20450) 23-NOV-73 11:19; Title: Author(s): Roger B. Panara/RBP;
Sub-Collections: RADC; Clerk: RBP;
Origin: <PANARA>FY74PMPTASK13FUSION.NLS;1, 23-NOV-73 11:08 RBP ;

RBP 23-NOV-73 11:30 20451

message to ESD

this is a message sent to esd in response to one received from esd.
it is concerned about the status of deferred fy74 funds.

RBP 23-NOV-73 11:30 20451

message to ESD

Marcelle, please type this message to ESD/MCI Mr Veckery and info copy to AFSC/DL. It's Routine and the reference is to ESD/MCI message PR 151520Z NOV 73 1

RADC has not received any official information regarding the withdrawal of the deferred $1.9 million. During the DL review held at RADC on 30Oct, we were unofficially informed that USAF, in response to the House of Representatives action to reduce the recommended appropriations by approximately $30 million, had identified the Project 5550 deferred funds as a source to be a part of this reduction. 2

The action is not final since the Appropriations Bill is not yet finallized and since actions of this type are normally arrived at after USAF/AFSC deliberations. If the reduction was being considered in an official sense, RADC would expect that AFSC would call upon us to provide information for impact or reclama. In the event that this occurs, RADC will ask ESD to provide the inputs for the Security and Semiautomated Requirements Analysis tasks. These inputs will be consolidated by RADC with statements on the other affected tasks and forwarded to AFSC/DL, the project OPR. 3

Signature : Col Thayer 4

NOTE FOR RECORD: This is sent in response to an ESD message. In effect it is a written record of what I provided to Major Bailey/MCI via telecall on 15Nov73. The information provided resulted from telephone conversations I had with Lt Col McGinnis/AFSSC and Major Starbuck/USAF. 5

cy-RADC/DO coord-ISIM&ISI 6

The ESD/MCI message was info-ed to AFSC/XRF ACD DLand read as follows: 7

SUBJECT:P.E. 63728FPROJECT 5550 FUNDING. AT THE AFSC/DL REVIEW HELD AT RADC 30 OCT - 1 NOV 1973 ESD/MCI PERSONNEL WERE INFORMED THAT THE ADDITIONAL FY74 FUNDING OF $1.9M PLANNED FOR RELEASE IN JAN 1974 WAS NO LONGER AVAILABLE. REQUEST STATUS OF THIS ADDITIONAL $1.9M AS NON-AVAILIBILITY OF FUNDS CAUSES SEVERE IMPACT ON BOTH CURRENT AND PLANNED EFFORTS. BT 8

RBP 23-NOV-73 11:30 20451

message to ESD

(J20451) 23-NOV-73 11:30; Title: Author(s): Roger B. Panara/RBP;
Sub-Collections: RADC; Clerk: RBP;
Origin: <PANARA>ESDMSGFUNDS.NLS;1, 23-NOV-73 10:55 RBP ;

KIRK 23-NOV-73 12:42 20452

Entering capital viewspecs from the mouse and keyset, an alternative to (20425,)

NOW, while the command language is being changed, is the time to again (see 18FEB--14492,) request ordering the functions of the mouse buttons in a logical way to effectively use the available alternatives and allow input of capital viewspecs. In the new language, in order to input a capital viewspec from the keyset and mouse, one must type at the least "<SP>sev" (four characters). A step backwards from the old language where typing only "v" was necessary.

KIRK 23-NOV-73 12:42 20452

Entering capital viewspecs from the mouse and keyset, an alternative to (20425,)

I re-propose the following:
OXX for CONTROL-SHIFT.
XOX for lowercase viewspecs in addition to XXO.
XXX for uppercase viewspecs (XOX + OXO).
OXO for capital-shift with all others would remain the same.
X = mouse buttons held down while a keyset chord is typed.
O = mouse buttons left up.

1

KIRK 23-NOV-73 12:42 20452

Entering capital viewspecs from the mouse and keyset, an alternative to (20425,)

(J20452) 23-NOV-73 12:42; Title: Author(s): Kirk E. Kelley/KIRK ;
Distribution: /SRI-ARC ; Sub-Collections: SRI-ARC; Clerk: KIRK ;

DVN 23-NOV-73 17:02 20453

Meeting on Changes in the New Command Language, Prompts and Journal

On November 21 Smokey Wallace, Jeanne Beck, Jeanne North, Kirk Kelley, Mike Kudlick, Charles Irby, Chuck Dornbush, Dick Watson, and I met to discuss changes in the NLS command Language that had been proposed as a result of use of the language by DIRT and the pressure of documentation. The agenda of the meetng was branch one of <userguides>CHANGES where several members of DIRT have been recording proposals.. 1

The contents of <userguides>CHANGES constantly changes. I will shortly journalize the version current as of the time of the meting as (journal,19286,) 1a

Early in the meeting we decide that some proposed changes could be judge better when we have accumulated more feedback from users and others involved changes too frareaching to settle in that meeting. The proposals that remained all had to do with prompts or the journal system. 2

Prompts: 3

<journal 19286,1a2> and <journal,20145,> the verbs and nominals in commands will be called command words and "C:" will prompt for them. 3a

