Memo Concerning Archive system on 940

Doug,
Two things have been happening with respect to the archive system. |

(1) As you know, I have been pushing hard on the Collector/Sorter and Archive systems. |a

As I mentioned to you some time back, I had plannned to finish the Collector/Sorter and Archive systems, and then take a week off. |a|

Unfortunately, I have crapped out. I think that the most expedient utilization of time and effort would call for me to take a week off now, and finish up the Archive when I return. |a|a

I dislike missing deadlines, but I feel that in my present state I could spend 2 weeks doing 4 days work. |a|b

Therefore, since I will be gone when you read this, I will see you next Monday, my apologies for crapping out, and I hope you understand. |a|c

(2) I have been experiencing deep-in-the-stomach-pit trepidations with respect to doing the Archive system on the 940. |b

When the Archive was first concieved, some 4 months ago, I visualized it as a simple, stop-gap system which would take a couple of weeks to implement. |b|

It has, since then, become a summer project, grown, experienced a period of awkwardness, and some development. |b2

That it, as currently specified, could be implemented on the 940 I have no doubt. |b3

There is, however, some question in my mind as to whether it should be implemented on the 940. |b4

Consider the following: |b5

We are at a stage where we may write and debug programs for the |0. |b5a

The PDP|0 is here (almost), and it will at least be

operational in the near the end of December. |b5a|

There will be time available before then on other |0 systems, and the |0 MOL is now operational. |b5a2

We are not entirely satisfied with the specification of the preliminary archive, which had been at least partially excused by considering it a 'stop-gap' system. |b5b

The prolongtion of the design effort has decreased both the useful life and the stop-gap nature of the archive on the 940. |b5c

The useful life of the preliminary archive system on the 940 is 3 to 5 months. |b5c|

Given at least | month for 'accomodation' of the system by ARC, the useful life becomes 2 to 4 months. |b5c2

This time is further reduced by thhe fact that the availibilty of the 940 will be minimal during the time that hardware work is being done on the |0. |b5c3

It is not clear, in my mind, that the archive system is a high priority item on the 940. What of significance will it allow us to do on the 940 that we cannot do now that is vital to our plans in the current time-frame? |b5d

From these and other considerations, there seems to me a strong likelihood that we should not expend the effort required to implement the archive system on the 940, but rather utilize the same time to better design a file system for the PDP|0. |b6

The system designed for the |0 should be a lasting, expandable file system which is compatible with the extant file system provded by the TENEX system. |b6a

We should give careful thought to designing a system which wouuld suit both our and BBN's needs, thereby opening the possibility of collaborating with BBN on the implementation. |b6b

The system should provide for automatic N-level (where N is greater than 2) file storage and retrieval, without undue implication of the user. |b6c

Provision should be made for the accomodation of our

files to a (set of) information retrieval needs. |b6d

These needs range from the interactive use of archived files in browsing (e.g. when perusing through a dialogue) to the generation of complicated catalogues from a large collection or collections. |b6d|

Special attention needs to be paid to making the archive system consistent with thee remainder of the file system, and thereby making it relatively 'natural' (perhaps even invisible) to use. |b6e

Concluding, I feel that we ought to seriously re-consider the decision to implement the archive on the 940 at this time. 2

The environment has significantly changed from the time when the decision to implement an archive sytem on the 940. 2a

When the decision was initially made, there was an uncertainty as to whether we were going to get a new computer, and when we would get it. It appeared that any system written at hat time would have a life time which was sufficient to justify its creation. 2b

We now have a hard time frame in which to work, and it appears that the useful life of any 940 program is short. 2b|

We have thus far not invested a great deal in the implementation if an Archive system ond the 940. Most of the effort has been spent on design. 2c

We would therefore not lose too much by deciding to defer implementation to the |0, and we would gain the experience of having designed the system for the 940. 2c|

We would, by defering the implementation, free up time for work on other projects which have a greater payoff on the 940, have a greater relevance to our short term needs, or directly relate to the PDP |0 transfer and/or system. 2d

N.B. 3

If we defer the implementation of the archive system, we leave one previously answered question unanswered: How do we transfer our files to the |0?? 3a

```
':4878', 09/27/70 0233:37 JCN ;  ':ARCHIVE NOTE', 09/25/70 1320:03 WSD ;
.HED="                                          4878 WSD 25SEP70
Memo Concerning Archive system on 940";  To DCE From WSD
.SNF=72;.MCH=65;.PGN=0;.DSN=1;.DPR=0;
```

Memo to JCN and JBN: where to find NIC files and documents

In addition to the following information, there is a black pasteboard binder labelled "NIC Workbook" on MGC desk in J2080 with a concordance between Xdoc numbers, NIC numbers, and NWG/RFC numbers of documents and with some notes titled "NIC Record of Entry and Processing" that will help you determine where on-line versions of NIC Documents previously transcribed, archived, and deleted from KDF are; other useful information about what has been done to which documents |

Archived on-line versions of NIC Catalog files as of June 1970 (since then nothing has been done on them) 2

Latest version (June 1970) of extended NIC citations, on-line version 2a

(NIC)AEXT Reel 3| 2a|

(NIC)BEXT Reel 3| 2a2

(NIC)CEXT Reel 3| 2a3

(NIC)FINDEXT Reel 3| 2a4

(NIC)EEXT Reel 3| 2a5

Latest version of brief citations, on-line version 2b

(NIC)CITON Reel 3| 2b|

Latest version of author, source index, on-line version 2c

(NIC)AUTOR Reel 3| 2c|

(NIC)SOURCE Reel 3| 2c2

Procedures used to process NIC catalogs as of June 1970 2d

(NIC)NICHB Reel 32 2d|

Location of hard copy originals of NIC documents: 3

NIC #s 1 - 83 except NWG/RFC documents: 3a

on bottom shelf in J2080 3a|

NIC #84 - #124 except NWG/RFC documents: 3b

Memo to JCN and JBN: where to find NIC files and documents

in top left hand drawer of MGC desk in J2080 3b|

BER has NWG/RFC documents 3b2

On-line version of NWG/RFC Documents (see (NAC)NWCAT) 4

(NAC)01NWG 4a

(NAC)02NWG 4b

(NAC)03NWG 4c

(NAC)04NWG 4d

(NAC)05NWG 4e

QED files containing transcribed NWG/RFC documents to be inserted in R2 NWG files: 5

(NAC):|2|6N (also: (NIC)|2|6N in KDF) (NWG/RFC |2, |3, |5) 5a

(NAC):2730N (also: (NIC)2730N in KDF) (NWG/RFC 27 and 30) 5b

(NAC):|6NWG (also: (NAC)|6NWG and (NIC)|6NWG,in KDF) (NWG/RFC |6) 5c

(NAC):6566N (also: (NAC)6566N in KDF) (65 and 66) 5d

```
:4879, 10/02/70 1042:56 MGC ;  :JRNL2MGC, 10/01/70 1614:31 MGC ;
.PGN=0; .HED="                                              4879 MGC 01OCT70
Memo to JCN and JBN:  where to find NIC files and documents";
.SNF=72;.MCH=65;.PGN=0;.DSN=1;.DPR=0;
```

4880 MGC 02/OCT70

Notes re tape procedures and folklore

Archived on Reel 16 is a file called (CALDWELL)FTS that describes in detail how to use the tape system currently used for archiving files and for saving journal files on mag tape. 1

I have been unable to get a copy from mag tape into the system to update and journalize it before I leave. Therefore an old copy with pencilled notes is attached to this document. The following information is to supplement (CALDWELL)FTS. 2

On-line tape CFD's are currently located in two files under username CATALOG instead of in (CALDWELL)TAPIN 3

(CATALOG)1ARCA and (CATALOG)2ARCA 3a

Since username CATALOG is set so that no colon files can be set permanent and so that tape system cannot be used with executivity, it is necessary either to get DJH to permanently change the userdirectory so that it is more convenient or to use the following procedure: 3b

Log in as somebody else other than CATALOG to get a CFD from a tape (see procedure in FTS) 3b1

Set the QED file containing the CFD permanent. 3b2

Log out and log in again as CATALOG; get 2ARCA out of KDF and insert the QED branch containing the CFD into the colon copy of 2ARCA; then re-write 2ARCA in KDF before logging out. 3b3

To print a hard copy of a tape CFD prior to its insertion into (CATALOG)2ARCA, use the PRInt command in EXEC and instead of "p" for "preformatted file" use "q" for "qed file"; then give the name of the QED file that contains the desired CFD (obtained by procedure defined in (CALDWELL)FTS) 3c

Note that (CATALOG)2ARCA lacks updated CFDs for the following reels: 33, 34, 35, 36 3d

CFD's for 33, 34, and 36 are currently in QED files under username journal, called :33CFD, :34CFD, and :36C/fD 3d1

The "insert QED command" has been inoperative for several weeks. Hard copy versions of tape /cFDs are in black pasteboard binders in J2080 on bottom shelf 3d2

Notes re tape procedures and folklore

There is a bug in the tape system such that, when giving the "dismount command", if the system finishes updating the tape's file directory before the tape finishes re-winding, your terminal gets hung up and the tape doesn't get properly dismounted and the system loses track of what it's doing and the tape usually gets clobbered. To avoid all this bad karma, before dismounting a tape you re-wind it by using control SYS and "re" for "rewind" followed by unit # and period; then wait a maximum of 3 minutes or until you verify by walking into the computer room and looking to see that the tape is finished rewinding. Then you should have no problem dismounting the tape. 4

When copying journal files to tape, please note: (after studying FTS) 5

Make sure you know which unit number the Journal reel is loaded on, and that no other tape drive is set to the same unit number 5a

Make sure that Journal tape is "ready" (check light on tape drive) before you try to mount the tape 5b

Make sure the journal tape is the one set current (see FTS) 5c

Make sure to dismount tape as soon as possible after copying (colon) journal file to tape, so that it gets recorded in tape CFD before next crash 5d

After tape has been dismounted, mount it again and copy tape file to a dummy scratch file, load it in TODAS and do file cleanup to error so that if there is anything wrong with the tape copy you will know immediately 5e

It is especially important to re-wind tape before dismounting When you have not written any new tape files since tape was mounted 5f

When you are finished copying a batch of files to Journal tape, set the current archive reel "current" again 5g

If you have any problems, Dave Hopper is probably the only one who can tell you what the matter is 5h

It is very important to duplicate tapes periodically. It is preferable that until a tape is full you duplicate it once and then the next time you duplicate it you use a new tape for the duplicate reel so that you have a slightly outdated backup duplicate, which you can then use for the duplicate reel the next

time you duplicate it, etc. until the tape is full. This is to keep you sane at those times when the system is being temperamental and you manage to clobber both the original and the duplicate reels on the same day. 6

In order to duplicate tapes you need a file called TDUP. It is supposed to be under username SYSTEM, but periodically disappears. You then read it from SYSTEM KDF into slash file space and set it permanent. If it disappears from SYSTEM KFDF you can get a copy off of Archive reel |7 where it is called (SYSTEM)TDUP 6a

When you have located the file TDUP use the following procedure: 6b

Set up the original tape on the far right tape drive and set the unit number = 0 6b|

Set up a tape on the middle tape drive and set the unit number = | 6b2

Make sure the unit # on the far left tape drive is something innocuous like 6 6b3

Go to the system TTY and from EXEC, call ()TDUP. 6b4

TDUP will ask you for an input unit number (answer 0 followed by period) an output unit number (answer | followed by period). In each case it will ask about format and the answer is "n" for "new" and a period. 6b5

TDUP will then do several carriage returns and ask for a "run title" -- I usually give "Archive Dup NN" where NN is the reel number, but anything will suffice -- and waits for a carriage return and line feed before proceeding 6b6

TDUP takes a few seconds to do some things and then checks to see if you have any requests. The response to this is "f" for finished and a period. 6b7

TDUP then asks for an output reel number. This number should be the same as the input reel number. For example, if you are duplicating Archive reel 37, the response is "37" followed by a period. 6b8

The rest of the duplicating process goes by itself unless the system crashes while it is running, in which case you need to rewind each tape (in EXEC: control SYS + "re" +

unit # + period) and give the dismount command for each tape and start over. 6b9

When TDUP finishes by itself, it dismounts both tapes and leaves you in EXEC. 6b|0

It is possible to rub out of TDUP after it has finished copying all the files and is merely listing the file directory -- wait until it has a good start so that you are sure that is what it's doing (if you are standing there you will see tapes being re-wound prior to this point). Then give a coupld of rubouts and when you get to EXEC, do a RESet. and give dismount tape command for each reel to make sure tapes are dismounted. This saves a lot of time if you already have a copy or plan on getting a QED file copy of the CFD. 6b||

The following tapes need duplicating right now: 7

Reels 30, 31, 32, 33, 34 7a

Reel 35, the journal tape, has two duplicates that were both done since anything has been written on the original. All three were in good shape prior to the moving of the tape units. Since the tape system has not been functional since then, it is unclear whether trying to use the malfunctioning tape system may have destroyed both the original and one of the duplicates. If so, the other duplicate is still in good shape but needs to be duplicated immediately before any files are written on it. 7b

Note that no journal files after 4866 have been copied to the tape and that 4865 has not been copied to the tape. This needs to be done as soon as reel 35 is duplicated. Journal numbers in Jernigan KDF are:J4869 J4870 J4872 J4873 J4874. After they are copied to tape and tape is duplicated again, they should be removed from Jernigan KDF. 8

Reel 35 is the journal tape. The following files are on the journal tape: 8a

Under username Caldwell: 8a|

J4800 J480| J4803 J4804 J4805 J4806 J4807 J4808 J4809
J48|0 J48|| J48|2 J48|3 J48|4 J48|5 J48|6 J48|7 8a|a

Under Username Trundy: 8a2

Notes re tape procedures and folklore

J4819 J4820 J4821 J4822 J4823 J4824 J4825 J4826 J4827
J4828 J4829 J4830 J4831 J4832 J4833 J4834 J4835 J4835
J4837 J4838 J4839 J4840 J4841 J4842 J4843 J4844 J4845 8a2a

Under Username Prince: 8a3

J4846 J4847 J4849 J4850 J4851 J4852 J4853 J4854 J4855
J4856 J4857 J4858 J4859 J4860 J4861 J4862 J4863 J4864
J4866 8a3a

When the tape system is functional again, the following files need to be retrieved from archive tapes to be journalized: 9

from reel 22: (CASSERES)NLDES (journalize as number 4871) 9a

from reel 22 (CALDWELL)APRPL-P 9b

(NASA FINAL files) from reel 34, username Journal: 9c

BAS-NFCH1 9c1

BAS-NFCH2 9c2

BAS-NFCH3 9c3

BAS-NFCH4 9c4

BAS-nFCH5 9c5

BAS-NFPRE 9c6

BAS-NFLIS 9c7

BAS-NFILL 9c8

BAS-NFABS 9c9

It is important to know that the hash table only allows a given number of files to be listed under a given username's file directory at a given time. When a tape is mounted, the system puts all files on the mounted tape that were written under a given username into that user's file directory. What this means is that there is an upper limit to the number of files that can be put on a single tape under the same username. The limit depends partially on the number of actual colon or slash files that are currently listed under that username. I don't remember what the limit is: it is something around 30-40. When you reach that limit, you get an I>> when you try to copy a file to the

tape. There are other times when you get the same message. Since there are always a large number of Journal scratch files, I avoid writing files on the journal tape under username Journal. 10

File Tape System Handling

This file is organized into three parts as follows:

Introductory comment describing file

Several branches each containing a task and a listed sequence of steps required in the order to follow to complete the task

An alphabetized list of names that can be jumped to for a definition of a step designated in the task sequence

To display list of task situations, jump link (,task:xbsyg)

To see how to do a given step in a task sequence jump name of a designated step (step names are capitalized)

(,step:xbzg) Will list all of the steps that may occur in file tape system handling

To discover all situations in which a given step occurs

["CURRENT"]; ["DISMOUNT]; ["DRIVE"]; ["FINISH"]; ["GENERATE"];
["INSERT"]; ["LABEL"]; ["LIST"]; ["LOAD"]; ["MOUNT"];
["NFXCFD"]; ["UNLOAD"];

(step)

(COPY) To read or write files on tape, user

Must be in EXEC

@Copy (NLS file name) to (tape file name).

System no. = -2. (any N depending on which tape is mounted)

OR

@Copy (tape file name) to (NLS file name).

Waits for "@" before giving another command or doing rubout

(CSTCOR) (,current:gnw)

(CURRENT) To establish a reel as the current reel:

DISMOUNT if tape is mounted

Set executivity to -1

Type in SYSCStcor. (where SYS = Control S, Control Y, Control S; and is not printed)

Program will recognize the command and ask for a system number and a reel number, which specify the reel you want to set current.

NOTE: If the reel number is set to 0,

system will assume that whatever reel is mounted directly afterward is the current reel number. This means that if ever two reels are to be mounted at the same time , the reel number should not be set to 0.

NOTE: When a reel is set current, no tape with the designated system number can be written on unless it has the designated reel number.

The same effect can be achieved temporarily by taking out the write ring before loading a tape.

To read a file from a tape that is not current, but is mounted, use RETRIEVE

If the system number is positive , the file tape system recognizes only the reel number "1"

(DISMOUNT) Current file directory of files on the mounted reel is updated and tape is made unavailable to users for writing but available to NFXCFD or CSTCOR

@Dismount tape on unit: N.

Where n is 0, 1, or 2 = the setting of the unit number knob on the tape drive where mounted tape is loaded

(DRIVE) Find available tape drive.

Available means that either the spools are empty or user has agreed to let you dismount and unload his tape and if necessary load and mount it again when finished.

Tape on drive MUST be dismounted before unloading (See DISMOUNT)

(FINISH) To get out of NFXCFD

-Finished.

You are now back in EXEC

(GENERATE) Sets up CFD at beginning of tape and marks system no. and reel number on tape.

DISMOUNT if tape is mounted

NFXCFD

-Generate new tape on unit N.

Reel No. = N.

System No. = N.

Finished.

Note: If tape system number is positive system recognizes only the reel no. "1"

If tape system number is negative, reels should be assigned numbers other than "1"

(INSERT) Use NLS to insert updated CFD as a QED branch in ~~(caldwell):TAPIN~~ (CATALOG);2ARCA
READ (CATALOG)2ARCA TO COLON FILE.
Load ~~(caldwell,tapin,2:xbbszg)~~ (CATALOG);2ARCA

Use (CATALOG)2ARCA in stead 10/2/70 MgC

Insert QED branch (sequential file output by NFXCFD) in appropriate place (see LIST)

Output Checkpoint

Execute file cleanup

Output file ~~:TAPIN~~ ;2ARCA

Edit CFD to match file format

Output file

Make new ~~caldwell~~ CATALOG KDF copy of ~~TAPIN~~ 2ARCA

(LABEL) Each FTS reel should have a label with the following information noted as various steps are completed:

When tape is generated and/or duplicated

System number

Reel number

Date generated and/or duplicated

When branch in (caldwell,tapin,:xb) containing tape's CFD is updated

Date updated (in pencil)

Name of branch in TAPIN where updated listing is inserted

(LIST) The CFD (Current File Directory) at the beginning of a tape

Contains the following information

Username

File Name

Position on tape, Date last written, etc.

Is begun at generation and updated each time tape is mounted

Is used to update (~~caldwell~~ CATALOG, ~~tapin~~ 2ARCA,:xb) each time CFD is updated -- see INSERT

Can be listed while you are in NFXCFD as follows:

DRIVE

LOAD

NFXCFD

User types "L" and system replies by recognizing "List CFD"

If user types a period then the system will list the File Directory for all users

If the user responds by typing a blank, the system will type "For User" and wait for user to enter a user name.

The system will request the number of the tape drive that carries the tape to be listed by typing "Unit Nuber" -- User responds with the drive number.

Can be output to any of the following addresses: sequential file, TTy, 8-level or Papertape (?)