The new prompt for confirmation that the previous change demands wll be "OK:". 3b

<journal 19286,1a8> "T:" will continue to prompt for Filenames and Idents. The noise words will guide the user what kind of typein to provide. 3c

The prompt that asks for a yes or no answer, at the end of substitute for example, will be "Y/N:" rather than "ANS". 3d

To handle the conflict between the meanings of "ADDRESS" in TNLS and DNLS, <journal,19286,1a3> we defined the prompt "A:" to mean DAE rathr than "address". 3e

Journal Commands: 4

We accepted the idea of a journal subsystem with one command level (some commands such as Interrogate and Reserve still have sub levels) and the following comands: 4a

Author IDENTLIST CONFIRM 4b

Comments CONTENT CONFIRM 4c

Do it CONFIRM 4d

Execute (command in) SUBSYSTEM 4e

Forward (document) CONTENT CONFIRM 4f

Goto SUBSYSTEM 4g

Group (at) SOURCE 4h

Insert (link at) ADDRESS CONFIRM 4i

Interrogate Forward (document) CONTENT CONFIRM (for submission) CONFIRM 4j

Keywords CONTENT CONFIRM 4k

Message [CINTENT] CONFIRM 4l

Number CONTENT CONFIRM 4m

Obsoletes (document(s)) CONTENT CONFIRM 4n

PLEX (at) SOURCE 4o

Process (submission form at)CONTENT CONFIRM 4p

Reserve (numbers): 4q

Rfc (number) ADDRESS CONFIRM 4r

Select: 4s

Sent (to) IDENTLIST CONFIRM 4t

Show (status) CONFIRM 4u

Statement (at) SOURCE 4v

Subcollections CONTENT CONFIRM 4w

Title CONTENT CONFIRM 4x

Updates (document(s)) CONTENT CONFIRM 4y

We look forward to Susan Lee and Paul Rech collecting further feedback from users and making recommendations on some of the issues left unsettled in <userguides>Changes. 5

DVN 23-NOV-73 17:02 20453
Meeting on Changes in the New Command Language, Prompts and Journal

(J20453) 23-NOV-73 17:02; Title: Author(s): Dirk H. Van Nouhuys/DVN; Distribution: /DIRT DSK(unless you want to stay on, I'm going to takee you out of DIRT next time I think of it.) SRL(I've take the liberty of adding you to DIRT); Sub-Collections: SRI-ARC DIRT NIC; Clerk: DVN;

BAH 23-NOV-73 21:47 20454

Nov 11 - 17, 1973: A WEEK IN REVIEW

In accordance with KEV's request, the weekly analysis report will start reflecting the new group allocation scheme beginning with the week of November 4, 1973.

Nov 11 - 17, 1973: A WEEK IN REVIEW

WEEKLY ANALYSIS REPORT: 1

2

WEEK: NOV 11 - 17, 1973 (24 HOURS/DAY) 3

4

TOTAL SYSTEM CPU: 46.100 5

6

(ARC)	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6a
						6a1
(DOC)						6a2
(JMB)	.636	15.871	.040	1.380	24.954	6a2a
(NDM)	.183	6.982	.026	.397	38.153	6a2b
CAT	-	-	-	-	-	6a2c
DOCB	-	-	-	-	-	6a2d
DOCUM	.361	17.000	.021	.783	47.091	6a2e
	-----	-----		-----		6a2f
TOTAL	1.180	39.853	.030	2.560		6a2g
(FAC)						6a3
(RAB)	.010	.227	.044	.022	22.700	6a3a
(MEH)	.016	.248	.065	.035	15.500	6a3b
(JCP)	2.352	56.170	.042	5.102	23.882	6a3c
(JR)	.024	.544	.044	.052	22.667	6a3d
(EKV)	.001	.027	.037	.002	27.000	6a3e
OPERA	1.669	27.184	.061	3.620	16.288	6a3f
	-----	-----		-----		6a3g
TOTAL	4.072	84.400	.048	8.833		6a3h

6a3i

(NIC)						6a4
(JDC)	.053	1.648	.032	.115	31.094	6a4a
(EJF)	.443	8.949	.050	.961	20.201	6a4b
(CBG)	.004	.072	.056	.009	18.000	6a4c
(MDK)	.518	10.843	.048	1.124	20.932	6a4d
(MLK)	.513	27.450	.019	1.113	53.509	6a4e
(JBN)	.336	14.406	.023	.729	42.875	6a4f
NETINFO	-	-	-	-	-	6a4g
NIC-WORK	-	-	-	-	-	6a4h
	-----	-----		-----		6a4i
TOTAL	1.867	63.368	.029	4.051		6a4j

6a4k

(PRO)						6a5
(DIA)	.336	13.066	.026	.729	38.887	6a5a
(CFD)	1.680	34.111	.049	3.644	20.304	6a5b
(WRF)	.347	10.067	.034	.753	29.012	6a5c
(JDH)	.815	17.969	.045	1.768	22.048	6a5d
(CHI)	.956	21.964	.044	2.074	22.975	6a5e
(DSK)	1.082	23.674	.046	2.347	21.880	6a5f
(HGL)	1.003	19.230	.052	2.176	19.172	6a5g
(EKM)	.515	33.718	.015	1.117	65.472	6a5h
(KEV)	.547	14.088	.039	1.187	25.755	6a5i
(JEW)	1.311	22.611	.058	2.844	17.247	6a5j
(DCW)	1.275	30.046	.042	2.766	23.565	6a5k

	-----	-----		-----		6a5l
TOTAL	9.867	240.544	.041	21.405		6a5m
						6a5n
(PSO)						6a6
(JML)	.066	4.779	.014	.143	72.409	6a6a
(BAH)	ERRONEOUS DATA					6a6b
(MEJ)	1.179	80.369	.015	2.557	68.167	6a6c
(KIR)	.617	23.748	.026	1.338	38.489	6a6d
	-----	-----		-----		6a6e
TOTAL	1.862	108.896	.017	4.038		6a6f
						6a6g
(STA)						6a7
(JHB)	.262	9.232	.028	.568	35.237	6a7a
(DCE)	.214	11.248	.019	.464	52.561	6a7b
(SRL)	.529	14.133	.037	1.148	26.716	6a7c
(JCN)	.447	12.324	.036	.970	27.570	6a7d
(DVN)	.814	23.088	.035	1.766	28.364	6a7e
(PR)	.339	17.257	.020	.735	50.906	6a7f
(RWW)	.058	2.417	.024	.126	41.672	6a7g
	-----	-----		-----		6a7h
TOTAL	2.663	89.699	.030	5.777		6a7i
						6a7j
(GROUP) TOTALS						6a8
						6a8a
GROUP	CPU HRS	CON HRS	CPU/CON	% SYS		6a8b

Nov 11 - 17, 1973: A WEEK IN REVIEW

(DOC)	1.180	39.853	.030	2.560	6a8c
(FAC)	4.072	84.400	.048	8.833	6a8d
(NIC)	1.867	63.368	.029	4.051	6a8e
(PRO)	9.867	240.544	.041	21.405	6a8f
(PSO)	1.862	108.896	.017	4.038	6a8g
(STA)	2.663	89.699	.030	5.777	6a8h
	-----	-----		-----	6a8i
TOTAL	21.511	626.760	.034	46.664	6a8j

6a8k

(STATS) 6a9

HIGHEST CPU: JCP 2.352 hrs LOWEST CPU: EKV .001 hrs 6a9a

HIGHEST CON: MEJ 80.369 hrs LOWEST CON: EKV .027 hrs 6a9b

HIGHEST CPU/CON: JEW .058 HIGHEST CON/CPU:1: MEJ 68.167 6a9c

6a9d

	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
(NET)						6b 6c
						6c1
TOTAL	5.397	278.882	.019	11.707	51.674	6c2
						6c3
TOP FIVE						6c4
--------						6c5
MITRE-TIP	1.062	61.566	.017	2.304	57.972	6c6
GUEST	.748	30.643	.024	1.623	40.967	6c7

UCLA-NMC	.679	28.193	.024	1.473	41.521	6c8
UCSB	.662	22.856	.029	1.436	34.526	6c9
UK-ICS	.534	20.936	.026	1.158	39.206	6c10
	-----	-----		-----		6c11
TOTAL	3.685	164.194	.022	7.994		6c12
						6c13
(SYS)						6d
						6d1
BACKGROUND	1.724	85.986	.020	3.740	49.876	6d2
PRINTER	5.699	241.909	.024	12.362	42.448	6d3
SYSTEM	7.806	338.712	.051	16.933	19.708	6d4
	-----	-----		-----		6d5
TOTAL	15.229	666.607	.023	33.035		6d6
(WOR)						6e
						6e1
CATALOG	-	-	-	-	-	6e2
ENERGY	.022	.901	.024	.048	40.955	6e3
GILBERT	-	-	-	-	-	6e4
JIMB	1.269	16.604	.076	2.753	13.084	6e5
MARRAH	.002	.086	.023	.004	43.000	6e6
MARTINEZ	.029	.612	.047	.053	21.103	6e7
	-----	-----		-----		6e8
TOTAL	1.322	18.203	.073	2.858		6e9
						6e10
(XOX)						6f

Nov 11 - 17, 1973: A WEEK IN REVIEW

DEUTSCH	.031	.435	.071	.067	14.032
MITCHELL	.014	.514	.027	.030	36.714
SATTERTHWAITE	.004	.113	.035	.009	28.250
SWEET	.002	.067	.030	.004	33.500
TOTAL	.051	1.129	.045	.110	

(RAD)

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	DIR
BERGS	.029	1.008	.029	.063	34.759	48
CARRI	.002	.024	.083	.004	12.000	17
CAVAN	.020	.631	.032	.043	31.550	122
DAUGH	.141	9.384	.015	.306	66.553	59
IUORN	.060	2.968	.020	.130	49.467	39
KENNE	.187	9.113	.021	.406	48.733	67
LAFOR	.050	1.660	.030	.108	33.200	19
LAMON	.136	7.881	.017	.295	57.949	95
LAWRE	.133	5.992	.022	.289	45.053	88
MCNAM	.018	1.200	.015	.039	66.667	112
PANAR	.429	15.315	.028	.931	35.699	140
RADC	.004	.129	.031	.009	32.250	70
RZEPK	.091	4.472	.020	.197	49.143	100