System will then ask if statement numbers are needed in the listing

If listing is to be printed out on TTY, answer "n" for "no"

If listing is to be output to a sequential file to INSERT, answer "y" for "yes"

System then will type "Output to"

If listing is to be output to TTY, type a "t" and after system recognizes "teletype" add a period

If listing is to be saved in a sequential file, type a space

System will type "Onto file" and user specifies filename as he would for any other output process

When action starts , system will type a "$"; when completed, a "-" will signal that NFXCFD is waiting for another request

(LOAD) Thread tape and set drive

Obtain tape from the FTS file cabinet in computer room and check the label to make sure you have right tape

Write Ring (all other factors being equal)

If ring is in, tape can be read or written on

If ring is out, tape can be read but not written on

Push (at center of tape reel) tape onto right hand spool of tape drive and thread it onto left spool as pictured (or like the one next to it)

Set the following knobs:

Density select = 566 bpi (bits per inch ---this is always the same)

Unit select = 0, 1, or 2 (arbitrary -- must be different for each tape unit at any given time; check the others to see which unit number is not in use ---then remember which unit number you chose because this is the value of N for most of the control commands

Hit the following buttons:

Manual reset (doesn't light)

Load (doesn't light)

Load point should light up when reading head detects load point -- if it doesn't it means either the light is burned out, the tape drive is broken or there's no load point marker (silver strip)

When load point lights up (or doesn't, but seems to have been detected), hit auto (will light)

(MOUNT) Tape is made available to users for reading Writing but unavailable to NFXCFD or CSTCOR

@Mount tape on unit: /N.

Mount new tape.

(NFXCFD) To enter NFXCFD

Sign on with any user name that has executivity

Set executivity to -1

In EXEC, type "Go to file ():NFXCFD." System will give starting address and type "-"

(UNLOAD) To remove tape from drive.

Hit the following buttons

Manual Reset

Rewind

When tape reaches load point, repeat sequence if tape does not completely unwind from left spool

Remove tape from spool

Close window

Make appropriate notations on label and return tape to file cabinet

(task)

To GENERATE one or several tapes ahead of time. (Note it is not necessary to mount tape).

DRIVE

LOAD

NFXCFD

GENERATE

FINISH

UNLOAD

If a current, mounted tape is full, and a new tape needs mounting in a hurry, do the following first and then mount a generated tape as in 3c

DISMOUNT

UNLOAD

If there is time, LIST -- otherwise remember to do it later

To MOUNT a "generated" tape

DRIVE

LOAD

if necessary, CURRENT

MOUNT

Can DISMOUNT tape without LIST but if so must do the following as soon as possible

DRIVE

LOAD

NFXCFD

LIST

SAVE current file directory in (CATALOG)ZARCA ~~(caldwell,tapin,:x)~~

UNLOAD

If a person has his own tape with a system number other than -2 and it is already generated:

DRIVE

LOAD

MOUNT

COPY

DISMOUNT

If listing is desired either before or after copying file to tape file, it must be obtained while tape is dismounted (see LIST)

If a member of the ARC community wants to retrieve or update files previously saved on tape

Search (CATALOG)IARCA and (CATALOG)ZARCA ~~(caldwell,tapin,)~~ to find out which tape file is on

DRIVE

LOAD

MOUNT

COPY or RETRIEVE

DISMOUNT

If no changes in tape's CFD, UNLOAD

If changes in tape's CFD, LIST and then INSERT

:FTS, 10/21/69 1641:46 MGC ; See also (caldwell,tapin,2:xbbsgz)
.BSN=1; .PGN=0; .LSP=0; .RTJ=0; .RES;

Archived on Reel 16

```
':4880', |0/02/70 |64|:4| MGC ;  :TAPES, |0/02/70 |357:22 MGC ;  .HED="
4880 MGC 02/OCT70
Notes re tape procedures and folklore";  HARD COPY ATTACHMENT  9 pp.
.SNF=72;.MCH=65;.PGN=0;.DSN=|;.DPR=0;
```

Notes on procedure for handling NWG/RFC Documents
Attention: JCN and JBN

John Melvin receives NWG/RFC Notes. He gives them to BER, who makes | complete copy for John Melvin and | copy of title page to MGC. |

BER transcribes NWG/RFC document and inserts the punched tape into the system under username NAC. (see Journal number 4879 re files transcribed and waiting to be inserted as QED branches into NWG/RFC files). If BER transcribes using TODAS, she puts documents in the appropriate NWG/RFC files. If she uses paper tape, someone else must use insert QED branch to get the files into R2 files, as the insert QED command does not yet work in TODAS and BER doesn't use NLS. 2

Meanwhile MGC XDOCs the new NWG/RFC document and records it in the notes titled "NIC RECORD of ENTRY and PROCESSING". The copy of title page (with XDOC number marked in red) is inserted into the black pasteboard binder labelled "NWG Entry Record" . 3

These documents are located in J2080 on MGC desk 3a

Periodically MGC has done the following. It will still need to be done periodically and someone should be assigned to do it: 4

Insert the transcribed versions that were put in the system via paper tape into the NWG/RFC files in the appropriate place (determined by NWG/RFC number) 4a

Insert XDOC numbers in the new entries, and make sure that branch header format conforms with branch headers of other entries. 4b

Check to make sure KDF copies of NWG/RFC files are still in good shape, doing file cleanup, etc. on files that have been changed and when finished saving the latest cleaned up versions of NWGRFC files on mag tape. 4c

Making a new NWCAT by merging into it an xs view of each NWG/RFC file that has been changed (delete branch that is being replaced) and deleting from the new branch all excess text (see current verison of NWCAT). 4d

Save updated version of NWCAT on archive mag tape 4d|

':488|', |0/02/70 |65|:|5 MGC ; ':NWGPROC', |0/02/70 ||||4:|5 MGC ;
.HED="
488| MGC 020CT70
Notes on procedure for handling NWG/RFC Documents
Attention: JCN and JBN"; .SNF=72;.MCH=65;.PGN=0;.DSN=|;.DPR=0;

XDOC 4882 MGC 02 OCT 70

In a black notebook on bottom shelf of J2080, on which appears the label "XDOC Documentation" are some notes documenting the XDOC system as of November 1970. |

I was unable to obtain from the archive tapes a copy of those files, to update and comment on them. The notes can be studied for details. The procedure I actually follow at present is roughly as follows: |a

MEJ or others deposit documents to be XDOCed in the XDOC "IN" basket on table in J2080 |b

If DCE needs a document returned immediately I check to see what next available number is and make a label with that number, attach it to document, go down to copy room and copy title page and other pages with informaation needed for citation, return document to DCE and put copy of title page with XDOC number on top of stack in "IN" basket to be cited in XDOC files as soon as possible. |b|

DCE frequently puts a note "XDOC and return" on documents that he wants XDOCed. When he does this, I enter a substatement to the citation for that document, checking it out to him, eg. |b2

DCE 10/2/70 |b2a

If papertape input is to be used, see BER for instructions on how to make a papertape. See also Journal entry :4847. Do everything else the same. |b3

If DCE puts a note on the document that says "NAS", insert a substatement that reads |b4

NAS bibliography DCE 10/2/70 |b4a

The date is, of course, the date the citation is entered |b4b

If the document is to be checked out to someone else, immediately, insert a substatement with his initials and the date |b5

If the document is published by any of the Network Sites (see labels on shelves in J2080) it belongs in a Network Site kit, rather than in the vault or in the Rap Room |b6

Insert after the citation a substatement that reads, for example: |b6a

MAC Site Kit 10/2/70 |b6b

University of Illinois Site Kit |0/2/70 |b6c

Then place the document on the appropriate stack in J2080 |b6d

If TODAS is used, load XDOC file with highest number and print last statement in file to see what was the last number assigned. Enter new citations, doing first any that have numbers pre-assigned as above, and labelling documents as you go. Save file in KDF and make quickprint copy to insert in blue XDOC notebook on bottom shelf of J2080. |b7

Study XDOC Notebook on bottom shelf in J2080 to see how citations are formatted. The black pasteboard binder labelled "FORMAT" that is next to the XDOC notebooks may also be useful. It also contains other more or less useful information about various catalogs now lying around. 2

I have not been handling unbound periodicals. Roberta Carillon was handling them until she left, and I'm not sure they're being catalogued at all since then. If there seems to be any point in doing anything but filing them in the Rap Room, see November documentation 3

We are out of book pockets to put in hard bound books that go in Rap Room. I will call MEJ on Monday to give her the address from which I ordered them originally. 4

NIC documents are always XDOCed, including NWG/RFC documents. Cite them as you would any other document, according to the information available, and insert a substatement after the citation, checking the NIC document out to NIC, as follows: 5

NIC |0/2/70 5a

See JBN as questions arise about handling NIC documents 5b

```
':4882', 10/02/70 1750:29 MGC ;  :XDOC, 10/02/70 1748:53 MGC ;
.SNF=72;.MCH=65;.PGN=0;.DSN=1;.DPR=0;
```

Should have

,HED="- - 4882 MGC 02OCT70
%R XDOC";

BLP $4883.1 WLB 10/05/70 1143:18 THANKS FOR THE INFO. PASS4 USED TO BARF ON THE FILE WHICH IS NOW KDF(BASS)NIC P. I CAN'T REMEMBER IF I CHANGED THINGS TO MAKE IT WORK RIGHT.$ 1

DCE $4883.2 MEJ 10/05/70 1252:16 (Engelbart) :JRNL is now 4884$ 2

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4883.3 WKE 10/05/70 1556:56 -- DISC MODIFICATION SCHEDULE --

The disc file will be modified to operate in 36 bit mode beginning at 5:00 PM on Thursday, Oct 22. Modifications are scheduled to be complete by Sunday night, Oct 25. The disc will be unavailable during this time.

All KDF files will be transfered to the disc in the new format. KDF dump will begin at 2:00 PM Oct 22. All users should have any files that want in KDF by that time and be off the system Colon files will not be transfered. $ 3

WKE $4883.4 WLB 10/05/70 1632:14 RE 4883.3 PLEASE GIVE ANOTHER WARNING CLOSER TO THE 22ND $ 4

MSC VDB CHI WHP $4883.5 WSD 10/05/70 1830:42 NUTILTY CHANGED TO LOAD CALC IN NEW WAY (AS FILE ':NCALC', S-PROC). BE SURE TO USE NNUTI FOR LOADING, AND HASHN IS NT SET UP FOR OLD VERSION.$ 5

VDB MSC CHI $4883.6 WSD 10/05/70 1834:29 P.S. THE COMMAND TO LOAD CALC IS: 'LOAD 'KALC$ 6

WSD JCN $4883.7 DCE 10/06/70 1242:17 Bill: please give early consideration to two mods for the analyzer. 1) delimited scan, and 2) much larger program size. For delimited scan, want to be able to say effectively " Between(P1,P2) ([xxx] AND [yyy] OR [zzz)" -- i.e. between the two parens following the delimitation declaration, the unanchored scans all are limited to the string between P1 and P2. User assumedly did some analysis and pointer setting earlier to provide himself with a meaningful search region. Examples: Isolating the title field in a catalog entry, searching "title only" for given content; or, after finding "memory" in some text, moving forward and backward a given number of words and then searching for "computer."

$ 7

JCN $4883.8 WSD 10/06/70 1714:17 DOES MEJ UNDERSTAND TAT SHE IS SUPPOSED TO DELETE ENTRIES TO JOURNAL AFTER THEY HAVE BEEN ENTERED?? AND THAT SE SHOULD PUT AN APPROPRIATE MESSAGE IN THE MAIL??$ 8

WSD $4883.9 JCN 10/06/70 1822:59 YES, BUT SHE HAD TROUBLE, AND THEY ARE NOT YET DONE WELL TRY TOMORROW AM ALSO, THE COLSRT

DOESNT SORT, I THINK ANYWAY, IM HAVING TROUBLES WHACHA THINK..CAN YOU TRY IT TOO?$ 9

JCN $4883.10 WSD 10/06/70 2022:42 WITH RESPECT TO CATALOGUES, YOU MAY WISH TO TRY THE FILE ':CATPAT' UNDER MY NAME.. EXECUTE TEXT :GO WITH SHIFT OFF PRODUCES FILE NAMED ':TITCAT'. IT WILL NEED SOME SCRATCH SPACES$ 10

JCN DCE $4883.11 WSD 10/06/70 2024:13 STRANGE 'ERROR' PROBLEM WITH AN-COMP MAY BE GOT AROUND BY SETTING VIEWSPECS TO:jwh before compiling$ 11

WSD $4883.12 DCE 10/07/70 0920:09 Bill: I'm having trouble with Execute Merge. When I get to the "pickup" file and strike "b" to indicate that I want a branch, the bug seems to strike, and I never do get a chance to select a branch not visible on the display. Is it a change I'm unaware of, or a bug? Dug.$ 12

DCE $4883.13 MEJ 10/07/70 0923:49 Your files have been journalized as follows:
(ENGE):JRNL now (JOURNAL):4885.
(ENGE):JRNLA now (JOURNAL):4884.
(ENGE):JRNLB now (JOURNAL):4887.$ 13

DCE $4883.14 WSD 10/07/70 1004:22 DOUG... WEN WE WENT TO TE NEW SPL, THE MERGE COMMAND DIDN'T GET COMPLETELY TRANSLATED, SO THAT HE FEEDBACK IS NOT CORRECT FOR PART YOU MENTIONED, I.E. TE ARROW DOESN'T MOVE AS IT SHOULD. GO AHEAD AND MAKE YOUR BRANC SELECTION ANYWAY, AND IT SOOLD WORK.$ 14

WSD $4883.15 MSC 10/07/70 1118:27 IS THERE AY REASON WHY NNUTI (WHAT LOADS KALC) SHOULDN'T BE MADE THE STANDARD NUTILITY (BY SAVING UNDER (MOL)NUTIL, I'LL DO ALL THAT'S NECESSARY WHEN YOU SAY ITS COOL$ 15

WSD $4883.16 MEJ 10/07/70 1123:23 Your files journalized as follows: (DUV):JRNLP4848 now (JOURNAL):4886. (DUV):JRNL1 now (JOURNAL):4888. Having trouble with your :JRNL2 -- must be something wrong with file, since program bombs out repeeatedly. File cleanup shows nothing. JCN will work on it when he gets time. Am deleting thhe two files completed, but am leaving JRNL2 in your colon space.$ 16

MSC $4883.17 WSD 10/07/70 1507:39 OK TO MAKE NNUTI NUTILTY BY MES$ 17

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4883.18 KEV 10/07/70 2003:55 THE FOLLOWING FILES ARE PROBABLY BAD ON THE KDF DUMP TAPES MADE LAST NITE (10/7/70): SYSTEM- B-DTN LAMPSON- TAUG ENGELBART- NCP, NFNET, FRJMP, RINS LICHTENBERGER- MOVIE N1FILES- CDSPL, CLNUP GUEST- P2ROM, ROMEF HOPPER- ODRMD T3FILES- BAD META- TREE, 20 MOL- TMR, MOL NLS- PROCL USR- AFD, 676 O'CONNEL- C680R XDOC- X4OUP T1FILES- BAD, CALC ERICKSON- NF5PR, NFCH4 P4DOC- ARGH DURHAM- CHECK T2FILES- PRM10 PAXTON- BAD2, RL10 CATALOG- NFCH5 IRBY-

BAKUP DIALOGUE- 671, 663, 662, 661, 6510 DIALOGUE- 965, X663
NORTON- STUDY PRINCE- NLSXR YARBOROUGH- TIM TRUNDY- MEMOE$ 18
KEV WKE $4883.19 JDH 10/08/70 0207:17 THE DISK TSS IS NOW OPERATIONAL. (OR AS OPERATIONAL AS I EXPECT TO MAKE IT.) I WON'T DESCRIBE HOW TO SWITCH HERE. IT IS STRAIGHT FORWARD. IT IS EASY TO INITIALIZE THE DISK SYSTEM. PUT BPT3 DOWN AND RUN THE INITIALIZE TAPE. NOTE NEW FILL TAPES AND NEW PAPER TAPE FOR CRASH REC. CHANGES TO THE SYSTEM FROM YESTERDAY ARE ONLY TO THE PAPER TAPE AND FILL TAPE LOADERS. $ 19
VDB WKE $4883.20 JDH 10/08/70 0214:26 FOUND A COUPLE OF BUGS IN XBUF MON. TTY SIM. DISP. LISTS NOT RIGHT. COMMAND TABLE HAS NO DISPLAY UNITS TURNED ON, HAS CORRECT POINTERS TO DISPLAY LISTS THOUGH. LOOKS LIKE DISPLAY BUFFERS AND WORD COUNT IN DISPLAY LISTS ARE OK. HAVEN'T TRIED WORK STATION OPENING HAVE WRITTEN BUT NOT DEBUGGED CORRECTION TO DISPLAY LISTS. DON'T UNDERSTAND PROBLEM WITH COMMAND TABLES YET. $ 20
WSD $4883.21 MEJ 10/08/70 0928:18 Your file :JRNL2 deleted and now (JOURNAL):4889.$ 21
WSD $4883.22 WLB 10/09/70 1317:05 PROBLEMS WITH CONTENT ANALYSER USING ANALYSERCOMPILER.

AFTER COMPILING A PROGRAM IF YOU VIEW THE FILE WITH I ON BUT CAP-O OFF, WHEN YOU TURN CAP-O ON, NO RESTRUCTURING TAKES PLACE. (I.E., YOU HAVE TO TURN CAP-O ON BEFORE OR AT-THE-SAME-TIME-AS YOU TURN I ON.