STONE	.451	18.966	.024	.978	42.053	205	6g17
THAYE	.020	.740	.027	.043	37.000	45	6g18
TOMAI	.054	2.355	.023	.117	43.611	23	6g19
	-----	-----		-----		-----	6g20
TOTAL	1.825	81.838		3.958		1249.000	6g21
(PER CENT TOTAL DISK CAPACITY)						2.565%	6g22
							6g23
							7

BAH 23-NOV-73 21:47 20454

Nov 11 - 17, 1973: A WEEK IN REVIEW

(J20454) 23-NOV-73 21:47; Title: Author(s): Beauregard A. Hardeman/BAH; Distribution: /WAR; Sub-Collections: SRI-ARC WAR; Clerk: BAH;

Nov 4-10, 1973: A WEEK IN REVIEW

WEEKLY ANALYSIS REPORT: 1

2

WEEK: NOV 4 - 10, 1973 (00 HOURS/DAY) 3

4

TOTAL SYSTEM CPU: 55.999 5

6

(ARC)	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6a
						6a1
(DOC)						6a2
(JMB)	.786	24.531	.032	1.404	31.210	6a2a
(NDM)	.150	8.299	.018	.268	55.327	6a2b
CAT	1.737	5.612	.310	3.102	3.231	6a2c
DOCB	-	-	-	-	-	6a2d
DOCUM	.271	10.549	.026	.484	38.926	6a2e
	-----	-----		-----		6a2f
TOTAL	2.944	48.991		5.258		6a2g
(FAC)						6a3
(RAB)	.002	.147	.014	.004	73.500	6a3a
(MEH)	.368	11.108	.033	.657	30.185	6a3b
(JCP)	1.752	62.562	.028	3.129	35.709	6a3c
(JR)	-	-	-	-	-	6a3d
(EKV)	-	-	-	-	-	6a3e
OPRATR	.764	35.862	.021	1.364	46.940	6a3f
	-----	-----		-----		6a3g
TOTAL	2.886	109.679		5.154		6a3h

						6a3i
(NIC)						6a4
(JDC)	.097	3.570	.027	.173	36.804	6a4a
(EJF)	.921	24.729	.037	1.645	26.850	6a4b
(CBG)	.008	.146	.055	.014	18.250	6a4c
(MDK)	.352	8.639	.041	.629	24.543	6a4d
(MLK)	.309	14.251	.022	.552	46.120	6a4e
(JBN)	1.002	31.786	.032	1.789	31.723	6a4f
NETINFO	-	-	-	-	-	6a4g
NIC-WORK	.003	.045	.067	.005	15.000	6a4h
	-----	-----		-----		6a4i
TOTAL	2.692	83.166		4.807		6a4j
						6a4k
(PRO)						6a5
(DIA)	.190	8.286	.023	.339	43.611	6a5a
(WRF)	.396	8.587	.046	.707	21.684	6a5b
(KEV)	.962	19.448	.049	1.718	20.216	6a5c
(DCW)	2.505	44.433	.056	4.473	17.738	6a5d
(CFD)	1.001	22.950	.044	1.788	22.927	6a5e
(JDH)	.386	11.839	.033	.689	30.671	6a5f
(CHI)	.576	14.472	.040	1.029	25.125	6a5g
(DSK)	.306	10.391	.029	.546	33.958	6a5h
(HGL)	.830	18.904	.044	1.482	22.776	6a5i
(EKM)	.995	27.781	.036	1.777	27.921	6a5j
(JEW)	.358	7.088	.051	.639	19.799	6a5k

	-----	-----		-----		6a5l
TOTAL	8.505	194.179		15.187		6a5m
						6a5n
(PSO)						6a6
(JML)	.177	9.906	.018	.316	55.966	6a6a
(BAH)	.763	16.468	.046	1.363	21.583	6a6b
(MEJ)	1.106	64.133	.017	1.975	57.986	6a6c
(KIR)	.474	13.460	.035	.846	28.397	6a6d
	-----	-----		-----		6a6e
TOTAL	2.520	103.967		4.500		6a6f
						6a6g
(STA)						6a7
(JHB)	.540	20.698	.026	.964	38.330	6a7a
(DCE)	.589	22.861	.026	1.052	38.813	6a7b
(SRL)	.367	9.057	.041	.655	24.678	6a7c
(JCN)	.642	14.535	.044	1.146	22.640	6a7d
(DVN)	.865	23.454	.037	1.545	27.114	6a7e
(PR)	.262	8.194	.032	.468	31.275	6a7f
(RWW)	.072	1.492	.048	.129	20.722	6a7g
	-----	-----		-----		6a7h
TOTAL	3.337	100.291		5.959		6a7i
						6a7j

(GROUP) TOTALS 6a8

GROUP	CPU HRS	CON HRS	CPU/CON	% SYS	
					6a8a
(DOC)	2.944	48.991	.060	5.258	6a8b

Nov 4-10, 1973: A WEEK IN REVIEW

(FAC)	2.886	109.679	.026	5.154	6a8c
(NIC)	2.692	83.166	.032	4.807	6a8d
(PRO)	8.505	194.179	.044	15.187	6a8e
(PSO)	2.520	103.967	.024	4.500	6a8f
(STA)	3.337	100.291	.033	5.959	6a8g
	-----	------		-----	6a8h
TOTAL	22.884	640.273	.036	40.865	6a8i

6a8j

(STATS) 6a9

HIGHEST CPU: DCW 2.505 hrs LOWEST CPU: RAB .002 hrs 6a9a

HIGHEST CON: MEJ 64.133 hrs LOWEST CON: CBG .146 hrs 6a9b

HIGHEST CPU/CON: DCW .056 HIGHEST CON/CPU:1: RAB 73.500 6a9c

6a9d

6a10

(NET)	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6b
						6b1
TOTAL	9.834	316.836	.031	17.561	32.218	6b2
						6b3
TOP FIVE						6b4
--------						6b5
UK-ICS	2.308	24.513	.094	4.122	10.621	6b6
UCLA-NMC	2.307	16.666	.138	4.120	7.224	6b7
MITRE-TIP	1.457	81.599	.018	2.602	56.005	6b8

GUEST	.970	37.929	.026	1.732	39.102	6b9
NSRDC	.885	42.250	.021	1.580	47.740	6b10
	-----	-----		-----		6b11
TOTAL	7.927	202.957	.039	14.156		6b12
						6b13
						6b14
(SYS)						6c
BACKGROUND	4.127	93.196	.044	7.370	22.582	6c1
PRINTER	9.744	186.404	.052	17.400	19.130	6c2
SYSTEM	6.156	278.458	.022	8.638	19.037	6c3
	-----	-----		-----		6c4
TOTAL	20.027	558.058	.036	35.753		6c5
(WOR)						6d
						6d1
ENERGY	.024	1.696	.014	.043	70.667	6d2
JIMB	.310	7.718	.040	.554	24.897	6d3
MARTINEZ	.098	6.059	.016	.175	61.827	6d4
CATALOG	-	-	-	-	-	6d5
GILBERT	-	-	-	-	-	6d6
	-----	-----		-----		6d7
TOTAL	.432	15.473	.028	.772		6d8
						6d9
(XOX)						6e
						6e1
NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6e2

Nov 4-10, 1973: A WEEK IN REVIEW

						6e3
DEUTSCH	.080	1.473	.054	.143	18.413	6e4
MITCHELL	.113	3.561	.032	.202	31.513	6e5
SATTERTHWAITE	.073	3.567	.020	.130	48.863	6e6
SWEET	.114	5.933	.019	.204	52.044	6e7
	-----	-----		-----		6e8
TOTAL	.380	14.534	.026	.679		6e9
						6e10

(RAD) 6f

						6f1
NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6f2
						6f3
BERGS	.069	4.542	.015	.123	65.826	6f4
CAVAN	.182	9.489	.019	.325	52.137	6f5
DAUGH	.001	.008	.125	.002	8.000	6f6
IUORN	.042	2.827	.015	.075	67.310	6f7
KENNE	.197	9.099	.022	.352	46.188	6f8
LAFOR	.007	.180	.039	.013	25.714	6f9
LAMON	.198	11.753	.017	.354	59.359	6f10
LAWRE	.019	.932	.020	.034	49.053	6f11
LIUZZ	.001	.010	.100	.002	10.000	6f12
MCNAM	.170	12.636	.013	.304	74.329	6f13
PANAR	.177	5.890	.030	.316	33.277	6f14
RADC	.047	1.905	.025	.084	40.532	6f15
RZEPK	.494	24.072	.021	.882	48.729	6f16

STONE	.564	25.111	.022	1.007	44.523	6f17
THAYE	.007	.306	.023	.013	43.714	6f18
TOMAI	.142	5.426	.026	.254	38.211	6f19
OTHER	.122	8.324	.015	.218	58.230	6f20
	-----	-----		-----		6f21
TOTAL	2.439	122.510	.020	4.358		6f22
						6f23
						7

BAH 23-NOV-73 21:49 20455

Nov 4-10, 1973: A WEEK IN REVIEW

(J20455) 23-NOV-73 21:49; Title: Author(s): Beauregard A. Hardeman/BAH; Distribution: /WAR; Sub-Collections: SRI-ARC WAR; Clerk: BAH;

OCT 23 - NOV 3, 1973: A WEEK IN REVIEW

WEEKLY ANALYSIS REPORT:

WEEK: OCT 28 - NOV 3, 1973 (24 HOURS/DAY)

TOTAL SYSTEM CPU: 59.378

(ARC)

IDENT	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1
(STAFF)					
(JMB)	.851	19.538	.044	1.433	22.959
(DCE)	.644	24.771	.026	1.085	38.464
(SRL)	.320	6.912	.046	.539	21.600
(NDM)	.319	17.048	.019	.537	53.442
(JCN)	.734	17.267	.043	1.236	23.525
(DVN)	.333	11.707	.028	.561	35.156
(PR)	.394	15.781	.025	.664	40.053
(RWW)	.084	2.487	.034	.141	29.607
	-----	-----		-----	
TOTAL	3.679	115.511		6.196	
(PSO)					
(JML)	.226	16.356	.014	.381	72.372
(BAH)	1.132	21.625	.052	1.906	19.103
(MEJ)	1.481	91.196	.016	2.494	61.577