I CAN'T GET VIEW RESTRUCTURNING WITHOUT WORKING-COPY RESTRUCTURING -- HAS THIS BEEN IMPLEMENTED YET?$ 22
MSC $4883.23 WHP 10/09/70 1616:59 (PRM10,LNMDPY) VSLEV/$ 23
MSC $4883.24 WHP 10/09/70 1617:58 (CONT) CAN'T CHECK FOR A FIELD BEING < O SINCE T IT NEVER WILL BE$ 24
WLB $4883.25 WSD 10/09/70 1659:52 ALL OF THOS THINGS WORK SO FAR AS I KNOW..PERHAPS THERE IS SOMETING WHICH YOU DON'T ENTIRELY UNDERSTAND...WAIT... IT OCCURRS THAT ONCE A STATEMENT HAS BEEN TESTED WITH THE CONAN AND TE THE WORKING COPY IS CANGED, TAT IT WILL NOT BE RE-TESTED AND THE RESTRUCTURING WILL NOT TAKE PLACE...I'LL TALK TO YOU ABOUT USING IT WHEN I COME DOWN$ 25
JCN $4883.26 WSD 10/09/70 1812:08 I TALKED WITH DCE, AND WE AGREE THAT THE INITIALS AT TE TOP OF JOURNAL DOCUMENTS SHOULD BE THOSE OF TE AUTOR...IS TAT OK WITH YOU??? $ 26
CHI WHP $4883.27 WSD 10/09/70 1813:41 LET'S BE COGNIZANT OF A POSSIBLE TROUBLE AREA... THERE WILL BE A LOT OF CONAN/STRCON PROGRAMS WRITTEN ON THE 940, AND THESE WILL NOT WORK ON THE 10$ 27
WSD $4883.28 JCN 10/11/70 2057:59 YES, THE INITIALS AT THE TOP OF THE M JOURNAL HEADER SHOULD BE THOSE OF THE AUTHOR, I'LL FIX THE CATALOG AND FUTURE ONES.$ 28
DCE $4883.29 MEJ 10/13/70 1029:32 Your memo to journal file, J1, "Notes About ARC Journal", is in your scratch space as :ARCJO

and entered in the Journal as (JO):4890. Your memo to journal file, J2, "On Catalog Conversion", is in your scratch space as :CATCO and entered in the Journal as (JO):4891. Both files are also in your KDF as their own names. Printout copies are in your In-Box.$ 29

JCN WLB JBN $4883.30 DCE 10/13/70 1045:35 cf(4885). Talked 9 Oct with Dan Slotnik and Mike Sher. Both very eager to cooperate with Net-Dialogue (4792). Mike will be in charge of selecting and supporting Agent and Liaison Man. Big changes in organization going on due to ILLIAC IV splitoff, but we'll hear from A and L by 16 Oct. Their IMP won't arrive until January (or...)..$ 30

JCN $4883.31 DCE 10/13/70 1041:08 (1) I didn't call Dave Harris yet. (2) Stanford AI Agent called JBN, was welcomed and told she'd be contacted when JBN returned from ASIS. She has a TTY37; we'll need see how she can read us with it. (data set, first?)$ 31

JCN WLB JBN $4883.32 DCE 10/13/70 1044:28 Received call on 8 October from Ted Glaser at Case re (4792). Questions apparently ironed out. He promised to select Agent in about 2 weeks. IMP delivery apparently delayed to January. They have lots of displays but few typewriters, so he seemed to feel the station typewriter might be a problem.$ 32

WKE JTM JCN WLB JBN $4883.33 DCE 10/13/70 1101:49 NET/NIC Note, from phone talk with L. Roberts 10 Sep: He has 5 more candidates seriously being considered for Network participants. Told me not to worry about them now with regard to NIC, and didn't volunteer their names (MITRE, Washington, D.C. branch, apparently is one).$ 33

':4883', 10/16/70 1100:19 MEJ ; .DPR=1; ':MAIL', 10/13/70 1112:45 WSD ;
.DSN=1;.DPR=0;

Proposal for Research No. ESU 69-119 1

EXPERIMENTAL DEVELOPMENT OF A SMALL COMPUTER-AUGMENTED INFORMATION SYSTEM 2

I INTRODUCTION 3

A. The Augmented Human Intellect Research Center 3a

The Augmented Human Intellect Research Center (AHIRC) of Stanford Research Institute's Information Science and Engineering Division is an externally supported, multiply sponsored group of 24 persons working in close cooperation on the problem of "augmenting the human intellect." "Augmentation" is a term indicating the extension, improvement, and amplification of the intellectual capabilities of humans, both as individuals and as working groups or teams. 3a1

The current approach to this goal concentrates on the use of highly interactive computer systems designed to aid individuals and groups in manipulating the information that they work with. This "manipulation of information" includes the following: 3a2

Externalization and storage of "ideas" in symbolic form -- for example, English text, or drawings, or computer programs, or special structures for relating various stored items. 3a2a

Studying the stored material, by means of high-speed computer display of the text, drawings, etc., coupled with specialized information-retrieval techniques geared for this type of application. 3a2b

Modifying and updating the stored material by means of a highly sophisticated system of interactive editing commands, which permit a range of operations from detail editing to wholesale rearrangement of information structures. 3a2c

II SUMMARY 4

A. Objectives 4a

We propose an experimental investigation of techniques for

the management, within AHIRC, of a collection of externally derived information (an "intelligence" collection), with the eventual purpose of creating, using, and developing an "intelligence system" adapted to our particular needs. We expect to develop design principles applicable to information systems for other groups that will be acquiring advanced interactive computer tools. 4a|

We have available a sizable repertoire of special on-line techniques for information handling, plus special capabilities for the development of more techniques. The objective of the proposed research is to develop a systematic application of these techniques and capabilities to the management of our growing collection of "intelligence" (external material), and to the methods of retrieval, extraction and integration of information by our on-line researchers. 4a2

B. Current Status 4b

An important characteristic of AHIRC is its "bootstrapping" strategy for research on augmentation. All systems designed by the Center are intended for actual, practical use in the Center itself; once designed and implemented they are used heavily on a day-to-day basis. This means that AHIRC staff are both experimenters and experimental subjects, and the result is strong "evolutionary" pressure upon the design process. 4b|

Each special development made by the Center in any of its areas of concern (including software design, management, etc.) evolves and is used within an integrated working environment that provides an otherwise unavailable context for evaluation of the real usefulness of the development. Such evaluation is of great importance in designing and developing tools and methodologies for the future world of on-line working groups. 4b|a

One focus of effort within this approach is the development of systems for managing the working information of the group. Considerable work has been done in the development of small, essentially personal information systems, and the Center is beginning to investigate the problems of somewhat larger systems of coordinated working records for use by the group as a whole. 4b2

We want to devote simultaneous attention to managing our

"external" records, as herein proposed. As a beginning, we have collected some 4000 items (books, periodicals, clippings, etc.) over the past ten years. This "XDOC" (external documentation) collection has a very rudimentary catalog whose citation entries are stored by accession number in computer-held files which we can search on content from on-line CRT consoles, but for which there is no formal indexing. With its present form and its current primitive management and usage methods, the XDOC collection is little used or valued. 4b3

We need to expand the coverage so that we can manage all important forms of useful externally derived information: trip reports, visitor records (including notes on information acquired from visitors), catalog and hearsay information on hardware, press clippings, conference announcements, etc. 4b4

We need to learn to apply our advanced interactive computer aids to the procedures for entering, filtering, cataloging and indexing. We need to explore various forms of file organization and indexing which, together with the associated methods of retrieval and extraction that our interactive aids offer, could provide a practical and useful "intelligence" system for us. 4b5

Our current on-line tools and methods are applicable to these needs. In addition, further tools and methods of a highly relevant nature are currently under development for various special purposes within AHIRC. 4b6

C. Approach 4c

1. General 4c1

This proposal represents a short-term and relatively small project in a long-term activity, all of whose components are continuously developing. 4c1a

We plan to launch a working "intelligence" system, and to pass through several phases of development. At the end of a year we expect to have an initial system which will be usable and reasonably effective, incorporating unusual features and revealing further possibilities. 4c1a1

We expect to spend most of the project resources at the information-systems level (procedures, file

organization, indexing methods, etc.) and a relatively small portion on special software developments. 4c|b

We are already very strong in relevant interactive computer aids, in techniques for programming new aids, and in techniques for tailoring the function and control procedures of these aids to the user's needs. 4c|b|

The development of the system will follow the needs of the AHIRC staff for accessing and integrating externally derived information. Each incremental allocation of this project's system-development resources will be aimed either at achieving an increase in system utility or at experimentation on means for increasing utility. 4c|c

2. Specific Approach 4c2

We plan the following specific tasks: 4c2a

(1) Conduct a bibliographic search for material relevant to our goal of setting up an "intelligence" system for use by our group. 4c2a|

Using the results of this search as an experimental information base, design and use prototype procedures, file structures, indexing, etc. to develop a better feeling for the needs, problems, and possibilities. 4c2a|a

(2) Concurrently, develop a working relationship with a specialist in library science and/or information retrieval for assistance in carrying out the proposed research. 4c2a2

(3) Make a straightforward, first-pass organization of our existing collection, to provide consistent cataloging procedures for the variety of materials we will be dealing with. Conduct initial development of indices for use in retrieval of information from the collection. 4c2a3

The aim of this will be a usable starting system, implemented with minimal software investment consistent with efficient subsequent development toward anticipated improvements. 4c2a3a

(4) Give special attention to several specific

needs, such as a hardware-products reference system, a correspondence record system, and bibliographic studies conducted under other projects in AHIRC. 4c2a4

(5) Evolve a plan for developing the system and its usage. Consider special possibilities for integration into the "intelligence" corpus of notes, reference linkages from the group's working records, subsequent extracts of already cited items, partial extracts, etc. to enrich the information and to provide more access paths. 4c2a5

(6) Follow a continuing cycle of improvement and development.

4c2a6

III DISCUSSION 5

A. General 5a

AHIRC has developed an on-line computer system with which users can study text and associated line drawings on video displays. Certain features of this system provide a unique framework for building an "intelligence" system. 5a|

The system includes powerful editing commands that enable the user to compose and modify text quickly. 5a|a

We can generate microform and paper representations of the text and drawings stored in the computer. Documents can be published directly from this hard copy, using photo-offset techniques. 5a|b

Information can be stored and displayed in a hierarchical structure of "statements". Thus we can construct classification schemes easily. 5a|c

(A "statement" is a structural unit of stored information, and can contain any sort of text string. Statements are frequently used as the equivalent of conventional paragrpahs, or indiividual entries in lists.) 5a|c|

Another feature allows a user to "link" any statement in the system with any other, creating trails of associations. 5a|d

(A link is a machine-executable equivalent of the conventional "cross-reference." Thus a link establishes an association between two statements; a subsequent user, seeing the link embedded in a statement, may cause the associated statement to be displayed instantaneously.) 5a|d|

Another user can follow these trails of associations, and add his own, if he wishes. With these links we can build and study complicated relationships within an information system. 5a|e

An interactive content analyzer lets the on-line user define patterns of words and phrases on-line and retrieve statements that contain these patterns. This

tool can be applied to a fairly simple catalog to provide considerable retrieval power even with no explicit indexing. Applied to appropriately structured indices, the content analyzer adds a new dimension of retrieval power. 5a|f

Another interactive tool lets us group related statements under a single identifier, called a "keyword." One can select one or more of these keywords and display the statements referenced by all of these keywords; a "scoring" technique is employed so that the statements referenced by the greatest number of the selected keywords appear at the top of the list. 5a|g

Since statements may contain links to other files, this capability can be used to retrieve whole files, as well as simply retrieving statements within a file. 5a|g|

Using the keyword feature with a hierarchical catalogue, we can retrieve documents relevant to one area of interest or to several areas. 5a|g2

Our current techniques for composing, modifying, and publishing would alone have a unique impact upon the way in which the group's "intelligence" system could be set up and maintained; our study aids, including the content analyzer and keyword system, add unique possiblities for using this system. 5a2

We plan to go slowly in settling on an over-all design for the "intelligence" system. We expect to go through considerable study, thought, and pilot experimentation before we commit the whole system to an integrated design. 5a3

B. Design Considerations for an "Intelligence" System 5b

Our "intelligence" system must satisfy many different kinds of information needs. 5b|

A small research group receives information from many different sources and in many different forms. Journals, books, newspapers, informal conversations, correspondence, conferences, visitors, and manufacturers are only some of the sources of our working information. This information may be recorded in print, in computer-held files, on audio tape, on film, or in microform. 5b|a

We need to cite all of these items in one central catalog, and we need to organize these citations so that we can easily find all the information we have about a particular topic. 5b|b

We also need to provide techniques that enable us to individually tailor "views" of the items in the collection. For example, if a member of the group is studying commercially available video devices, he may wish to add a trail of associational links that lets him, and other members of his team, compare the prices of these devices at a glance. 5b|c

Our "intelligence" system should provide a well-organized library collection that can be expanded or reorganized easily. It should allow each individual to maintain the integrity of his own personal collection while sharing this information with the group. 5b2

C. Methodology 5c

Our initial efforts at designing an "intelligence" system would focus on the techniques for organizing the collection and for retrieving information from it. The study of these two areas of concern would proceed dialectically: experimental catalogs and indices would be organized to conform to the requirements of a particular retrieval technique, and the development of the retrieval tools would in turn be influenced by the demands of efficient schemes of organization. 5c|

1. Specific Topics for Study 5c2

During the period of this contract we hope to study several specific problems. 5c2a

a. Conventions for Organization of Central Catalog 5c2b

The usefulness of our collection will be strongly influenced by the conventions we adopt for citing items in the central catalog. This catalog should provide a primary source of information for generating indices and subject classifications of items in the collection. 5c2b|

The central catalog should be organized so that when the user retrieves the citation for a given

item in the collection, he may also retrieve the citations for all other items in the collection which are known to refer to the given item. 5c2b|a

In addition, the catalog conventions must be flexible enough to admit many different kinds of items, while having the standardization necessary for convenient machine retrieval. 5c2b2

For example, we may wish to put the tape recording of a conference in the collection. Its citation might include a brief abstract of the material discussed, the names of panel members, and the date and location of the proceedings. 5c2b2a

b. Procedures for Entry of New Material 5c2c

The procedures used to enter items into the collection and catalog must also be developed carefully and experimentally. We hope that the collection can be maintained by someone without the training of a professional librarian, so these procedures must be uncomplicated. 5c2c|

c. Treating Catalog Items According to Their Importance 5c2d

The collection must be organized flexibly enough so that information about an item reflects its current importance in the working atmosphere of the group. For example, a journal article may enter the collection with the notation that a reprint of it has been requested from the author. After it arrives, it may become important enough as a working paper to transcribe into machine-readable form and keep on-line. As the work of the group progresses, the article may be used very infrequently; at this point it should be put into a magnetic tape archive. The procedures for maintaining the collection must allow an item to evolve through these stages. 5c2d|

2. Retrieval Tools and Techniques 5c3

As we experiment with different schemes of organization and administrative procedures, we will also be developing retrieval tools. 5c3a

We plan to begin studying the information-retrieval techniques used in other systems, with the aid of a

professional librarian. We intend to incorporate this information into our "intelligence" system and to study and manipulate it as the working body of information with which to try out various retrieval techniques. 5c3a1

We will construct experimental indices of the items in the collection. These indices, and other possible classification schemes such as thesauri, will be used to locate citations in the catalog file by subject. We intend to use these indices and judge their relative merits as retrieval techniques. 5c3a2

Several features of our current system -- especially the content analyzer and the keyword system -- will prove useful as retrieval tools to extract information and citations from indices. We can use these same tools to create the experimental indices and classification schemes. 5c3a2a

Besides such current techniques, we are considering a number of improvements over the coming year that would increase the power of our tools quite significantly. If implemented, these improvements would be developed cooperatively by several of the various projects within AHIRC, including this proposed project. 5c3a2b

We may expand the power of our "keyword" operations. These extensions would let us save references reordered by the keyword system in their new order. We could use this technique to build comprehensive classification schemes from reasonably simple ones. This expanded keyword system would also let each member of the group construct his own classification schemes and store them for others to use. 5c3a2b1

We may also develop a batch-processor facility that could reorganize files in accord with a user's specifications. Such a processor could convert the entry format of our catalog files. It could also collect all of the items referenced by a trail of links in a new file. Such processors would also be useful for updating catalog and index files from information entered in a format best suited to the clerk. 5c3a2b2

Another aspect of retrieval in our "intelligence" system centers around the problem of locating, from the on-line catalog, items that are not in machine-readable form. The citation catalog will indicate the physical location of each source document. Procedures must be developed for moving this document to another office and updating the information in the central catalog. 5c3a3

We also plan to develop procedures for generating microform and paper versions of the on-line catalog, and of selected indices or portions of indices. We already have the tools to perform the mechanical part of these operations; however, we need to adopt conventions that would make these documents useful as working bibliographies or for publication.

5c3a4

IV PERSONNEL 6

It is planned that the Principal Investigator will be Dr. Douglas C. Engelbart, Head, Augmented Human Intellect Research Center. Dr. Engelbart's Social Security number is [redacted]. 6a

Other significant contributions, including project management, are anticipated from Mary S. Church, Programmer. 6b

V ESTIMATED TIME AND CHARGES 7

It is proposed that the research work outlined herein be performed during a period of twelve months, starting 8 February 1970. 7a

Pursuant to the provisions of ASPR 16-206.2, attached is a cost estimate and support schedule in lieu of the DD Form 633-4. Also enclosed is a signed form complete except as to the "Detail Description of Cost Elements." 7b

VI REPORTS 8

A final report will be submitted upon completion of the work. 8a

During the period of the proposed work, we expect to be developing a "Handbook," which will be a comprehensive description and history of all work in the Center, suitably structured for study and manipulation with the Center's computer aids. It is anticipated that individual projects, such as the proposed work, will be covered in the Handbook as "chapters" and reports will be produced in hard copy directly from the Handbook (with suitable editing to produce useful hard-copy formats). Depending on the state of Handbook development at the completion of the proposed work, the final report may be in this form. 8b

VII GOVERNMENT-FURNISHED EQUIPMENT 9

The performance of the proposed work will involve the use of equipment furnished under Air Force Contract F30602-68-C-0286 and NASA contract NAS1-7897. 9a

VIII CONTRACT FORM 10

It is requested that any contract resulting from this

proposal be awarded on a cost plus fixed fee basis. |0a

IX RELATED SUPPORT FROM OTHER AGENCIES |1

The Augmented Human Intellect research program has been supported largely by the Advanced Research Projects Agency on a continuing basis. Support has also been provided by NASA-Langley Research Center and the U.S. Air Force Rome Air Development Center.

|1a

X ACCEPTANCE PERIOD |2

For staff scheduling purposes, this proposal will remain in effect until 31 December 1969. If additional time is required for its consideration, the Institute will be glad to consider a request for an extension of the period. |2a

XI BIOGRAPHIES |3

The following professional biographies are presented as being representative of SRI personnel who may contribute to the proposed work. |3a

Douglas C. Engelbart, Head, AHIRC
Information Science and Engineering Division |3b

Dr. Engelbart received a B.S. degree in Electrical Engineering from Oregon State College in 1948. |3b1

In 1953 he received an E.E. degree from the University of California; his thesis described the logical design and programming of a drum-type general-purpose computer to obtain increased flexibility and speed by optimizing the utilization of the electronic register capacity. |3b1a

In 1955 he received a Ph.D. degree in Electrical Engineering, also from the University of California; his thesis dealt with the development of special gas-discharge tubes for computer use. |3b1b

While studying at the University of California, he was an Associate in Electrical Engineering. |3b1c

He served as an Assistant Professor in 1955-1956. |3b1d

Since 1959, Dr. Engelbart has been principally occupied in developing a program at Stanford Research Institute aimed at improving human intellectual effectiveness through real-time computer aid. |3b2

First with only Institute in-house support, and since March 1961 with joint support from AFOSR, he formulated a comprehensive conceptual framework for man-machine studies with both broad and specific research goals. |3b2a

The specific goals have been translated into the

establishment of a computer-based experimental laboratory and a number of on-going projects within a coordinated and growing program for which Dr. Engelbart serves as Head. |3b2b

From 1948 to 1951, he was an Electrical Engineer in the Electrical Section at the Ames Laboratory, Moffett Field, California. |3b3

In 1955-1956, Dr. Engelbart was a consultant to Marchant Research, Inc., Oakland, where development work has been carried out on patents bought from him. |3b3a

In 1956 he formed and directed a corporation, Digital Techniques, Inc., which in 1956-57, did further development work on his inventions. |3b3b

In October 1957, Dr. Engelbart joined the staff of Stanford Research Institute, where he was initially concerned with basic developmental work on magnetic components for computers and with other fundamental research into the physical techniques of computers. |3b4

In 1959 he began, under Institute sponsorship, to expand and develop the basic concepts for the Augmented Human Intellect program which he had developed independently since 1950. |3b4a

His fields of specialization have included circuits, special components, logical design, and programming of digital computers; vacuum and gas-discharge techniques; large intercommunication systems; wind-tunnel drive and control systems; electromechanical control systems; information systems; and man-machine systems. |3b5

Dr. Engelbart is a member of Pi Mu Epsilon, Sigma Tau, Tau Beta Pi, Phi Kappa Phi, Sigma Xi, Eta Kappa Nu, the Institute of Electrical and Electronics Engineers, and the IEEE Group on Computers (Electronic). |3b6

He was Chairman of the San Francisco Chapter of IRE PGEC in 1959-1960 and has served as member of the IRE Solid State Circuits Subcommittee 4.10 and of the IEEE Cybernetics Committee. |3b6a

Mary S. Church, Programmer, AHIRC
Information Science and Engineering Division |3c

Specialized Professional Competence |3c|

Development of large-scale multifunction computer systems; integration of nonstandard devices (such as specialized computers) into generalized software systems. |3c|a