(KIR)	.495	35.776	.014	.834	72.275	6a4d
	-----	-----		-----		6a4e
TOTAL	3.334	164.953		5.615		6a4f
						6a4g
(NIC)						6a5
(JDC)	.167	23.536	.007	.281	140.934	6a5a
(EJF)	.661	20.614	.032	1.113	31.186	6a5b
(CBG)	.014	.607	.023	.024	43.357	6a5c
(MDK)	.491	9.144	.054	.827	18.623	6a5d
(MLK)	.617	31.745	.019	1.039	51.451	6a5e
(JBN)	.268	16.847	.016	.451	62.862	6a5f
	-----	-----		-----		6a5g
TOTAL	2.218	102.493		3.735		6a5h
						6a5i
(HARDWARE)						6a6
(RAB)	.007	.219	.032	.012	31.286	6a6a
(MEH)	.535	15.819	.034	.901	29.568	6a6b
(JR)	-	-	-	-	-	6a6c
(EKV)	-	-	-	-	-	6a6d
	-----	-----		-----		6a6e
TOTAL	.542	16.038		.913		6a6f
						6a6g
(TENEX)						6a7
(DIA)	.269	11.122	.024	.453	41.346	6a7a
(WRF)	1.193	20.436	.058	2.009	17.130	6a7b

(KEV)	2.505	34.273	.073	4.219	13.687	6a7c
(DCW)	1.739	29.826	.058	2.929	17.151	6a7d
	-----	-----		-----		6a7e
TOTAL	5.706	95.657		9.610		6a7f
						6a7g
(NLS)						6a8
(CFD)	2.081	45.316	.046	3.505	21.776	6a8a
(JDH)	.341	14.454	.024	.574	42.387	6a8b
(CHI)	.320	9.978	.032	.539	31.181	6a8c
(DSK)	-	-	-	-	-	6a8d
(HGL)	.601	11.229	.054	1.012	18.684	6a8e
(EKM)	.185	10.439	.018	.312	56.427	6a8f
(JEW)	.951	13.609	.070	1.602	14.310	6a8g
	-----	-----		-----		6a8h
TOTAL	4.479	105.025		7.544		6a8i
						6a8j
(GROUP) TOTALS						6b
GROUP	CPU HRS	CON HRS	CPU/CON	% SYS		6b1
						6b2
(STAFF)	3.679	115.511	.032	6.196		6b3
(PSO)	3.334	164.953	.020	5.615		6b4
(NIC)	2.218	102.493	.022	3.735		6b5
(HARDWARE)	.542	16.038	.034	.913		6b6
(TENEX)	5.706	95.657	.060	9.610		6b7
(NLS)	4.479	105.025	.043	7.543		6b8

	-----	------		------	6b9
TOTAL	19.958	599.677	.033	33.612	6b10
					6b11

(STATS) 6c

HIGHEST CPU: KEV 2.505 hrs LOWEST CPU: RAB .007 hrs 6c1

HIGHEST CON: MEJ 91.196 hrs LOWEST CON: RAB .219 hrs 6c2

HIGHEST CPU/CON: KEV .073 HIGHEST CON/CPU:1: JDC 140.934 6c3

6c4

(OVERHEAD) 6d

6d1

BACKGROUND	1.711	129.077	.013	2.882	75.440	6d2
CAT	1.756	9.565	.184	2.957	5.447	6d3
DOCUMENTATION	.425	15.865	.027	.716	37.329	6d4
NETINFO	.006	.117	.051	.010	19.500	6d5
NIC-WORK	.020	1.305	.015	.034	65.250	6d6
OPERATOR	.769	28.889	.027	1.295	37.567	6d7
PETERS	4.333	53.802	.081	7.297	12.417	6d8
PRINTER	8.093	258.164	.031	13.630	31.900	6d9
SYSTEM	11.684	365.738	.032	19.677	31.250	6d10
	-----	-----		-----		6d11
TOTAL	28.797	991.409		48.498		6d12

(XEROX) 6e

6e1

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	6e2

6e3

DEUTSCH	.047	.858	.055	.079	18.255	6e4
MITCHELL	.257	9.710	.026	.433	37.782	6e5
SATTERTHWAITE	.241	8.959	.027	.406	37.174	6e6
SWEET	.017	1.036	.016	.029	60.941	6e7
	-----	-----		-----		6e8
TOTAL	.562	20.563		.947		6e9
						6e10