Current Research Assignment at SRI |3c2

Development of information-retrieval center for a computer network. |3c2a

Other Professional Experience |3c3

Columbia University, Technical Writer; supervisor of systems programming, responsible for programming group implementing general operating system to support large computers, small satellite computers, and low-speed terminal devices. |3c3a

Academic Background |3c4

B.S. in biochemistry (1964), Radcliffe College. |3c4a

Graduate work in English literature (1965-67), Columbia University. |3c4b

Professional Associations |3c5

Association for Computing Machinery. |3c5a

Mary G. Caldwell, Research Assistant, AHIRC
Information Science and Engineering Division |3d

Professional Experience |3d|

Research Assistant, Medical Fact Bank Project, Missouri Regional Medical Project 1967-68. |3d|a

Conducted feasibility study of use of IBM 1050 audiovisual system (on-line, remote) for planned Multidisciplinary Learning Laboratory. |3d|a|

Planned construction of a medical thesaurus for Fact Bank retrieval. |3d|a2

Academic Background |3d2

B.A. in English (1967), University of Missouri. |3d2a

David Casseres, Technical Writer, AHIRC
Information Science and Engineering Division |3e

Specialized Professional Competence |3e|

Text-handling procedures in an automated environment. |3e|a

Information structures for computer-held text. |3e|b

Technical writing. |3e|c

Representative Research Assignments at SRI (since 1966) |3e2

Construction and coordination of documentation from existing computer-held information. |3e2a

Techniques for generation of documentation using advanced computer-aid systems.

|3e5a

XII BIBLIOGRAPHY OF AHIRC PUBLICATIONS |4

Note: This bibliography is arranged in chronological order. Reports with AD numbers are available from Defense Documentation Center, Building 5, Cameron Station, Alexandria, Virginia 223|4. |4a

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14r

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':4884', 10/05/70 1224:15 MEJ ;  :JRNLA, 10/05/70 0951:57 DCE ;
.SINCE(69/10/27 1355:00);.HED="
4884 DCE 05Oct70
ARC PROPOSAL TO ONR FOR THE RINS PROJECT (Oct 69)"; [-'" "intelligence"
-'"]; '.LLL; ["bora"]; [-'. 2$NP]; ↑P| SE(P|) < -'.; ['. |$|NP];
.DSN=|; .RTJ=0;  .LSP=0;  .PGN=0; .DPR=0;
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Mail File

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4848.| WSD 09/25/70 |440:30 A NEW COMMAND IN COLSORT ALLOWS YOU TO SELECT LENGTH AS A CRITERIA FOR SORTS. TYPE 'L FOR 'LENGTH KEY?'$ 1

KEV WKE WHP CHI JTM $4848.2 JDH 09/27/70 0005:49 I AM LEAVING A VERSION OF THE SYSTEM RUNNING WITH BLOCK POSITION DISABLED ON THE DRUM INTERFACE. IT DOES NOT SPLIT PAGES SO IS A LITTLE SLOWER THAT THE REGULAR SYSTEM. I MADE FILL TAPES THAT CAN RUN IN EITHER MODE. TO CHANGE FROM ONE MODE TO ANOTHER, MAKE A FILL TAPE WITH THE USER DIRECTOYRY ON IT (USE (SYSTEM) SWDT OR (HOPPER)BWDT), STOP SYSTEM, CHANGE DRUM INTERFACE, RUN USER DIRECTORY FILL TAPE, THEN RUN THE APPROPRIATE RECOVERY TAPE AND RECOVER. IF YOU HAVE TROUBLE, I'M SOMEWHERE IN DESOLATION VALLEY. $ 2

WSD $4848.3 JCN 09/27/70 0237:45 (DUV):JRNL| IS NOW (JO):4878$ 3

WSD $4848.4 JCN 09/27/70 2232:|2 LIKE A CHARM.. NEXT IVE GOT LEARN HOW TO USE IT IN SPECIFIC CASES .. THE CATALOG-BUILDER, THAT IS. w1b WILL PROBABLY BE READY TO CARRY ON THIS FRONT FROM HERE ON, AND I CAN BEND THE TECHNIQUES TOWARD MANAGEMENT INFO.. MUCH HELP FROM YOU WAS APPRECIATED, IN FACT ALL$ 4

WSD $4848.5 MEJ 09/28/70 |044:|6 (DUVALL):JRNL 4865 AND (DUVALL):JRNLP 4865 ARE NOOW J4865.$ 5

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4848.6 KEV 09/29/70 |045:48 PLLEASE TRY NOT TO INITIALIZE THE SYSTEM EVER.! CHECK WITH ME (KEV) IF YOU THINK IT NECESSARY TO INITIALIZE. SOON THERE WILL BE FRESH FRESH INSTRUCTIONS IN THE MACHINE ROOM.$ 6

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4848.7 KEV 09/29/70 2007:3| THE FOLLOWING FILES ARE PROBABLY BAD ON THE KDF DUMP MADE LAST NITE (9/29/70): SYSTEM- B-DTN LAMPSON- TAUG ENGELBART- NCP, NFNET, FRJMP, RINS LICHTENBERGER- MOVIE N|FILES- CDSPL, CLNUP N2FILES- SEQGE T3FILES- TXTED META- TREE, 20 MOL- TMR, MOL NLS- NPRCL,PROCL USR- AFD, 676 O'CONNELL- C68OR, TEMP XDOC- X4OUP T|FILES- BAD, CALC ERICKSON- NF5PR, NFCH4 P4DOC- ARGH DURHAM- CHECK PAXTON- BAD2, RL|O CATALOG- NFCH5 DIALOGUE-

671, 663, 662, 661, 6510, 965, X663 CALDWELL- 634 PRINCE- NLSXR BASS- XWRIT TRUNDY- MEMOE$ 7

ARG BER BLP CHI DOC DIA DCE DGC EKV HAL JMY JBN JCN JDH JMH JNL JTM JRX KEV LSL MGC MEH MEJ MET MSC NDM VRB VDB WHP WKE WLB WSD $4848.8 KEV 09/30/70 0842:58 THERE IS A NEW SET OF INSTRUCTIONS IN THE MACHINE ROOM FOR BRINGING UP THE SYSTEM AFTER A CRASH. A NEW PROCEDURE HAS BEEN ADDED THAT SHOULD BE TRIED IF A MAG TAPE RECOVERY FAILS, BUT BEFORE AND INITIALIZE IS TRIED.$ 8

JDH KEV WHP $4848.9 WKE 10/01/70 1146:50 Doug expects that in 3 to 4 weeks we will be ready to offer NIC service over the Network. My note (english,netac,:xb) describes the proposed system implementation.

Please let me know how much of this could be ready by then and with how much effort. I would also welcome any alternative proposals.$ 9

JCN $4848.10 DGC 10/01/70 1645:01 MY FILE DIRECTORY (CASSERES,FD,) NOW HAS A FIRST BRANCH THAT LISTS FILES THAT PEOPLE ARE LIKELY TO BE LOOKING FOR.$ 10

BLP $4848.11 WLB 10/02/70 1720:26 CARRIAGE RETURNS ARE COUNTED AS CHARACTERS AT THE END OF A LINE IN NLS. THIS MEANS THAT THE VISIBLE TEXT IN A LINE TERMINATED BY A CR IS ONE CHARACTER SHORTER THAN THE VISIBLE TEXT POSSIBLE IN A LINE NOT TERMINATED BY A CR, WHICH ISN'T NICE.

ALSO: HAVE YOU EVER TRIED ISOLATING WHATEVER IT IS THAT CAUSES PASS4 TO BARF ON TABS? $ 11

WSD $4848.12 WLB 10/02/70 1722:06 SUGGESTED NEW MAIL COMMAND: "INITIALS" WHICH SIMPLY ALLOWS YOUU TO CHANGE INITIALS WITHOUT QUITTING AND CONTINUEING $ 12

WLB $4848.13 BLP 10/03/70 1226:07 PASS4 HAS A DIFFERENT ALGORITHM FOR BREAKING LINES THAN NLS HAS -- IT LOOKS ONE (OR MORE) CHARACTERS AHEAD. THE NEW PASS4 WILL USUALLY BREAK LINES IN THE SAME PLACE AS NLS HOWEVER. THE THING ABOUT CARRIAGE RETURNS IS A PROBLEM OF NLS NOT PASS4. THERE IS A REASON FOR IT IN NLS -- YOU WANT TO BE ABLE TO SEE THE CARRIAGE RETUR CARRIAGE RETURN SO YOU CAN EDIT IT. CREATE DISPLAY WOULD HAVE TO BE CHANGED CONSIDERABLY (IT TOO WOULD HAVE TO LOOK ONE CHARACTER AHEAD) TO DO WHAT YOU WANT.

PLEASE SHOW ME THE FILE WITH TABS THAT PASS4 BARFS ON. I THOUGHT PASS4 HANDELED TABS OK -- ALTHOUGH DIFFERENTLY THAN NLS --

THERE'S A BUG IN NLS. $ |3

JBN $4848.|4 JCN |0/04/70 2|49:40 THERE'S A DRAFT OF THE nic INITIAL CATALOG ON THE PRINTER (IF THE FILE i SENT FROM HOME TONITE GOT THERE). i ALSO SENT ONE OF THE DIRECTORY...DRAFT, THAT IS.aLTHOUGH i'LL BE AWAY mONDAY, YOU MAY FIND A WAY TO GET THEM FARTHER TOWARD SENDABLE STAGE. tHEY ARE ONLINE UNDER (nor):NICAT AND (nor):DIREC AT LEAST IN kdf. sEE YOU$ |4

WSD $4848.|5 MEJ |0/05/70 0839:2| I am temporarily short of KDF space, so I have had to eliminate my KDF copy of your file MLDOC, so don't eliminate this file from your KDF space thinking you are backed up by a file in my space. Situation is only temporary, however.$ |5

```
':4886', 10/07/70 0929:59 MEJ ;  ':MAIL', 10/05/70 1027:07 WSD ; .HED="
4886 WSD 5OCT7O
Mail File";  .SNF=72;.MCH=65;.PGN=0;.DSN=1;.DPR=0;
```

Portrayal Generator Approach and NLS Picture Manipulation

These notes were developed to support a meeting today. The purpose was to begin the process of integrating some related developments within a framework that is on the one hand coordinated in timing, resource allocation, payoff etc. (as good little plans should be), but brings coordination also into the architectural and conceptual approach. 1

The topic bears generally upon those processes we use, and will use, to construct views, dislays, printout, or etc. of our working files for the different purposes. It seem overdue to integrate them. 1a

This is part of a current general move toward developing our needs and possibilities, in terms of a trial set of designs, allocations and schedules, whose continual examination, revision, improvement, and extension I view as the central component of collaborative dialogue among a team of system developers -- i.e. learning how to do this process well, and to augment it etc., is to be offerred as ARC's current contribution to the team-augmentation effort. The Dialogue Support System should gauge its value by the support it provides to ARC collaboration on developing and maintaining its "Baseline Records." 1b

About Portrayal Generator: 2

Want to integrate all of the portrayal-generation processes within one package. Use common concepts, architecture, procedures, code wherever possible. Common evolution combining functions currently served by Create Display, Pass4, Output QED, Output Compiler, Quickprint, etc. (and affecting the IMLAC system). 2a

Allow a user at a display, for instance, to call upon as much of the package as he wants, knowing that he has to pay the price in computation time, screen flicker, or etc. -- but assuming that the quality of dynamic display systems will steadily improve so that for instance the kind of portrayal construction we'd now consider only for a high-grade COM product would be a standard kind of "view specification" to an on-line user. We want on-line usage to be able to evolve smoothly toward this, while uers are experimenting fully with exotic portrayals as generated with generous use of processor time, on the best hard-copy output device. 2b

Portrayal Generator Approach and NLS Picture Manipulation

We could expect fairly early (like by next summer, at least) to be able to work "interactively" by getting a page of output-processor product in view on a television screen as quickly as it can be generated by the Output processor -- inspect this, use NLS (with same screen switched to NLS output, or a separate NLS station) to make changes in the driving directives or the source text, and try again. 2b|

at at least one console around here where the full page content of o|r output processor can be gotten on a screen, and with a mouse for selection and regular NL-like operations for editing. 2b2

Try as soon as possible to get our future developments in the Output Processor and the Create Display domains integrated. 2c

Portrayal-Generator developments interact with: 3

Picture-package evolution 3a

Display-Calculator evolution 3b

Hard-copy output facility 3c

Associated OP facilities 3d

IMLAC programming 3e

Integrated Seq-Gen, Collector, aalyzer, formatter, sorter, calculator, picture system, 3f

We want use of the hard-copy output facility as soon as possible -- which could be like in February. But its utility will depend upon the coordinated features provided in NLS/TODAS. 4

About picture-manipulation 5

Calculator package is important for MSR work (at least), and especially if it could interact with the picture parts of statements 5a

like getting operands from selected entities, replacing selected entities with newly calculaed vector constructs, replace the function-curve part of a graph with a newly calculated one derived from a latest pass through the source-data file(s). 5a|

Portrayal Generator Approach and NLS Picture Manipulation

Having a calculator package that could interact reasonably both with the user and with the picture data in a statement would seemingly provide for important experimentation, special-applicaton, and growth possibilities with our graphical manipulations. Working up special entities, and special operations upon them, could be done at the "user-programming" level. Constructs such as boxes and arrows could be inserted on a calculated basis, so that the user could know that things are square, centered, etc., despite the evidence transmitted to him via the Tasker hardware, so that on printout there could be achieved good, documentation-quality graphics as developed and manipulated within NLS/Calculator. 5b

Having a wider choice of fonts, sizes, characters and weights would be very useful in producing readable documentation. 5c

Software guys apparently want to make changes in the picture-data structure and organization within statements. It would seem more economical to do these when first movng pictures onto the |ONLS, rather than converting the old picture package to the |O and then subsequently making file and NLS mods. 5d

Here are some recommendations that emerge for me, from my current state of understanding and desire: 5e

I'd like to consider making the file-structure picture-data mods as we move onto the |O, assuming the same picture-package user features as we now have, with coordinated, calculator-picture interaction features implemented as soon as possible. 5e|

I'd like to see the users being able to write interactive calculator programs for constructing and manipulating picture entities. 5e|a

Then I'd like to see the evolutionary improvement of the "built-in, picture-manipulation" NLS user features subsequently be done in coordination with the kinds of usage that emerge thereafter. 5e|b

Hopefully, the progamming for the picture-package features that might be embedded wihin NLS would eventually be done in a nice language such that smart users can read the source code to see what are th real definitions of entities and operations. To this end it would seem worth

considering to program these features with the same graphical-calculator language that the users have available. 5e2

It will be important to provide typewriter users with as much manipulation capability over the graphic domain as is possible. Cerical support, being caught at home with an Execuport, NIC users shaping up their documentaion, or etc. 5f

At first we can at least offer to move, copy, and delete pictures. As we evolve our particular brands of pictures and manipulations which we use in our documentation, plans, etc., we'll watchfor other operations that can be usefully be done from a typewriter. 5f1

Notes after meeting, with WKE, WHP, BLP, CHI: 6

Agreed that we would generate a plan for Output-Processor evolution that included integration of the new Create Display as a special-device output. (BLP to produce this) 6a

Also generally acknowledged that both kinds of portrayal (for hard copy or for display) would have the equivalent of a "display list" (what will become a "display structure" I guess), generated and kept associated with that portrayal, to be referenced when the need arose to identify the file entity referenced by a coordinate-pair variable as generated by a mouse selection (or by some coordinate-pair operatnd provided with reference to a hard-copy page). 6b

New graphic package in NLS would seek some temporary solutions to Label manipulation -- although it is realized that someday labels would probably be handled as just another form of "text area". 6c

WHP will look into the possibility for using the "everyman's NLS calculator language", equipped perhaps with special procedure calls for doing basic things with picture constructs, to build up whatever extended-entity features he'd add into the picture package. DCE would like this approach because of its compatibility with the way other users could add special features of their own using the calculator/graphic facility. 6d

The new hard-copy hardware system looks now to be likely made up of: 6e

Portrayal Generator Approach and NLS Picture Manipulation

The guts from an ARDS terminal, providing ASCII compatible interface, ready-made character generator, and a general, point-lotting capabillity. (at a cost of like $6000) 6e|

A Princeton-Electronics scan converter unit, that takes the xyz signals from the ARDS and stores the resulting "display" pattern on its storage screen (not directly viewable). 6e2

A TV monitor, into which the scan converter can provide a video piture of what it has stored -- thus providing a check view (if desire) before converting to hard copy. 6e3

A Xerox LDX, high-resolution scanning receiver, which can take output from another video outtput of the scan converter to produce a page copy of the stored display. 6e4

Considerable discussion as to whether the character generator would have adequate quality to have general use to us, whether the point-plotting raster would be fine enough for us to produce characters of the quality we'd like (and that the scan-converter and LDX unit evidently can accommodate), etc. 6f

Request by DCE that the specific details of our plans and designs, as they will be shaping up in our Baseline Records, soon begins to show the effects of the above agreements and considerations. 6g

WKE for coordinating responsibility, WHP in graphics and languages, BLP in the Portrayal Generator plans and designs, CHI in the balance of user-feature details. 6g|

':4887', 10/07/70 0905:37 MEJ ; :JRNLB, 10/07/70 0847:49 DCE ; .HED="
4887 DCE 70CT70

Portrayal Generator Approach and NLS Picture Manipulation"; Distribute
copies to: WKE WHP BLP CHI WSD JCN FVB DIA MSC
.SNF=72;.MCH=65;.PGN=0;.DSN=1;.DPR=0;

A Brief Description Of the 'Core NLS' Concept, and a guide to usi
g super processors on the 940

Core NLS |

The core NLS model views what we now call NLS as a tree, with the lowest node on the tree being a Library of routines for performing NLS functions...in effect a 'Core NLS'. |a

The functions performed by the library are essentially the non-interactive functions in NLS, e.g. |a|

Structure Manipulation |a|a

Text editing |a|b

File handling |a|c

The remaining functions of our (current) NLS are performed either by libraries at intermediate nodes on the tree, or by Terminal Node Programs (TNP). |a2

An example of an intermediate node library would be our current Input/Feedback SPL library, and an example of a TNP would be the Main Control portion of what we now call NLS, or TODAS. |a3

All programs at a given level node in the tree may depend on any programs at lower levels on the same branch, but must operate independently of any program-nodes on different branches or at different levels. |b

Any TNP may, however, call any other TNP in one of two manners: |c

(1)Branch |c|

A terminal node may pass control to another TNP. This is in effect a branch, insofar as there may be no return |c|a

(2) Call |c2

A TNP may call another TNP as though it were a procedure. In this instance, a return location is stacked, so that the called TNP may return control to the calling TNP. |c2a

Super processors. 2

A Brief Description Of the 'Core NLS' Concept, and a guide to using supe processors on the 940

Super Processors on the 940 are a first step toward the Core NLS described above. 2a

They allow a front end to be written for what is now a greatly expanded Core NLS, i.e. the current Core NLS contains many routines which rightly belong in intermediate nodes. 2a|

In other words, a super processor is roughly the equivalent of a TNP, and all of the lower nodes on the tree are included in the Core NLS (or in some cases, the 'Super Processor'). 2a|a

Creating a Super Processor: 2a2

A super processor is described by a 'Super Processor Information block'. 2a2a

Word |: Station mode (0=Does Not interact, |= Work Station, 2=typewriter terminal) 2a2a|

Words 2-n: List of overlays used by SP. First in list must be overlay in which control is to be initially passed, and overlay position in list must reflect position of overlay (page) in save file, If SP is in separate file. 2a2a2

The list is terminated by a -|. 2a2a2a

Word n+|: Number of characters in Processor file name, or starting address if no file. 2a2a3

Word n+2: Number of characters to skip over in file name for running system 2a2a4

Words n+3-m: Number of characters in file name 2a2a5

The super processor file must be a save file with the desired overlays in the same order as in the list in the information block. When a super processor is called, any overlay which is not in the relabeling is read from the indicated file. 2a2b

The starting address of the file must be equal to the starting address of the processor + |B7. The |B7 will be unecessary at some future date. 2a2c

Calling a super Processor. 2a3

To call a super processor: 2a3a

EXU recint; 2a3a1

spcall(@procib,parm); 2a3a2

procib is the name of the processor information block, and parm is a bit mask which indicates which overlays of the calling processor are to be released from the PMT when the call is executed. A one in a bit position means to release the overlay in the corresponding position in the information block list. The high order bit represents the first entry in the list. 2a3a3

spcall skips if there are no errors in the call, and no fatal errors in the processor. 2a3a4

A no-skip return means that the processor was not around, or something was wrong wit the file, or an rerror or serious error occcurred in the processor. 2a3a4a

Returning from a super processor: 2a3b

EXU recint; 2a3b1

spret(errorf,parm) 2a3b2

parm is the same as in spcall, but refers to processor which is returning 2a3b3

errorf = 1 for no skip return. 2a3b4

```
':4888', |0/07/70 |000:26 MEJ ;  ':CORE NLS', |0/06/70 |7||:03 WSD ;
.HED="                                                  4888 WSD 60CT70
A Brief Description Of the 'Core NLS' Concept, and a guide to using
super processors on the 940";
.SNF=72;.MCH=65;.PGN=0;.DSN=|;.DPR=0;
```

PROGRAM FOR PRODUCING A TITLE CATALOGUE FROM JOURNAL ACCESSION NUMBER CATALOGUE (TITLES SORTED ALPHABETICALLY)

```
(pa|) pattern for re-organising catalogue                                    |

   PROGRAM (p)PROCEDURE;                                                     |a

      :C D $D↑P|←P|  /"
      "/ $NP ↑P2:                                                           |a|

      IF flag THEN :C SE(P|) ↑P3 < /"oS"/ $NP ↑P3;  ST P| ← P2
      P3,"
                                                                        ",
      SF(P|) P|: flag ← |; ENDF                                         |a2

      RETURN END. FINISH                                                |a3

(pa2) pattern to use for sorting                                             2

   PROGRAM (p)PROCEDURE;                                                    2a

      :C ↑P| -"':X" SF(P|) $D $NP ↑P| /NP/ ↑P2←P2 ←P2: IF flag
      THEN :C ST P| ← "@",P| P2,"@",P| SE(P|): ENDF                     2a|

      RETURN END. FINISH                                                2a2

(go)evcd% ca n%so%fc0%%%et:go|%                                              3

   (go|)ea:pa| d%vi0%et:go2%                                                 3a

   (go2)ex%f (jo):newjo%o xnewjo%et:go3%                                     3b

   (go3)g%eq%1f(duv):catpat%et:go4%                                          3c

   (go4)vj%ea:pa2 d%vi0%et:go5%                                              3d

   (go5)ex%f xnewjo|,xnewjo2%o titcat%s%d%lng%eq%pp|%j%eq%                    3e
```

```
':4889', 10/07/70 122|:22 MEJ ;  :CATPAT, 10/06/70 2026:23 WSD ; .HED="
4889 WSD 60CT70
PROGRAM FOR PRODUCING A TITLE CATALOGUE FROM JOURNAL ACCESSION NUMBER
CATALOGUE (TITLES SORTED ALPHABETICALLY)"; TITLE CATALOGUE IS NAMED
':TITCAT|', ':TITCAT2', ETC.
.SNF=72;.MCH=65;.PGN=0;.DSN=|;.DPR=0;
```

Special note regarding latest NASA report: 2c

Since we have to re-publish it anyway to achieve better-quality typescript, we perhaps could use new, Journal-consistent printout conventions. 2c1

I will contact Gene Gribble about his feelings thereto. 2c2

WKE and BLP have raised the possibility of using III COM service for producing an improved version. This would be a valuable experiment. If we do it, I want to find out (via BLP) if we could put some small-font referencing items on the pages. 2c3

E.g., use an SNF-directive varition to put unobtrusive, tiny statement-location numbers down the right margin. 2c3a

Somewhere on each page put the ARC catalog number for that chapter's file. 2c3b

```
':4890', |0/|3/70 0906:36 MEJ ;  ':ARCJO', |0/|2/70 |20|:42 DCE ;.HED="
|20OCT70 DCE 4890
Notes About ARC Journal";
.SNF=72;.COD[2|B]=||4B;.MCH=65;.PGN=0;.DSN=1;.DPR=0;
```

On Catalog Conversion

Here are some notes about converting our catalog into the unified system we're aiming for: 1

We begin with a number of different conventions, used for existing entries: 1a

About four different XDOC conventions, each over a stretch of XDOC entries (Refer to them as CATX1, CATX2,...). 1a1

The biblio collection generated for Geoff Ball on computer-aided text manipulation (CATUSR), 1a2

The early NIC items, as developed by Mimi (CATNC), 1a3

A general new form, for current NIC collection (CATNEW). 1a4

We'll plan to end up with one uniform convention -- but this may well have many variations. 1b

One "variation" which I expect to have around for some time (maybe forever) are some that have an unambiguous descriptor tag, NYC, saying "this item is NOT YET CONVERTED to standard form" -- for items we haven't gotten around to converting yet. 1b1

Another tag, NLR, which says "NO LONGER RELEVANT", can retire some of the older entries from any concern about reformatting and (added) classification concern. 1b2

The conversion process needs to produce: 2

An official Master Catalog File Set, kept up by a Catalog Development and Maintenance Activity that serves NIC, DSS, RINS, individuals, etc., in their various cataloging activities. 2a

A safely protected, archived version of MCFS. 2a1

A generally available (read only) working version of MCFS. 2a2

Procedures and processes for developing and maintaining special sub-collections -- which each should be viewed as a subset that can easily expand and contract over the master set, and that may have arbitrary intersections with other special-collection sets. 2b

This, for instance, leads toward considering the form of a catalog entry to be affected more by the intrinsic nature of the item being cataloged than by the current expectation of special-collection membership. 2b1

For instance, a catalog entry for a hardware-design plan could end up in collections having to do with parts-acquisition, funds allocation, design discussion, maintenance planning, design-methodology study, management-system study, study on analytic-calculation aids, study on portrayal-generation techniques, etc. 2b1a

Some consideration and possibilities for the way we go about the conversion process: 3

Estblish a Master Catalog File Set. 3a

A procedure for storing, backing up, and accessing that keeps it safe but accessible. 3a1

A very unified "custodianship" organization -- providing careful and well-observed responsibilities and procedures for producing updated versions. 3a2

This is very important: Like even requiring five officially responsible people to produce notarized statements of approval for a Brinks-guarded next-version candidate, etc. 3a2a

At least, we shouldn't have different people going into MCFS, independently editing, adding descriptors, etc., without careful coordination. 3a2b

A general means of organizing various conjoint efforts toward building and updating the MCFS -- e.g., converting entry formats, establishing classification groupings, assigning descriptors to entries, inserting descriptors, developing processes and procedures, etc. 3a3

Put all entries, of all forms, into the MCFS, each with a standard "Descriptor Field". 3b

The Descriptor Field must be uniquely delimited, for every catalog-entry form, by one common analyzer pattern. 3b1

Multi-statement entries (such as from CATUSR and CATNC) may be entered in their full-branch form -- with the top-level statement having the Descriptor Field. 3b2

Add to each entry a descriptor identifying its catalog-entry format. 3c

This may evolve into a group of descriptors during the conversion process: identifying, for instance, the stage of conversion, the nature of special content (entered by hand to guide an automatic conversion process), etc. 3c1

From here on, evolution and addition of descriptors could proceed in parallel with the format-conversion activity. 3d

Format conversion steps need always preserve the contents and the unique delimiting syntax of the Descriptor Field. 3d1

E.g., that the Level-1 statement contains the DF, delimited with P1 and P2 by :C ↑P1 SE(P1) < [“1d*”] > [“*”] ↑P1 [“*”] < [SP] ↑P2; (assuming “*d1” is a front delimiter and “*” an end delimiter to the field. 3d1a

Or, always at the end of the statement, delimited by P1 and SE(P1), with :C ↑P1 SE(P1) < [“1a*”] > [“*”] ↑P1; 3d1b

Format conversion could be viewed in several ways. We should seek a balance between them: 3e

Getting it done soon, by any means (retyping, or big on-line push on a weekend, or, etc.); 3e1

Exercising Analyzer-Formatter processes, to help make changes faster and more accurately, to shake down the language, to learn the tricks, etc.; 3e2

Perhaps writing some special, one-shot programs (e.g., to collapse multi-statement entries into one statement). 3e3

':489|', |0/|3/70 |0|2:29 MEJ ; .DPR=|; :CATCO, |0/|2/70 |443:55 DCE ;
(Distribute copies to JCN WLB JBN WSD) .DSN=1;.DPR=0;

Mostly history of ideas about the Output Processor

Mostly history of ideas about the Output Processor

This version of this file has been entered into the Journal for historical reasons only. It was last alterred in July 1970 and is thus currently sadly out of date.

Mostly history of ideas about the Output Processor

OTHER RELEVANT FILES 2

all the following files are in Tomlin's KDF space unless otherwise noted 2a

ADSUG ADditional SUGgestions or new PASS4 Directives 2b

List of suggestions for new directives for PASS4 from members of ARC. 2b1

AX PASS4 directives to get the AX 2c

This contains a list of current PASS4 Directives proposed to be deleted. It also has a list of the directives that will be kept. 2c1

FMTDS ForMaT DEsigner/user interface 2d

A presentation of the questions the Format Designer will ask the user. 2d1

OPGLU Output Processor 2e

An outline of all the envisaged features for the full Output Processor and sort of a proposed implementation order. It also contains some thoughts on the internal design of some of the features. In particular it contains the beggining of a taxonomy and listing of attributes for Areas. 2e1

OPROP Output Processor PROPosal 2f

Proposals for order of doing things for the OP 2f1

OPSCN Output Processor SCaN 2g

List of subjects relevant to the Output Processor to be used for scanning Doug's notebooks. 2g1

TBLC TaBLe of Contents for the OP notebook 2h

Mostly history of ideas about the Output Processor

Mostly history of ideas about the Output Processor

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Mostly history of ideas about the Output Processor

48 hours mag tape to master 6f1h
$.02-10/COM page 6f1i
Beta does Cal/comp things 6f1j
Byron Mandel at MDS knows about programming Beta 6f1k
Meeting with Will Meyers 6g
10 Dec. 6g1
Mimi was there thruout and Doug for a few minutes at the end 6g1a
read: Data Processing Magazine; August 69 p34; "Computer Output Microfilmers, Part I"; September 69 p34; "Computer Output Microfilmers, Part II" 6g1b
book: Computer Output Microfilmers ;National Microfilm Association; Annapolis; about $10 6g1c
NMA meeting April 28-30 in S. F. 6g1d
1/2 of exhibits will be COM and related 6g1d1
100' cartrige 16mm
2400 images
@ $5 each 6g1e

1 ultrafiche with 2400 images
@ $1 per copy
+ $500 per master 6g1f
several systems now of publishing catalogues (parts and spec sheets) 6g1g
leave the basic info alone (except for prices) 6g1g1
just change the index 6g1g2
new index just doesn't point to an old version of a page 6g1g2a
index can be hardcopy 6g1g2a1
standards for fiche 6g1h
COSATI - 4x6" 5x12=60 images about 18-20X reduction 6g1h1
NMA - 4x6" 7x14=98 images about 24X reduction 6g1h2
you have to clean your reader to get readability 6g1i
EB's library publishing 6g1j
is going 65X reduction (super-fiche) 6g1j1
3x5" fiche 6g1j2
FR-80 -- might be able to go 80X reduction, i.e., can write super-fiche directly 6g1k
FR-80 first customer (LA service bureau) they very happy with it 6g1l
he impressed by Beta 6g1m
Planning meeting, With Bill English, Bill Paxton, Mimi, Chuck 6h
11 December 6h1
meeting was held essentially at suggestion of Doug --

purpose was to allow Paxton to do coordinating role for software people 6h1a
specifically to integrate work on the output processor with other software stuff 6h1a1
results: idea of user interactively setting up output formats was liked 6h1b
another meetin is to held on or about 30 Dec. I am to work out a more or less complete, general plan for the output processor plus an order of implementation plus some time estimates 6h1b1
Discussion with Doug 6i
12 Dec.; nobody else there 6i1
there will be a great deal of pressure from ARPA on ARC to provide NIC with some fairly sophisticated features and soon 6i1a
first of all Doug sort of stole the privelige? of doing NIC 6i1a1
several of the other nodes would like to do NIC and can apply a lot of political type pressure on ARPA to let them do it 6i1a1a
ARPA must justify its dispersal of funds and Network support is justifiable, so our support of NIC goes a long ways towards guaranteeing us funding 6i1a2
the soon comes because the schedule for the Network has been greatly accelerated because of pressure from ARPA 6i1a3
Doug sees the "Output Processor" as including as an integral part of the output specification and functions to be performed such things as automatic generation of table of contents, indices, concordances, link conversions to page references, and KWICs. 6i1b
Doug sees the Output Processor as having great importance, both because of the political considerations mentioned above and because the Output Processor could be an important, integral part of an Augmentation System downstream sometime, 6i1c
Doug sees himself as having at least two roles (not positions) 6i1d
one is as manager, i.e., as order giver, overall coordinater, and general strategist 6i1d1
the other is as promoter of systems designs that definitely facilitate system evolution (see below for more on this idea) 6i1d2
this is a general design principle of his and is seen as an integral part of the augmentation and bootstrapping strategies 6i1d2a
In this last role Doug wants a hand in on at least

the design of the architecture of the Output Processor 6ild3

Doug wants something like daily conversations with me to insure that at least his minimum requirements for an evolutionary systems design are met and that service for the NIC is provided at an early date 6ild4

to provide this last I am also to keep close contact with Mimi 6ild4a

it is to be well noted that Doug allows and expects negotiation between me, him, English, Mimi and Paxton on all these points and that he can be persuaded and/or outvoted 6ile

In keeping with the above considerations Doug offered the following ideas and suggestions: 6ilf

it might be wise to implement as the first step an index generator, table of contents generator, link convertor, or other NIC-wanted features 6ilf1

these might initially be separate, self-contained "processors" 6ilf1a

we must consider how much time would be lost by such an approach 6ilf1b

how much of the work on these processors could be carried over to the eventual Output Processor 6ilf1b1

how soon could these processors be programmed as usable features anyway 6ilf1b2

For a system architecture Doug suggested that the Output Processor work thru a portal with NLS and that its architecture look something like the present NLS, namely that there be three hierarchical levels: a state machine that interpreted commands and went to the right place to execute them, a section that contained the algorithms for executing each of the features, and a group of subroutines that actually did the dirty work. 6ilf2

Doug presented his phlosophy that a system could be designed to allow evolution in four dimensions:

1. the languages for programming functions
2. new or added functions
3. the means a user has to specify what he wants done
4. the architecture of the system? 6ilf3

Another idea was that since the Portal Processor is unlikely to be ready soon, the possibility of driving TODAS with MOL programs be investigated (see Duvall). 6ilf4

I am to come up with at least two approaches to the Output Processor. One will be as a grand design, the other approach will implement the NIC-wanted features

firct. The thing I'm to come up with will include at least system architecture, gross features envisioned, possibilities for future evolution, implementation order, gross time estimates, and predictions of what if anything is lost by taking the second approach. 6ilg

Post mortem thoughts by me on this discussion 6ilh

most of the following thought were not presented by me at the discussion with Doug 6ilh1

It now seems that Bill English has the role of coordinator of software efforts and Bill Paxton has the role of overseeing systems design. This is at varience with what was implied before, namely that Paxton had the coordinating role (see Planning meeting of 12 Dec. branch) 6ilh2

I am still unhappy and will probably remain so about not getting to design a general system from the start. But that's the way it goes sometimes. 6ilh3

The following are considerations mitigating against the exercising by Doug of the role of system design monitor: 6ilh4

Good people usually do not like someone watching over their shoulder and suggesting or requiring that the watcher's ideas get into the design. 6ilh4a

If this role is carried far enough, some people could be driven out of the group. There are already beginnings of this. 6ilh4b

I don't think Doug has the time to do this, or at least his time is better spent elsewhere. 6ilh4c

This all sounds like the old problem of managers delegating responsibility. 6ilh4d

It helps if the two roles of Doug are made explicit -- people will be more comfortable when he exercises the second role, but there is still the problem that the role of manager exists. Doug may not be able to sufficiently divide the roles. People may not always be able to tell which role is currently speaking. Undue weight may be lent to statements said while in the system design monitor role because of the same person having the manager role. 6ilh4e

The following is a suggestion for a way to handle the above problems: 6ilh5

Doug should make sure that his system design philosophy is well known by every programmer. It would be nice for many reasons if it were well documented some place. It could be indicated that all systems designs were expected to follow these general criteria unless the designer showed very

good reasons why they didn't apply to his particular system or he could show a better or at least reasonable different design philosophy. 6i1h5a
Either it is assummed that system designers are good enough to follow the above rules or some monitoring could be done. If monitoring is to be done then Doug should lose most of his monitoring role. He could still have the role of final approval of all major designs and perhaps even review designs at a few points along the way, but closer monitoring (and certainly day-to-day stuff which probably shouldn't be done anyway) should be the role of say Bill Paxton. 6i1h5b

Talk with Vic Christianson 6j
On 13 Dec. 1969, 6j1
He is an IBM salesman, tel: 328-3200, and ordered all documentation on Composition 360. He said to expect a three week waiting period. In the mean time there is one document in the local IBM office library at 525 University, 5th floor, in Palo Alto. I have to be cleared by him before the librarian will let me in. 6j1a

Meeting with Mimi 6k
16 Dec. Mimi and I were the only ones there 6k1
Mimi agreed to what NIC presently needs and/or wants and assigned what she thought should be the priorities. This last should be checked with Doug. 6k1a
Here are the features desired in the order of Mimi's priorities: 6k1b
link conversion 6k1b1
table of contents 6k1b2
KWIC or KWOC 6k1b3
index and/or concordance 6k1b4
Mimi mostly agreed to do the KWIC and I'm probably supposed to do the link conversion. I am also to very soon come up with at least the architecture of the OP so that Mimi can do the KWIC so that it can be moved over easily to the OP later. 6k1c
Mimi also mentioned a couple of things that NIC would like at some time in the future: 6k1d
provision for special symbols (especially math) 6k1d1
provision for getting either photographs or links to them in NIC documents. 6k1d2