(RADC) 6f

6f1

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	DIR	
							6f3
BERGS	.060	2.812	.021	.101	46.867	44	6f4
BETHK	.129	6.256	.021	.217	48.496	?	6f5
CAVAN	.145	8.297	.017	.244	57.221	118	6f6
IUORN	.026	2.058	.013	.044	79.154	46	6f7
KENNE	.228	10.473	.022	.384	45.934	58	6f8
LAMON	.667	19.873	.034	1.123	29.795	130	6f9
LAWRE	.206	24.469	.008	.347	118.782	42	6f10
MCNAM	.049	3.741	.013	.083	76.347	119	6f11
PANAR	.191	12.504	.015	.322	65.466	132	6f12
RADC	.059	2.043	.029	.099	34.627	62	6f13
RZEPK	.371	25.305	.015	.625	68.208	159	6f14
STONE	.321	15.599	.021	.541	48.595	273	6f15
THAYE	.022	1.887	.012	.037	85.773	39	6f16
TOMAI	.064	2.799	.023	.108	43.734	34	6f17

OCT 23 - NOV 3, 1973: A WEEK IN REVIEW

	-----	-----		-----	----	6f18
TOTAL	2.538	138.116		4.275	1256	6f19
(PER CENT TOTAL DISK CAPACITY)					2.579%	6f20

(NETUSERS) TOP FIVE 6g

6g1

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6g3
MITRE-TIP	1.073	64.157	.017	1.807	59.792	6g4
UCLA-NMC	.938	32.976	.028	1.580	35.156	6g5
GUEST	.860	40.030	.021	1.448	46.547	6g6
NSRDC	.633	31.850	.020	1.066	50.316	6g7
UCSB	.355	12.608	.028	.598	35.515	6g8
	-----	-----		-----		6g9
TOTAL	3.859	181.621		6.499		6g10

6g11

(NET) TOTAL	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6h1
TOTAL	6.266	312.304		10.553		6h2

6h3

(OTHER)	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6i1
BAIR	.374	15.543	.024	.474	41.559	6i2
ENERGY	.001	.054	.019	.001	54.000	6i3
JIMB	.861	10.731	.080	1.090	12.463	6i4
MARRAH	.004	.148	.027	.005	37.000	6i5

MARTINEZ	.001	.087	.011	.001	87.000	616
	-----	-----		-----		617
TOTAL	1.241	26.563		2.090		618
						619
						7

BAH 23-NOV-73 21:55 20456

OCT 23 - NOV 3, 1973: A WEEK IN REVIEW

(J20456) 23-NOV-73 21:55; Title: Author(s): Beauregard A. Hardeman/BAH; Distribution: /WAR; Sub-Collections: SRI-ARC WAR; Clerk: BAH;

OCT 21-27, 1973: A WEEK IN REVIEW

WEEKLY ANALYSIS REPORT:

WEEK: OCT 21 - 27, 1973 (24 HOURS/DAY)

TOTAL SYSTEM CPU: 55.125

(ARC)

IDENT	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1
(STAFF)					
(JMB)	.484	11.402	.042	.878	23.558
(DCE)	.355	8.040	.044	.644	22.648
(SRL)	.936	18.770	.050	1.698	20.053
(NDM)	1.415	21.643	.065	2.567	15.295
(JCN)	1.538	32.485	.047	2.790	21.122
(DVN)	1.254	33.169	.038	2.275	26.451
(PR)	.004	.043	.093	.007	10.750
(RWW)	.115	4.211	.027	.209	36.617
	-----	-----		-----	
TOTAL	6.101	129.763		11.068	
(PSO)					
(JML)	.234	17.213	.014	.424	73.560
(BAH)	2.402	32.526	.074	4.357	13.541
(MEJ)	1.148	82.474	.014	2.083	71.841

(KIR)	1.039	35.910	.029	1.885	34.562	6a4d
	-----	-----		-----		6a4e
TOTAL	4.823	168.123		8.749		6a4f
						6a4g
(NIC)						6a5
(JDC)	.099	3.285	.030	.180	33.182	6a5a
(EJF)	.502	16.726	.030	.911	33.319	6a5b
(CBG)	.071	3.116	.023	.129	43.887	6a5c
(MDK)	.507	11.090	.046	.920	21.874	6a5d
(MLK)	.636	31.546	.020	1.154	49.601	6a5e
(JBN)	.014	1.048	.013	.025	74.857	6a5f
	-----	-----		-----		6a5g
TOTAL	1.829	66.811		3.319		6a5h
						6a5i
(HARDWARE)						6a6
(RAB)	0.000	0.000	0.000	0.000	0.000	6a6a
(MEH)	.417	15.015	.028	.756	36.007	6a6b
(JR)	.001	.052	.019	.002	52.000	6a6c
(EKV)	0.000	0.000	0.000	0.000	0.000	6a6d
	-----	-----		-----		6a6e
TOTAL	.418	15.067		.758		6a6f
						6a6g
(TENEX)						6a7
(DIA)	.255	18.379	.014	.463	72.075	6a7a
(WRF)	1.610	16.491	.098	2.921	10.243	6a7b

(KEV)	1.004	67.032	.015	1.821	66.765	6a7c
(DCW)	.477	12.604	.038	.865	26.423	6a7d
	-----	-----		-----		6a7e
TOTAL	3.346	114.506		6.070		6a7f
						6a7g
(NLS)						6a8
(CFD)	1.556	35.693	.044	2.823	22.939	6a8a
(JDH)	.454	22.415	.020	.824	49.372	6a8b
(CHI)	2.225	53.205	.042	4.036	23.912	6a8c
(DSK)	0.000	0.000	0.000	0.000	0.000	6a8d
(HGL)	.046	1.124	.041	.083	24.435	6a8e
(EKM)	0.000	0.000	0.000	0.000	0.000	6a8f
(JEW)	1.002	15.402	.065	1.818	15.371	6a8g
	-----	-----		-----		6a8h
TOTAL	5.283	127.839		9.584		6a8i
						6a8j