Meeting with Mimi 6l
17 Dec. Mimi and I were the only ones present 6l1
special character translation should be earlier says M. 6l1a
she suggests doing final translation to a device by means of a table look up rather than the compiler method 6l1a1

we discovered that the creation of the intermediate file (paginated) is very device dependent because of number of lines per page and must be able to recognize special characters and know how much space they take 611b
Mimi would like to have an errata list generated, e.g., unresolvable links 611c
With Dave Casseres 6m
19 Dec. 6m1
I didn't take any notes and I can't remembber anything 6m1a
With Casseres, Duvall, Chuck, Mimi, and Jed 6n
22 Dec. 6n1
idea of separating format from text file was lengthally discussed 6n1a
Casseres really liked it 6n1a1
nobody else did 6n1a2
was pointed out that of course format has to be associated with file (at least attached in some way to specific points in the file) 6n1a3
most everybody seemed to favor the old method of directives 6n1a4
was suggested that thing to do was to rationalize and expand the current PASS4 directives 6n1b
Casseres liked idea of doing page layout (which PASS4 really doesn't do) and he said most of his difficulties with PASS4 come from that fact he thinks probably 6n1c
also much discussion on inefficiency and time consumption of my design 6n1d
also proliferation of files and file tyes was criticised 6n1e
has been tried here before and didn't work 6n1e1
Q was asked what does this do for you that PASS4 doesn't -- A: not much except indexing, etc. 6n1f
suggestion was made that you want to keep a current format for each sitting and only change it on command 6n1g
for ultimate default case -- want to output working copy according to current viewspecs 6n1g1
PASS4 will not work with the new NLS 6n1h
idea came out 6n1i
set up Format File as nothing but an NLS file that is a text string of directives 6n1i1
for the time being user does an insert QED branch 6n1i1a
has to insert directives directly in the NLS text 6n1i1b
later a preprocessor takes text file and format file (including format info linked to characters in the text file) and merges them and then passes that to the above formatter 6n1i2
OP Planning. With English, Paxton, Mimi 6o
30 Dec. 6o1

there were no strong objections to my design of the OP, nor to my implementation schedule 6o1a
new things that went down 6o1b
the OP ends up being mostly a front end to PASS4 6o1b1
things like the index generators will take as input NLS files and produce as output NLS files 6o1b2
format info will be kept either as directives in the NLS file itself or as a string of directives in an NLS Format file 6o1b3
one of the first things that I will do is to rewrite PASS4 in the new MOL and change it so it will recognize links 6o1b4
about the second thing I will do is to do the link converter 6o1b5
new ideas 6o1c
links will be syntatically identified by the opening and closing parens being preceded by a special 8-bit code 6o1c1
the 8-bit code will be mostly the same as those presenty used, but will be either one not currently used, if such exist, or a combination of bits that are rarely used 6o1c1a
this would necessitate little or no change to NLS with the exception of the addition of something like a Set Text to Link command 6o1c1b
I, not Mimi, will do the TOC generator 6o1c2
it still has not been decided in what manner the Link Converter will know where links point to 6o1d
an idea of mine not brought up at this meeting: for the first pass the LC will only remember where documents start 6o1e
About NIC. With Doug, English, Paxton, Mimi 6p
30 Dec. 6p1
only a KWIC index and bibliographies with accession numbers and both maybe only in hardcopy are necessary by 1 March 6p1a
the rest of the meeting was about Doug's ideas for a query system for NIC 6p1b
Doug is mumbling about my doing the format stuff for showing a user the catalogue entries that are members of a set 6p1c
this is mainly because I'm supposed to know about formatting output 6p1c1
Doug will look into and talk to Ed about my using Dean for the OP 6p1d
With Doug 6q
7 Jan. 1970 6q1
A strange thing happenned in this discussion -- at

least roles were reversed from our previous discussions. This time Doug was the one talking about big, super features with groovy ways of implementing them and I kept plugging for the interim, easily, and quickly implementable things. 6q1a

New ideas from Doug 6q1b

would like eventually for formatting to be changed by tags in the NLS text file, by content analysis performed on the NLS text file, and by such things as level dependency (this last I'd planned on). 6q1b1

He talked about having links and/or their converted form containing PSID's or the new idea of system-wide, eternal pointers. 6q1b2

He wants to have enough info around in some form or another to to be able to bug points on the microfiche reader screen and do NLS things 6q1b3

Doug is hot for the idea of using a higher level language to describe how you format. I pointed out and he mostly agreed that that was not so important since people describing formatting will often be editor, non-programming type people and their best language is the interactive formatting I plan to do. 6q1c

Ideas that sort of came out between us 6q1d

maybe move the "Page Location File" building function to the Formatter and away from the link converter 6q1d1

con: the Formatter is mostly PASS4 and this means more modifications there instead of a fresh start 6q1d1a

if we do copy fitting before link converting then would have to redefine the page locs 6q1d1b

pro: user ought to be able to let his page locations get into the file and not have his links converted 6q1d1c

Maybe need a separate Copy Looker pass where you just get to look at what the formatter did (this will be the first pass at the CopY fitter anyway) 6q1e

My idea: may as well move the link converter after the copy fitter pass 6q1f

pro: would have to reconvert intra-file links again after copyfitting 6q1f1

con: would be nice to present at copyfitting time the real formatted output -- i.e., with the number of characters in the links known and their content too 6q1f2

would also be able to show unresolvable links at copyfitting time 6q1f3

asked him to keep me better informed about developements in NIC 6q1g
he said my using Dean was OK 6q1h
he was talking about my using him full time 6q1h1
I said I didn't have enough for him to do 6q1h2
I'm to talk to Ed to try and work out something 6q1h3
Ed has first priority on Dean's time 6q1h4
Discussion with Chuck about link conversion 6r
12 Jan. 1970 6r1
The initial design of the link conversion process came out of this discussion. 6r1a
see (id1c) 6r1b
Discussion with WHP about link conversion 6s
15 Jan. 1970 6s1
Refinements of the design of the link conversion process came out of this discussion. 6s1a
see (id1c) 6s1b
Discussion with WHP about link conversion 6t
19 Jan. 1970 6t1
Refinements of the design of the link conversion process came out of this discussion. 6t1a
see (id1c) 6t1b
Meeting with Computer Micrographics Inc. 6u
26 Jan. 1970. Steve Miller was there. 6u1
CMI salesman we talked to was: Peter Klein, 46 Freemont St., S.F., tel: 433-0134 6u1a
CMI is a microform service bureau offering nearly comprehensive service 6u1b
CMI also handles uform viewing equipment 6u1b1
they have a FR-80 (it has a PDP 9L inside) 6u1b2
don't now have 105mm camera -- its on order and they expect it to be running in a month or two 6u1b3
can get 700 chars/line and 3-400 lines/page; they do their reduction this way and not necessarily with lenses 6u1c
Photo-mem makes a fiche jumper; Mossler too 6u1d
Prices 6u1e
for a 14x7 frame fichees: 6u1e1
$24-25/1000 pages original this is for mag tape to roll film master 6u1e1a
graphics 6u1e2
tape to film (35mm) -- $.40/page + $5 setup + $.08/sheet of paper or $.13/vellum 6u1e2a
4 character fonts -- working on 3 more 6u1f
can give probably one day turnaround on large(NIC) batches with preschedulling 6u1g
Comparison of machines 6u1h

	SCORS	IGS		
	4060	4060	FR-80	6u1h1 6u1h2

Mostly history of ideas about the Output Processor

char size	1	4	64	6u1h3
char set	upper only	u/l	u/l	6u1h4
char rotation	none	90	every 45	6u1h5
line/char width	1	2	8	6u1h6
line weight (density)	2	4	8	6u1h7
raster (addressable)	1024	4096	16K	6u1h8

Meeting with Jack Byrne (Senior Editor at SRI) 6v

10 Feb. 1970 Byrne's boss and Dean were there 6v1

their algorithm for widow lines is that not less than two lines of a paragraph are allowed to start a page 6v1a

they have some problems leaving room for pics 6v1b

they often want chapters to start on the right hand page 6v1c

they suggested we talk to Long Range Planning as the only people at SRI that do real and fancy page layout 6v1d

they were very insistent about the usual editor's demand to do editing on hardcopy -- not on-line. 6v1e

all they want from an on-line system is to have the latest draft come back fast in hardcopy and they will pencil in the changes in their normal manner and hand it to a secretary to get the updated, clean draft 6v1e1

Meeting with an RCA salesman 6w

about March 1970 Steve Miller was there 6w1

Donald Van Deusen is the salesman's name 6w1a

he's at Palo Alto 321-5000 6w1a1

he was selling "Videotext" a new program by RCA that runs on the Videocomp -- not the Spectra 6w1b

it will accept input tapes formatted for a line printer and drive the Videocomp to get hardcopy output 6w1b1

it will handle both upper and lower case 6w1b2

it will handle strictly verticle and strictly horizontal lines 6w1b3

with a specially formatted input tape it will handle graphics in general (I think) 6w1b4

J.W. Clement Co. is a local firm that has a Videocomp with Videotext that will rent time on a service Bureau basis 6w1c

Discussion with Doug 6x

18 March 1970 6x1

I told him about the file OP and gave him a print out of the planning branch 6x1a

the following came out as new information to me that ought to be kept in mind 6x1b

there will be two different kinds of links in on-line NLS files 6x1b1

normal -- to on-line files 6x1b1a

agreed was: 6a1B
three cases: 6a1BL
continuous "pagination" over the specified collection 6a1BLA
number according to form n,m where user specifies m 6a1BLB
e.g. use: microfiche where m is the number of frames on a fiche 6a1BLBL
number according to n,m where m is the number of pages in each document, but m <= mm where mm is specified by the user 6a1BLC
e.g. use: microfiche where each document goes on a separate fiche and mm is the number of frames on a fiche 6a1BLCL
user specifies a mask, e.g., '/gronuk ***/' shere the number goes in the place of the *'s 6a1B2

Output Processor Meeting 6aa
6 April 1970 Mimi, Paxton, Jed, Casseres, and Dean were there; Norton came later and that discussion is included 6aa1
I went thru the "how to output a file" chart and explained the features 6aa1a
there ensued a discussion about the features 6aa1b
it was realized that there are three basic ways of approaching the OP 6aa1c
1, incremental -- first add features to PASS4, go to step 2 or 3 6aa1c1
2, half-assed -- do a Format Designer (a subset of the grand one), a Key Designer, a Key Attacher, and a front end to PASS4 to convert the information from the above into directives to feed to PASS4 at the appropriate points; go to step 3 6aa1c2
3, scrap PASS4 (lifing the line formatting code as subroutines) and build a real page formatter; there are two ways to do this 6aa1c3
a, do-it -- do the formatting in a fairly straight forward way 6aa1c3a
b, grandiose -- attempt to develope the "area" concept and implemaent that way 6aa1c3b
the consensus of those present (except that I'd rather do it the grandiose way) was that #1 was the best way and then maybe go to step 3 rather than 2 6aa1c4
the reasons are that you get valuable results quickly and at a cheap cost doing #1 first 6aa1c4a
the following are suggestions for additions to PASS4 during step #1: 6aa1c5
output as one document pieces from several NLS files 6aa1c5a
Table of Contents Generator 6aa1c5b

KWIC generator 6aa1c5c
other index generators 6aa1c5d
invisible text on/off (this could be both a new NLS feature with an attendent viewspec and a new PASS4 directive) 6aa1c5e
link conversion 6aa1c5f
straighten out the treatment of tabs (PASS4 currently has some bugs here) 6aa1c5g
see branch named (Bugs) for other current bugs in PASS4 that should be eliminated 6aa1c5h
print the time of printing and/or the time the file was last changed as part of the running head 6aa1c5i
on the following items, implement new directives to PASS4 (if necessary) and make their default setting be the viewspecs in force at the time the file is output to PASS4 6aa1c5j
T setting 6aa1c5j1
statement number on/off 6aa1c5j2
statement names on/off 6aa1c5j3
indentation setting 6aa1c5j4
names on/off 6aa1c5j5
signatures on/off 6aa1c5j6

NMA Convention 6ab
29 & 30 April Mimi and O'Connell also attendedJ 6ab1
Kodak KOM-90 6ab1a
no CPU; no core 6ab1a1
mag tape in; character codes <= 128 6ab1a2
no vectors; characters generated with a stroke generator 6ab1a3
Beta 700 6ab1b
characters generated by means of a dot matrix stored in ROM <= 128 6ab1b1
could also stroke generate characters 6ab1b2
also can have disk or fonts (bit matrices) stored out there 6ab1b3
Dan O'C will get specs from Peter Simon 6ab1b4
8K core max 6ab1b5
$141K min 6ab1b6
LINC (Singer) 6ab1c
$125K 6ab1c1
no CPU 6ab1c2
online or offline with a tape and a character generator 6ab1c3
PTI 2600 6ab1d
printer only -- no graphics 6ab1d1
Memorex 1603 6ab1e
printer 6ab1e1
3M 6ab1f

Mostly history of ideas about the Output Processor

printer	6ablfl
UCC	6ablg
no CPU	6ablg1
all hardwired	6ablg2
about $130K?	6ablg3
CalComp	6ablh
apparently have resolution of 4Kx4K dots whereas Beta's is 1Kx1K	6ablh1
Beta is faster in print mode (12-25KC)	6ablh2
Beta has a universal camera	6ablh3
FR-80	6abli
PDP-9 inside	6abli1
will soon put in PDP-15's	6abli2
no documentation	6abli3
4K-8K core; can get disc	6abli4
have vector generator, stroke generator, and a graphics arts quality character generator (extra option, like a Videocomp)	6abli5
normal is tape input	6abli6
fonts stored in core or on disk	6abli7
8 widths, 8 intensities	6abli8
$200K min. $7K/month	6abli9
color option	6abli10
filters under program control	6abli10a
programmer type says he sees no limitations	6abli11
full blown	6abli12
graphics option never sold	6abli12a
$300K	6abli12b
have a font designer	6abli13

Mostly history of ideas about the Output Processor

(Problems) 7
two facts: 7a
when KDF goes: 7a1
file directory size will not be increased 7a1a
each disk file no matter how small takes 4K words 7a1b
blocks are 2K -- 1 block for data, 1 block for index 7a1b1
this means a large number of small files is a very bod idea 7a2
this means separate named format files is bad 7a3
this means maybe one format file per user with a Format Designer built index by name into it 7a4
there also exist implications for separate backlink files 7a5
LC may have to change page numbers 7b
how about files output thru the trail, keyword, or content analyzer features 7c
output file will mostly be a tape 7d
problems: 7d1
header/trailer blocks 7d1a
getting the tape produced on-line 7d1b
labeling the tape 7d1c
link conversion 7e
how do you keep track of where things got stuck (page no.) for later generation of indices 7f
how do you attach format info to a character in the file 7g
to named statements (or position therein) only 7g1
to pointers 7g2
to special entity types 7g3
could bury format info in file if had this 7g3a

Mostly history of ideas about the Output Processor

(Bugs) in PASS4 8
currently cannot get pagination without getting page numbers 8a
Casseres says that TCR may not work 8b
Casseres says that NBL may not take effect immediately 8c
Casseres says that centering doesn't work right 8d
Casseres says that directive defining doesn't work if define directive as a string of directives 8e
Casseres doesn't like the syntax or conditionals 8f
the thing about tabs ought to be straightened out 8g
Casseres says he thinks that tabs work OK for the DURA 8g1
if it starts to print on a page but then hits something like a SKP=1 and does not print anything, it thinks it did print and a subsequent SKP=0;RES causes it to leave a blank page 8h
see p. 18 of BBPERS printout 8h1

(Thoughts) random 9
for case of OP as an RPG 9a
probably need to do special formatting at syntatically recognizable places 9a1
Create Display and OP have very different design criteria: 9b
efficiency vs. powerr and multiple hardware devices 9b1
but if I do area things, I want to divide out functions 9b2
keys 9c
have keys defined two ways 9c1
1) within a document format 9c1a
2) whthin a user's "Key Library" 9c1b
at any time using the Key Attacher a user may attach either of the two types -- one within the document format that is currently in force or qualify the key name invoked say with an 'L and you get a key out of the library 9c2
how the Format Designer should handle apparent inconsistencies in format specifications 9d
impossible conditions 9d1
ask user to resolve and give a recommendation 9d1a
automatically change something 9d1b
(in most cases would at least notify the user of the change) 9d1b1
made tentative change and ask user if it's OK 9d1c
(about the same as the first) 9d1c1
probable 9d2
give a warning -- did you really want to do that? 9d2a
from Doug's notebooks: 9e
Don Jevons' (x 2604 SRI Commercial Artist) specialty is layout and typography 9e1
1-69 p. 8 9e1a
only output updated pages 9e2
1-69 p. 21 9e2a
Maybe this is what the "Area" approach does for you: 9f
It isolates the difficult problem 9f1
The formatting within a rectangular area was solved a long time ago -- sure you can keep thinking of new features, but they're almost always very easy to solve 9f1a
Size is easy 9f1b
Shape (as long as convex (maybe not that) and edges are mathematically describable curves is easy 9f1c
Attitude is easy 9f1d
Margin is easy 9f1e
Souce from which to fill is new and I can't think of a good way to solve now 9f1f
Position as determined by Priority is the hard one -- here is where describable algorithms need to be developed 9f1g

running head has muliple parts that get filled from different sources 9g
Formatter is equivalent to a bigger Create Display 9h
Copy Fitter is equivalent to a bigger NLS 9h1
generalized sequence generator that can go get a branch of another file in the middle of the current file 9i
this file (branch) could be full of directives (or a dummy) and the input routine generates the directive string 9i1
the sequence generator would have to be conditional -- then could format a file several different ways 9i2
NLS has to tell PASS4 if the input PASS4 is recieving is under the control of the content analyxer, trails, keyword reordering, or is normal 9j
eventually PASS4 or a new program is going to hve todo real page formatting and not just line formatting 9k
(np4) proposed things to do for a rewriting of PASS4 91
see (parsley,ax:wh) for a list of directives proposed for deleting 911
the following is a list of directives that will be kept that were suggested to be cut in the first AX proposal 911a
RTJ 911a1
MSP (max number of spaces to use in right justification) 911a2
TYP 911a3
PGN 911a4
SSW (insert a stop code at end of every page) 911a5
CSW 911a6
CMD 911a7
conditionals and expressions in directives are proposed to be dropped 912
the following are changes internal to PASS4 that should cause no functional change other than maybe an increase in speed 913
get rid of the interpreter 913a
use CASE statements instead 913a1
make into two real coroutines -- OUTST and DINCHR 913b
need DINCHR to decide where next input comes from 913b1
if a major rewriting is to be done all at once then the additional directives mentioned in the branch named Features could be implemented at that time 914
need a "Key Attacher" 9m
could be an integral part of the Copy Looker 9m1
it would construct or add to the Connection File mentioned below 9m2
N.B. would need a subsequent pass thru the Formatter to make keys effective -- i.e., produce another paginated file 9m3
have three files 9n
the original NLS text file 9n1

a connection file (connecting points in the NLS file to named formats) -- much like the idea for implementing back links 9n2
named format files (of different types) 9n3
when formatting algorithm can't do too well, e.g., picture forces referring text to next page 9o
flag that and when user is scanning formatted text akd him: 9o1
add more lines to this page 9o1a
make picture smaller 9o1b
etc. 9o1c
he chooses (or lets slide) and gets presented with how it turned out (can change it again) 9o2
eventually we find out what is usually done and also what options we missed and change the first pass algorithm accordingly 9o3
Strategy questions 9p
what has this to do with augmentation 9p1
not much 9p1a
thus maybe not worth the resources 9p1b
maybe hardcopy is inherently too limiting 9p2
maybe want to wait til can do all this on CRT's 9p2a
(but this approach would be able to treat that CRT as another device) 9p2b
maybe it's good approach, because don't make any initial restrictions on ways of representing information because of hardware limitations (except maybe "pages") 9p3
ways of representing info is part of our work 9p4
don't want to set up in-house printing microfilming capability 9p5
Pro Doug wants it (and I think a general solution) 9p6
Necessary changes to PASS4 9q
1. recognize links 9q1
new directives: 9q1a
CVL ConVert Links (will eventually be superseeded by a flag set by the Commander) 9q1a1
SPL=n allow n SPaces for converted Links (could combine these two directives into one) 9q1a2
2. recognize special characters and leave proper room for them 9q2
3. set up Page Location File?? 9q3
4. pass along statement numbers 9q4
need line number where statement begins in the ring element 9r
need ignore codes appended on end for short textual links 9s
for the first pass the LC will only remember where documents start 9t
Formatter uses Special Symbol Table to: 9u

recognize occurrance of character strings that represent special symbols 9u1
find out size of the target special symbols 9u2
by looking it up in the device description file? 9u2a
translates user's notation into internal notation that will display on the screen in proper size 9u3
translate meaning of character size; boldface; italic; flashing; underline; overbar. 9u4
maybe special symbol table could contain content analyzer patterns 9u5
Note that PAGE1 retains directives 9v
but they claim flexibililty of named formats 9v1
fairly big thing in their advertisement 9v1a
what you do is change meaning of a format call (e.g. A4) 9v2
what you end up doing then is identifying functional/format entities (e.g. title, subhead1, subhead2, subsubhead1, etc.) and delimiting them with FFD's and then get different outputs by redefining meaning of a format call associated with a given FFD 9v3
after OP is created 9w
write a user's guide 9w1
give users teaching session 9w2
after a while -- pass out a detailed questionnaire to user's on a scale of 1-10 rate frequency of use of each of the features and directives 9w3
complaints 9w4
suggestions 9w5
features desired 9w6
bugs 9w7
maybe way to attach format info to a character is to generate a link to the character in the format file and maybe a backlink in the text file 9x
use backlinks to attach format info to a character in file 9y
original format designer (not copyfitter) has to allow at least separate formatting for TOC, index, etc., and main body 9z
way to attach formats to point in file is by occurance of link (with special syntax so is recognizable by the formatter) in the NLS file 9a
Table of Contents generator 9aa
system default conditions 9aa1
first and second level statements truncated to one line (i.e., L=2, T=1) 9aa1a
options 9aa1b
L=n, T=n, truncate to n characters 9aa1b1
set L, T, or truncation for a branch 9aa1b2
show user the first pass at the TOC 9aa2
he gets to use normal NLS commands to change it 9aa2a
he may also use copyfitter to change printing format 9aa2b

Page layout becomes interactive and neat when: 9ab
page layout in line/graphic representation shown on screen 9ab1
user can get current value of some entity (say chap. heading) by bugging its line on the screen 9ab2
he can change it 9ab2a
in the page layout program, he can specify that if certain conditions are met, e.g., if chap. heading has more than 31 characters, then page layout will show that thing as flashing 9ab3
will be able to move entities about by bugging them, they get attached to bug (same as move labels) and then deposited 9ab4
will need to be able to show facing pages anyway 9ab5
problem exists of changing changed things in
NLS file
format file
page makeup program as the user does page layout 9ab6

on-line composition 9ac
call in named text and picture entities, make up headings as you go along 9ac1
move, narrow, widen, shorten, heighthen, heavier, lighter face the elements 9ac2
have a command: Print It!! 9ac3

several systems now of publishing catalogues (parts and spec sheets) 9ad
leave the basic info alone (except for prices) 9ad1
just change the index 9ad2
new index just doesn't point to an old version of a page 9ad2a
index can be hardcopy 9ad2a1

Fonts 9ae
pick a standard character grid 9ae1
say 2**10x2**10 9ae1a
each character is then stored as a bit matrix 9ae1b
fonts are named sequential files of indefinite length 9ae1c
specify a character by name, number 9ae2
will have facility for setting name till is changed and symbolic representations of the numbers (say the ASCII 7 bit code is the assummed symbolic) 9ae2a
set of functions that transform character matrices to another 9ae3
size tilt rotation heighth
translate a 2**nx2**m matrix into a 2**10x2**10 matrix
thicken/thin horizontal/verticle lines condense
expand
transform (move to left or right in matrix) 9ae3a
look at optical scanner logic for ideas here 9ae3a1

Mostly history of ideas about the Output Processor

how do you handle character spacing with some of these 9ae3a2
compose text ultimately into a 2**nx2**m grid 9ae3b
separate programs take this as input and produce output for a specific device 9ae3b1
IBM guy says keep text and layout in separate data bases 9af
IBM 9ag
does item layout graphically 9ag1
then computer tries page layout graphically 9ag2
then fellow at CRT moves items around 9ag3
keep accounting of references to a document and thereby move it in level storage 9ah
hard, film. on-line 9ah1
Page Composition Language 9ai
have several entities 9ai1
e.g. title, chapter heading, subheading, sub-sub, folio number, illustration, marginal note 9aila
all have attributes of placement on page 9ailb
centered, noncentered, centered about a certain point, justified, right left, hyphenated (hyphen rule is another) 9ailc
all probably turn out to be character strings 9aild
actually might treat them as blocks same as Page-1 9aild1
other attributes 9aile
type size, boldface, italic, upright, underline, overline,font 9ailf
PAGE-1's idea of format labels (macros) is good 9aj
Page Layout Language could be subroutinized and user could write a routine to replace something he didn't like 9ak
could be hole for user supplied subroutines 9ak1
setting up a format file must be interactive 9al
could give a list of blanks to fill in 9al1
or the blanks already filled with the default values 9al2
non-changed ones would be system set values 9al2a
could give a sample format and let fellow move it around 9al3
he could also bug an entity and blanks to fill in with numeric or literal values would occur 9al3a

Mostly history of ideas about the Output Processor

(Meta-design)
APPROACH

10

10a

what service,
quantity, & time
wanted

newly
discovered
services

find all possible
ways of prooviding
that service

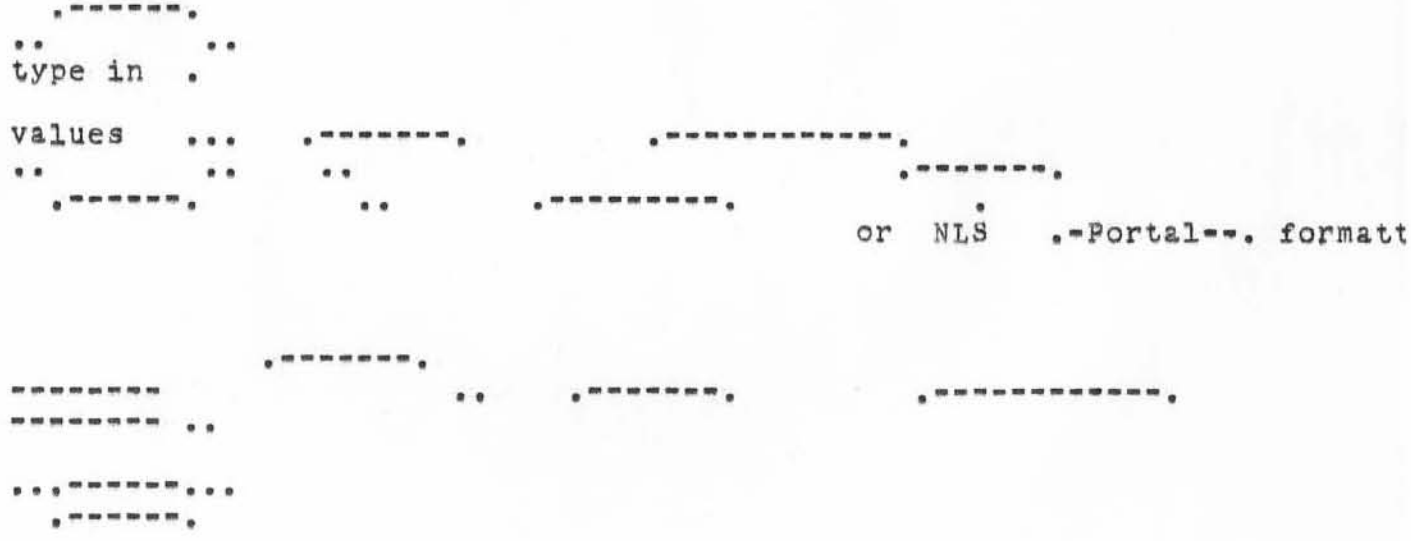
what does each
method cost

is
cost
acceptable

yes

10a1
10b

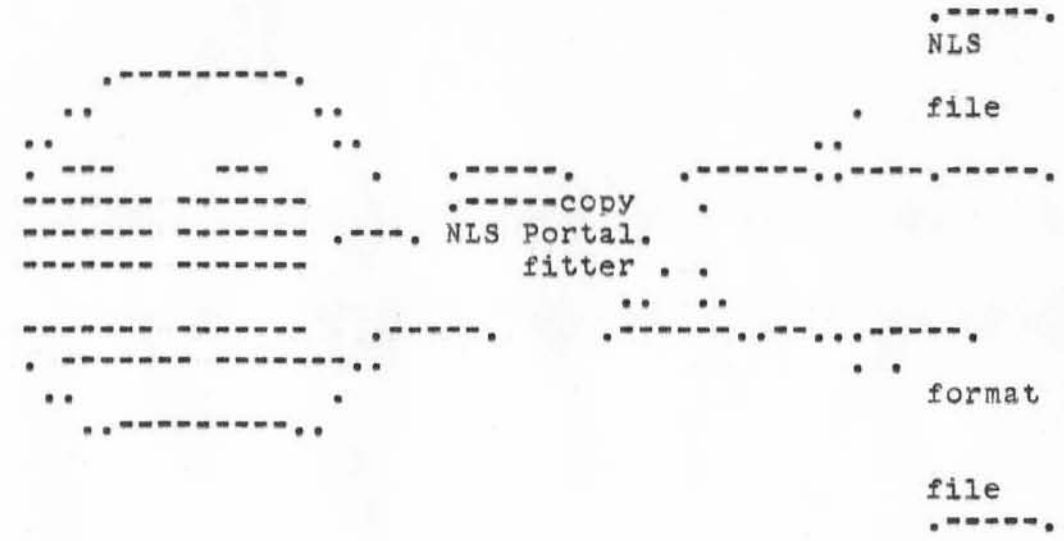
Architecture
Formatter



10b1

Mostly history of ideas about the Output Processor

Copy fitter



10b2

Mostly history of ideas about the Output Processor

10b3

(Design) 11
the following is a suggestion of Chuck's for handling the problem of keeping the original text of a link in the paginated file, but assuring that the line breaks get done correctly 11a
when the special 8-bit code beginning a link is seen for the first time, scan the input buffer to make sure that there really is a link there 11a1
if so, steal the text of the link away from the format routine and squirrel it away somewhere and feed the format routine the pattern to be substituted for the link instead 11a1a
then when the format routine gets ready to make its line break, change the number of characters to output for that line, feed the format routine a few spaces and then the text of the link that was squirreled away 11a1b
in this manner the original test of the link gets printed in the margin of the document 11a1c
now when the Link Converter starts doing it's job it will replace the pattern in the paginated file with a page reference and either blank out or fill with ignore codes the marginal text of the link 11a2
(id1c) Initial Design of the Link Conversion process 11b
The basic idea is that PASS4, while processing a file, sets up a Structure File that looks a great deal like NLS's ring element file. Each statement of input generates a "ring element" in this Structure File. 11b1
There were basically n considerations that led to this approach: 11b2
1) PASS4 has to pass along statement number information because it is impossible to even tell where a statement begins in the output files from PASS4, so that info can't be calculated later on; 11b2a
2) the information needed for converting links to page or frame numbers is very much like what would be needed for on-line fiche jumping, commenting, editing, etc., so since it's as easy to generate information in one format as another, why not leave around all the information gathered for converting links for the on-line fiche stuff and in a format well suited for that? 11b2b
3) we might be able to use some NLS machinery or at least some of the algorithms for handling something that looks like an NLS ring element file 11b2c
The process for converting links looks like this: 11b3
Output a file thru PASS4 telling it to set up for converting links in this file. 11b3a
As PASS4 reads each new statement, it sets up a ring

element in a the Structure File for that input file. These ring elements contain the items listed below. 11b3b

Also each time a new statement is input to PASS4, it gets that statement's statement number from NLS and writes it into the Structure File (into a list that is separate from the ring elements but of course pointed to from the appropriate ring element). This is necessary to do only for files output with the content analyzer, trails, or keyword reordering turned on. 11b3c

Each statement is scanned for links. When one is found the column width of that line is changed appropriately, the link is allowed to pass thru to the paginated file unalterred, the text of the link is copied into the Structure File in a list for links only, the ring element for that statement gets a pointer off to the link in the Structure File, and the scan continues. 11b3d

When all documents that make up a collection have been thru PASS4, the LINK Converter may be activated. It is told a list of documents that are interlinked and the order in which the documents fall if the numbering is to be continuous over the collection. The LC then collects all the Structure Files for the documents, figures out the relocation factor for continuous pageing, and starts its scan. 11b3e

The scan consists of looking at a new Structure File, finding the head of the link list, getting the next link, decoding the link, going to the appropriate Structure File, picking up the ring element for the statement that link points to, pulling out the page number, adding the relocation factor, going to the paginated file of the original Structure File, finding the link there, changing the text in the Paginated file, picking up the next link in the link list, and continuing. 11b3f

Voila!! the link conversion is complete for that week. The Structure Files are left around for the on-line fiche interacter. 11b3g

Details of items in the Structure File. 11b3h

General: the Structure File is a random file with three types of items (see below). Each item in each item type is the same length. The ring element list has one element per item, the statement number and link lists have variable length elements that cross item boundaries at will (the items are linked together to form list). 11b3h1

Ring element: 11b3h2

element type flag 11b3h2a

pointer to successor ring element 11b3h2b

(Features) including additional directives for PASS4 [see also (Melvin,adsug,)] 12
The following branch gives the correspondence planned between NLS View specs and Viewset paramenters and the initial setting of some PASS4 directives 12a
Viewspecs to be used 12a1
L setting 12a1a
T setting 12a1b
content analyzer on/off 12a1c
trails on/off 12a1d
keyword reordering on/off 12a1e
statement numbers on/off 12a1f
statement names on/off 12a1g
blank lines on/off 12a1h
indenting on/off 12a1i
signatures on/off 12a1j
Viewspecs not used 12a2
branch only 12a2a
frozen statements on/off 12a2b
pointers show/not show 12a2c
picture clip on/off 12a2d
tree structure display 12a2e
Viewchange parameters to be used 12a3
tab stops 12a3a
number of columns 12a3b
indentation amount 12a3c
if entire page is indented more than n spaces, reduce indentation by m spaces 12b
thus maintaining relative indentation 12b1
line numbers down the side of the page 12c
statement id at right and below each statement 12d
verticle placement 12d1
on first line of each statement 12d1a
on last line of each statement 12d1b
in blank line immediately preceding the statement 12d1c
in blank line immediately following the statement 12d1d
horizontal placement 12d2
right justified to column n 12d2a
leftjustified to column n 12d2b
first n levels 12d3
every n lines/statements 12d4
truncate to n characters 12d5
want to output more than one file merged into the same document 12e
including files or branches that contain only directives 12e1
number "sections" like 18.5.45.s.a.i 12f
translate meaning of character size; boldface; italic; flashing; underline; overbar. 12g

Mostly history of ideas about the Output Processor

(Hardware) 13

COM's 13a

S-C 4060 3M (there exists a rental in S.f. area; we have brochures) Eastman-Kodac Beta Instruments Itek NCR CalComp 13a1

character generators 13b

Charachatron (extruded beam) Videocomp Stroke generator -- input is character codes, output is analogue signals dot generator line generators 13b1

there exists an FM 3400 that can superimpose character on microfilm viewing screen 13c

see BLP's Pentaflex folder: "COM Hardware" 13d

Mostly history of ideas about the Output Processor

Mostly history of ideas about the Output Processor

(Planning) 15
.DSN=1;.RTJ=0;.DPR=0; 15a
(name) OUTPUT PROCESSOR BLP 15b
Description of: OUTPUT PROCESSOR 15b1
Summary: The OP will eventually be a rather to very large set of programs that will enable a user to interactively design a format and then output an NLS file according to that format onto various devices. Besides that basic capability there will be automatic generation fo various types of indices, conversion of links to page or microfiche references, provision for special symbols, and an interactive copyfitter. As fallout, the Output Processor will leave around information for NIC users to do on-line fiche jumping. 15b1a
() Significant *'milestone" points for: OUTPUT PROCESSOR
Step 1: PASS4 rewritten and first pass at Link Converter.
Step 2: the Output Processor becomes a Processor; first version of the Format Designer; Formatter (front end to PASS4) gets written; Table of Contents Generator; probably a second pass at the Link Converter.
Step 3: a Copy Looker; provision for special characters; a second version of a Format Designer; probably another pass at the Link Converter.
Step 4: first version of the Copy Fitter; maybe another pass at the Link Converter; more features for the Format Designers.
Step 5: a Font Designer; another version of the Copy Fitter; more features for the Format Designers.
Steps 6 thru n: more features for the Copy Fitter and the Format Designers.
NB. Various index generators will be provided all through the above. 15b1b
Date/initials of major plan updates 01/09/70 15b1c
Relation of: OUTPUT PROCESSOR to other tasks and goals 15b2
Dependency on other tasks: Portal Processor; any changes to NLS that may be necessary to provide needed functions thru the Portal; a special 8-bit code and attendant command(s) in NLS to identify links. 15b2a
Other tasks dependent on this task: Features desired by NIC (at least enough information left around for fiche jumping); 15b2b
Notes on relative importance to the overall ARC goals: Because of NIC dependency, it seems to be very important. 15b2c
*Estimates re: OUTPUT PROCESSOR

Mostly history of ideas about the Output Processor

Initials	Estimated man-weeks of effort		15b3
*XXX	8	Step 1	15b3a
*XXX	7	Step 2	15b3b
*XXX	4	Step 3	15b3c
*XXX	8	Step 4	15b3d
*XXX	4	Step 5	15b3e
*XXX	--	Step 6	15b3f
			15b3g

Timing: 15b3h

Step 1 15b3h1
*Start -- 15b3h2
*End -- 1 March 15b3h3
Step 2 15b3h4
*Start -- 1 March 15b3h5
*End -- 1 May 15b3h6
Step 3 15b3h7
*Start -- 1 May 15b3h8
*End -- 1 June 15b3h9
Step 4 15b3h10
*Start -- 1 June 15b3h11
*End -- 1 August 15b3h12
15b3h13

PASS4 has been rewritten in the new MOL and debugged so that it will work with the new NLS and it's "mini-portal". The link converter has been designed. Coding is about 40% completed. No debugging yet. Also the first Format Designer and the Formatter are about 60% designed. 15b4

03/18/70 about 5 weeks behind schedule 15b4a

15b4b

Possible Additional Tasks 15b5

add directives to PASS4 (see Features) 15b5a

delete directives to PASS4 (see np4) 15b5b

delete conditionals and expressions in directives 15b5c

rewrite parts of PASS4 to make it faster, internally cleaner, and smaller (see np4) 15b5d

It would be most efficient to do this all at once -- time estimate: 3 weeks 15b5d1

rewrite PASS4 and whatever else has been done up to that point to make the Output Processor a real page by page rather than a line by line formatter -- time estimate: 2 months?? 15b5e

Mostly history of ideas about the Output Processor

```
(Short Planning)                                                    16
    (name) OUTPUT PROCESSOR   BLP                                   16a
      Description of:  OUTPUT PROCESSOR                             16a1
         1.  Link Converter                                         16a1a
            clean up Structure File Generator                       16a1a1
         2.  Work on PASS4                                          16a1b
            a.  new directives                                      16a1b1
               signatures on/off                                    16a1b1a
               truncate statements (T setting)                      16a1b1b
               date of printing and/or last file change in
              running head                                          16a1b1c
               statement identification to right hand margin        16a1b1d
             b. some directives take initial setting from
           current viewspecs                                        16a1b2
             c. remove some bugs in PASS4                           16a1b3
                                                                    16a1b4
      *Estimates re:  OUTPUT PROCESSOR

      Initials       Estimated man-weeks of effort                  16a2
         *BLP                3    Step 1                          16a2a
         *BLP                5    Step 2 (total)                  16a2b
            *BLP                2     Step a                       16a2b1
            *BLP                1     Step b                       16a2b2
            *BLP                2     Step c                       16a2b3
                                                                    16a2c
                                                                    16a3
      *Start -- 4/20      *End -- 5/21      Step1                 16a4
      *Start -- 4/27      *End --  ?        Step2                 16a5
                                                                    16a6
```

Mostly history of ideas about the Output Processor

16a6a

Mostly history of ideas about the Output Processor

':4893', 10/20/70 1637:55 MEJ ; .DPR=1; ':0P', 10/20/70 1329:15 BLP ;
.DSN=1;.DPR=0;