(GROUP) TOTALS 6b

GROUP	CPU HRS	CON HRS	CPU/CON	% SYS	
					6b1
					6b2
(STAFF)	6.101	129.763	.047	11.068	6b3
(PSO)	4.823	168.123	.029	8.749	6b4
(NIC)	1.829	66.811	.027	3.319	6b5
(HARDWARE)	.418	15.067	.028	.758	6b6
(TENEX)	3.346	114.506	.029	6.070	6b7
(NLS)	5.283	127.839	.041	9.584	6b8

	-----	------		-----		6b9
TOTAL	21.800	622.109	.035	39.548		6b10
						6b11

(STATS) 6c

HIGHEST CPU: BAH 2.402 hrs LOWEST CPU: JR .001 hrs 6c1

HIGHEST CON: MEJ 82.474 hrs LOWEST CON: PR .043 hrs 6c2

HIGHEST CPU/CON: WRF .098 HIGHEST CON/CPU:1: JBN 74.857 6c3

6c4

(OVERHEAD) 6d

6d1

BACKGROUND	2.025	134.604	.015	3.573	66.471	6d2
CAT	3.852	7.846	.491	6.988	2.037	6d3
CATALOG	0.000	0.000	0.000	0.000	0.000	6d4
DOCB	0.000	0.000	0.000	0.000	0.000	6d5
DOCUMENTATION	.130	10.336	.013	.236	79.508	6d6
GILBERT	.004	2.061	.002	.007	515.250	6d7
NETINFO	.006	.042	.143	.011	7.000	6d8
NIC-WORK	.006	.873	.007	.011	145.500	6d9
OPERATOR	.693	36.955	.019	1.257	53.326	6d10
PETERS	2.195	50.678	.043	3.982	23.088	6d11
PRINTER	8.927	260.065	.034	16.194	29.132	6d12
SYSTEM	8.192	403.615	.020	14.860	50.000	6d13
	-----	-----		-----		6d14
TOTAL	26.030	907.075		47.219		6d15

(XEROX) 6e

OCT 21-27, 1973: A WEEK IN REVIEW

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1
DEUTSCH	.200	6.306	.032	.353	31.530
GESCHKE	.002	.046	.043	.004	23.000
MITCHELL	.202	8.924	.023	.366	44.178
SATTERTHWAITE	.117	7.334	.016	.212	62.684
SWEET	.035	2.995	.012	.063	85.571
TOTAL	.556	25.605		1.008	

(RADC)

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1
BERGS	.204	8.374	.024	.370	41.049
CAVAN	.156	7.716	.020	.283	49.462
IUORN	.015	1.587	.009	.027	105.800
KENNE	.409	13.149	.031	.742	32.149
LAMON	.740	18.669	.040	1.342	25.228
LAWRE	.132	9.686	.014	.239	73.379
MCNAM	.062	4.769	.013	.112	76.919
PANAR	.206	11.472	.018	.374	55.689
RZEPK	.153	21.024	.007	.278	137.412
STONE	.301	8.960	.034	.546	29.767

THAYE	.014	1.030	.014	.025	73.571	6f14
TOMAI	.096	4.637	.021	.174	48.302	6f15
OTHER	.003	.058	.052	.005	19.333	6f16
OTHER	.065	4.876	.013	.118	75.015	6f17
	-----	-----		-----		6f18
TOTAL	2.556	116.007		4.635		6f19
						6f20

(NETUSERS) TOP FIVE 6g

6g1

NAME	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6g3
NSRDC	.579	26.137	.022	1.050	45.142	6g4
UCSB	.477	22.606	.021	.865	47.392	6g5
BELL	.360	19.022	.019	.653	52.839	6g6
SU-HP	.223	5.638	.040	.405	25.283	6g7
SDAC-TIP	.176	9.781	.018	.319	55.574	6g8
	-----	-----		-----		6g9
TOTAL	1.815	83.184		3.292		6g10

6g11

(NET) TOTAL	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6h1
TOTAL	3.124	159.392	.020	5.657		6h2
						6h3

(OTHER)	CPU HRS	CON HRS	CPU/CON	% SYS	CON/CPU:1	
						6i1

BAIR	.900	27.116	.033	1.633	30.129	612
ENERGY	.013	.650	.020	.024	50.000	613
JIMB	.125	5.356	.023	.227	42.848	614
MARRAH	.019	.979	.019	.034	51.526	615
	-----	-----		-----		616
TOTAL	1.057	34.101		1.918		617
						618
						7

BAH 23-NOV-73 23:26 20457

OCT 21-27, 1973: A WEEK IN REVIEW

(J20457) 23-NOV-73 23:26; Title: Author(s): Beauregard A. Hardeman/BAH; Distribution: /WAR; Sub-Collections: SRI-ARC WAR; Clerk: BAH;