Plans for Output Processor until the Coming of the 10

Plans for Output Processor until the Coming of the 10

The following is a fairly complete outline of what I intend to do to PASS4 (one thing is to change the name to the Output Processor) before the coming of the 10. There are several stages: 1

0) This was (September 1970) the running PASS4. There are some changes that don't appear in the current PASS4 Users' Guide. 1a

1) The addition of several new directives, a couple of bugs removed, a few directives working a bit differently, and a radical reorganization of the Output Processor. 1b

This stage should be the running version of the Output Processor by around the first of September. (Made it in the first week of October) 1b1

1a) The addition of a few new directives. 1c

about 2 weeks' work 1c1

2) The addition of several more directives and the rewriting of the Directive Recognizer/Executor with an expanded syntax for directives (written in Tree-Meta with a special library). This last will be attended by some further reorganization of the Output Processor. 1d

This stage should be debugged before the 10 is ready for it. 1d1

3) Make necessary changes to the Output Processor code for L10 and 10-Tree-Meta 1e

This stage should take less than a week and will be done whenever 10-TODAS is running well enough to provide the proper input for the Output Processor. 1e1

4) A Stage IV is included in this file as a collection point for ideas of things to do sometime. 1f

1f1

Plans for Output Processor until the Coming of the 10

```
(sched) Output Processor schedule BLP:                                    2
          Month       ! OC OC OC NO NO NO NO DE DE DE DE JA JA
  JA JA JA FE FE FE FE                                                    2a
          Day         ! 17 24 31 07 14 21 28 05 12 19 26 02 09
  16 23 30 06 13 20 27                                                    2b
  Reorg OP & add dirs  !x                                                 2c
       (PAR, oplan, Stage I:wg)                                           2c1
  OP Users' Guide      !xxx                                               2d
  Add a feW directives !   xxxxx                                          2e
       (PAR, oplan, Stage Ia:wg)                                          2e1
  New Dir Recog/Exec   !      xxxxxxxxxxxxxxxxx?                          2f
       (PAR, oplan, Stage II:wg)                                          2f1
  Survey print reports !xxxxxxxxxxxxxxxxxxxxxx?                           2g
      Talk to service bureaus in area and SRi Report
     Reproduction to find means of producing ARC reports of
     acceptable quality.                                                  2g1
  Debug device Film    !   xxxxxxxxx                                      2h
      Get Output Device Film to generate tapes (not including
     any pictures) for George Lithograph to run some tests to
     what George can do.                                                  2h1
  Add device Scan-print!
  ?xxxxxxxxx xxxxxxxxxx?                                                  2i
      This means the new scan-line printer/display system that
     is expected to be operational in February.                           2i1
  Move OP to 10        !                          ?xxx                    2j
       (PAR, oplan, Stage III:wg)                                         2j1
  Integrate OP/CDSPLY  !
  ?x>                                                                     2k
      Start of evolution towards the Portrayal Generator, which
     will eventually include all of the "Output Processor's"
     devices plus the function of the current Create Display.             2k1
```

(Stage I) 4

Reorganization 4a

The Output Processor has been radically reorganized. To a large degree it has been subroutinized -- mainly with a view to the purposes of the later Output Processor when it works with something like "areas" and it will do something like page formatting rather than the current line or statement formatting. 4a1

There are mainly two subroutines that were not there before: 4a1a

an input line routine that is used independently by the parts of the Output Processor that make up the "areas" of the body, header, and page number 4a1a1

a line formatting and outputting routine that formats (centers, "right justifies, etc.) and outputs the results left by the line input routine 4a1a2

Virtually all the device dependence has now been localized in two areas: the initialization process and the output character routine 4a1b

previously, device dependence was scattered throughout the Output Processor 4a1b1

The code has been straightened out and probably made substantially faster -- no timing tests have been run as yet. 4a2

This is an interim reorganization. 4a3

Because the Directive Recognizer/Executor won't be rewritten for this stage, the control mechanism is still badly screwed up, but most of the Output Processor won't know it, so the Stage II reorganization will be very easy. 4a3a

The Output Processor looks a lot more like a page formatter (at least there is a controlling routine that acts sort of like one), but it isn't really because there is no backup beyond one line. 4a3b

This all means that the Output Processor is a lot closer to a "page/area" formatter where new "areas" can be added easily and each "area" can have an independent set of directives that govern its formatting within the area and its placement on the page. 4a4

4a4a

Completely New Directives 4b

4b1

TLN=n: Truncate to n LiNes 4b2

Will work the same as the NLS T Viewspec. 4b2a

The "default setting" is the NLS T Viewspec at the time the file is output thru the Output Processor. 4b2b

4b2b1

LCP=n: Level CLipping 4b3

This will work similarly to the NLS L Viewspec. 4b3a
The "default setting" is the NLS L Viewspec at the time the file is output thru the Output Processor. 4b3b
If 1 is the setting of the L Viewspec when the file is output thru the Output Processor, the Output Processor only sees the first 1 levels of statements. So having n > 1 just won't do anything. 4b3c
4b3c1

LMS=n: Left Margin Setting 4b4
This sets the left margin of the page to n columns to the right of the standard (on all devices it's to the right of the edge of the page to begin with). Thus except for lines that are "centered with respect to the page", all lines will be indented at least n columns. 4b4a
The default setting is zero. 4b4b
LMS applies equally to the body, header, and page number areas. 4b4c
4b4c1

PES: Paginate at End of Statement 4b5
When the entire statement (including statement number, signature, and/or picture) has been output, a new page is begun. 4b5a
It is suggested that this directive be used in almost all places where the RES directive is now being used. 4b5b
If you are using SNF and/or SGF then you will probably want the statement number and/or signature to be printed on the same page as their statements. If SNF and SGF are not being used and the RES is the last thing in its statement, there will be SCR blank lines at the top of the body area of the next page. Thus it would seem that the only time someone would want to use a RES would be to paginate in the middle of a statement or to get a blank page by having a RES immediately precede a PES at the end of a statement. 4b5b1
4b5b1a

PSH=n: Page Show 4b6
Only produce output for page n, but format and scan all the other pages for directives. 4b6a
The default setting is zero, which means print all pages. 4b6b
This would be nearly equivalent to beginning the file with a TYP=0 and having a TYP=1 immediately before page n and a TYP=0 immediately after. 4b6c
Note that there could be several PSH's in a file and if put in the right places, one could get any number of single pages as output. 4b6d
4b6d1

HJB=n: Horizontal Justification of the lines in the Body area 4b7

The default setting is 1. 4b7a

How do you want the lines of the body area formatted -- let me count the ways: 4b7b

4b7b1

= 0: don't format the lines 4b7c

i.e., don't bother backing up to last invisible to make a line break, but maybe make a line break in the middle of a word 4b7c1

This replaces the old directive FLN=0 (don't Format LiNes) 4b7c1a

= 1: set lines flush left 4b7d

This replaces the old directive FLN=1 (Format LiNes) when CEN=0 (CENtering off) and RTJ=0 (RighT Justification off) 4b7d1

= 2: set lines flush right 4b7e

= 3: set lines centered with respect to left margin setting 4b7f

i.e., centered between the left and right margins 4b7f1

This replaces the old directive CEN=1 (CENtering on) 4b7f1a

= 4: set lines centered with respect to page 4b7g

i.e., centered as if LMS=0 4b7g1

= 5: set lines centered with respect to indentation for the statement 4b7h

i.e., indent according to LMS and the statement's level and then center between that point and the right margin 4b7h1

= 6: set odd/even numbered pages lines flush right/left 4b7i

= 7: set odd/even numbered pages lines flush left/right 4b7j

= 8: set lines "right justified" 4b7k

if can't: set lines flush left 4b7k1

"can't" means that it would take more than MSP spaces to do it. Also the last output line of every statement is set according to the "can't" option. 4b7k1a

This replaces the old directive RTJ=1 (RighT Justification on) 4b7k1b

= 9: set lines "right justified" 4b7l

if can't: set lines flush right 4b7l1

= 10: set lines "right justified" 4b7m

if can't: set odd/even pages lines flush right/left 4b7m1

= 11: set lines "right justified" 4b7n

if can't: set odd/even pages lines flush left/right 4b7n1

If there is a tab in a line then the line is set flush left. 4b7o
4b7o1

HJH=n: Horizontal Positioning of the Header lines 4b8
Same options as with HPB except that centered with respect to indentation doesn't make any sense. 4b8a
The default setting is 1 -- left flush. Maybe it ought to be changed to centered. 4b8b
4b8b1

HJP=n: Horizontal positioning of the Page number lines 4b9
Same options as with HPB except no "right justification" and centered with respect to indentation doesn't make any sense. 4b9a
The default setting is 3 -- centered with respect to LMS. 4b9b
HJP=3 replaces NSW=1 (center page numbers) 4b9b1
HJP=6 replaces NSW=2 (put odd page numbers flush right and even page numbers flush left) 4b9b2
4b9b3

PNO=n: Page Numbering Option 4b10
This combines the old option NSW=0 (no page number) and the directives ROM (Roman numeral page numbers or not) and FNC (upper or lower case for Roman numeral page numbers). 4b10a
The default setting is 1. 4b10b
The four possible settings are: 4b10c
= 0: no page number 4b10c1
replaces NSW=0 4b10c1a
= 1: arabic numeral page numbers 4b10c2
replaces ROM=0 4b10c2a
= 3: lower case Roman numeral page numbers 4b10c3
replaces ROM=1 and FNC=3 or 5 4b10c3a
= 4: upper case Roman numeral page numbers 4b10c4
replaces ROM=1 and FNC=1 or 4 4b10c4a
4b10c4a1

IRS: Ignore Rest of Statement 4b11
At the point this directive is encountered the same thing happens as if the directive were the last thing in its statement. 4b11a
4b11a1

IST: Ignore this STatement 4b12
Normally the Output Processor will behave just as if a statement containing an IST were not there. It will not get confused if the next statement it sees is of a lower or higher level. 4b12a
Any directives occuring in the same statement but before this one are recognized and executed. Thus a good way to hide directives on output might be to make

up a statement consisting entirely of directives, the last of which is IST. Then you won't even get a blank line output for the statement. 4b12b

If IST would occur in the ith output (printed not input) line of a statement, then the first i-1 lines of that statement will be printed -- there is no backup beyond the current line -- so be sure to put the IST early enough in the statement. 4b12c

4b12c1

IBR: Ignore BRanch 4b13

At the point this directive is encountered, the statement containing it is treated the same way as if an IST had occurred. In addition all subseqent statements are ignored (without any scanning at all) until a statement is seen that is of a level less than or equal to that of the statement in which the IBR occurred. 4b13a

4b13a1

HLT: HaLT 4b14

At the point this directive is encountered the same thing happens as if the directive were the last thing in its statement and the statement were the last in the file. The output file is closed normally and everything up to that point gets printed. 4b14a

(existed previously, but now it'll do it) 4b14b

4b14b1

SGF=n: SiGnature Format 4b15

Its setting has a similiar meaning to that of SNF, i.e., 4b15a

if n > 0, print each statement's signature (date, time, and initials of the person when the statement was created or last alterred) right justified to column n after the last of the text of the statement has been printed. 4b15a1

The "default setting" is determined by the NLS Viewspecs in force at the time the file is output thru the Output Processor. If signatures are on and blank lines are on, then SGF is set to 60; otherwise it is set to zero -- this is the same convention as in NLS. 4b15b

If SCR*NBL = 1, the Output Processor will attempt to put the signature in the last line of the statement. If the signature would "overlap" the text of the statement or the statement number, then it will put the signature in a blank line following the statement. A blank line will be forced, if necessary, to accomodate the signature (before the statement number was not printed if SCR*NBL=1 and the statement number overlapped the last line of text). 4b15c

A convention will be followed that if SCR > 1, then the

signature will be forced onto a blank line following the last line of its statement -- it will not go on the same line as the last line of its statement even if it wouldn't "overlap". 4b15d

If both SNF and SGF are set and they "overlap" each other, then the statement number has precedence (the signature will be printed on the next line). 4b15e

Two things "overlap" if there is not at least one space between the ends of the things. There are 20 characters in a signature. 4b15e1

The signature and statement number will be printed no matter what SCR and NBL are. However the lines occupied by SGF and/or SNF are subtracted from SCR*NBL -- there won't be SCR*NBL blank lines following the signature and statement number unless they are both printed on the same line as the last line of the text of their statement. 4b15f

If the signature is printed on a line following the statement, the directive LMS (Left Margin Set) will not be effective for that line so that it will be possible to get the signature printed in the left margin. The amount of indentation for a statement has no affect on the placement of the signature. This is a different convention than was used before with SNF. 4b15g

If 0 < n <= 20, the signature will be printed flush against the left edge of the page (there are 20 characters in a signature). 4b15g1

The signature (and statement number) will always go on the same page as the last line of its statement (unless there is a RES in the statement). 4b15h

The bugs that occured before with SNF when the line containing the statement number was supposed to be centered or the line contained nothing or nothing but but blanks will not occur. 4b15i

SGF may be used in conjunction with the directive MCH, which sets the right margin for the body of the printout. SGF is not constrained by the setting of MCH -- it can be larger. 4b15j

4b15j1

New Directives That Replace Old Directives 4c

4c1

HJB=n: Horizontal Justification of lines of Body area 4c2

A subset of its options replace FLN (Format LiNes on/off), RTJ (RighT Justification on/off), and CEN (CENter lines on/off). 4c2a

Default setting is 1 -- flush left. 4c2b

HJB=0 replaces FLN=0 4c2b1

HJB=1 replaces FLN=1, CEN=0, RTJ=0 4c2b2

HJB=3 replaces CEN=1 4c2b3
HJB=8 replaces RTJ=1 4c2b4
4c2b4a

PNO=n: Page Numbering Option 4c3
This combines the old option NSW=0 (no page number) and the old directives ROM (Roman numeral page numbers or not) and FNC (upper or lower case for Roman numeral page numbers). 4c3a
Default setting is 1 -- arabic page numbers. 4c3b
The four possible settings are: 4c3c
= 0: no page number 4c3c1
replaces NSW=0 4c3c1a
= 1: arabic numeral page numbers 4c3c2
replaces ROM=0 4c3c2a
= 3: lower case Roman numeral page numbers 4c3c3
replaces ROM=1 and FNC=3 or 5 4c3c3a
= 4: upper case Roman numeral page numbers 4c3c4
replaces ROM=1 and FNC=1 or 4 4c3c4a
4c3c4a1

HJP=n: Horizontal Justification of Page number 4c4
A subset of its options replace NSW = 1 or 2 (page numbers centered or flush right on odd pages and flush left on even pages). 4c4a
Default setting is 3 -- center between right and left margins (taking LMS into account). 4c4b
HJP=3 replaces NSW=1 4c4b1
HJP=6 replaces NSW=2 4c4b2
4c4b2a

TAB=n: TABs -- what to do with them 4c5
This will replace parts of the old directives TAL (TAb Algorithm), TSP (Tab SPace), and TSW (Tab SWitch) and straighten them out. 4c5a
The default setting is 1. 4c5b
The three possible settings will be: 4c5c
= 0: delete tabs 4c5c1
= 1: keep tabs 4c5c2
= 2: replace tabs by a single space 4c5c3

TBD=n: describes how the Device hardware handles TaB characters 4c6
Replaces the rest of TSW, TAL and TSP. Don't fool with TBD. It will disappear soon anyway. 4c6a
4c6a1

UBD=n: describes how the Device hardware handles UnderBar characters 4c7
Replaces USW, UPR, and USP. 4c7a

OVD=n: describes how the Device hardware handles OVerbar characters 4c8
Replaces OSW, POV, and SOV. 4c8a

Don't fool with UBD or OVD. They will disappear soon anyway. 4c8b

4c8b1

New Name and meaning of setting reversed 4c9

The action performed is exactly the same as with the old directives. The specification of the action is different. First of all there is a new directive name. Also, the settings are reversed, i.e., setting the new directive to one gets the same results as setting the old directive to zero and vice versa. 4c9a

This is an effort to do away with the the problem of trying to figure out what setting a Delete or Don't Print Something to 1 or 0 does. There will be no more directives of the negative sense. All directives will name some entity and if you set that directive to zero (off), then the entity won't be printed, If you set the directive to any positive value (on), the the entity will be printed. 4c9b

4c9b1

SNB=1/0: Statement NumBers print on/off 4c9c

Replaces old directive DSN=0/1 (Delete Statement Numbers) 4c9c1

Default setting is 0 -- don't print statement numbers. 4c9c2

Note that SNB is entirely independent of SNF. 4c9c2a

4c9c2a1

SNA=1/0: Statement NAmes print on/off 4c9d

Replaces old directive DPN=0/1 (Don't Print statement Names) 4c9d1

Default setting is 1 -- print the names. 4c9d2

4c9d2a

PIC=1/0: PICture print on/off 4c9e

Replaces old directive DPV=0/1 (Don't Produce Vector output). 4c9e1

Default setting is 1 -- print pictures -- for the printer and 0 -- don't print pictures -- for all the other devices. 4c9e2

4c9e2a

UBR=1/0: UnderbaR print on/off 4c9f

Replaces old directive DUB=0/1 (Delete Underbars). The new directive applies only to 8-bit underbars. 4c9f1

Default setting is 0 -- delete underbars -- for the printer and teletype and 1 -- print underbars -- for all the other devices. 4c9f2

4c9f2a

OVB=1/0: OVerBar print on/off 4c9g

Replaces old directive DOV=0/1 (Delete OVerBars). The new directive applies only to 8-bit overbars. 4c9g1

Default setting is 0 -- delete overbars -- for all devices. 4c9g2 4c9g2a

New names only 4c10

New names only. The new directives will do exactly what the ones they replace did. 4c10a 4c10a1

DIR=1/0: DIRective print/not print 4c10b
Replaces old directive DPR (Directive PRint) 4c10b1
Default setting is still 0 -- don't print directives. 4c10b2 4c10b2a

PEL: Paginate at End of Line 4c10c
This directive replaces REL. The old form was REL=1 -- the new form is PEL. 4c10c1 4c10c1a

DSH=n: code to be used for character to do NDH 4c10d
Replaces FDS (the code for the character to be printed when NDH (Number of Dashes at end of each page) is greater than zero). Note that you can print a row of Q's at the bottom of every page if you'd like. 4c10d1
The default setting is 15B -- a dash (minus sign). 4c10d2 4c10d2a

GCR; Generate a Carriage Return 4c10e
Replaces CRL. 4c10e1

GTB; Generate a TaB 4c10f
Replaces TAB. 4c10f1
There are going to be a lot more directives of the "Generate" kind -- see Stage II. This is an effort to make their names consistent -- the directive names will all begin with a G. 4c10f2 4c10f2a

Don't pay any attention to the following. If you fool with them you'll get in trouble. 4c10g
ICR=n; Input code for a Carriage Return 4c10g1
replaces FCR 4c10g1a
ISP=n; Input code for a SPace 4c10g2
replaces FSP 4c10g2a
ITB=n; Input code for a TaB 4c10g3
replaces FTB 4c10g3a
IUB=n; Input code for an UnderBar 4c10g4
replaces FUB 4c10g4a
IOV=n; Input code for an OverBar 4c10g5
replaces FOV 4c10g5a
BSP=n: code for a BackSPace 4c10g6
replaces FBS 4c10g6a
SHU=n: output code for a SHift to Upper case 4c10g7

replaces FSU 4c10g7a
SHD=n: output code for a SHift to Lower case 4c10g8
replaces FSD 4c10g8a
STP=n: output code for a SToP code 4c10g9
replaces FSC 4c10g9a
4c10g9a1

Modifications to Old Directives (the way they work or their syntax) 4d

4d1

The following directives will have their "default settings" set according to the settings of the corresponding NLS Viewspecs or Viewchange Parameters in force at the time the file is output thru the Output Processor. 4d2

Actually the following directives have no default settings in the usual sense, but are initialized at Output Processor execution time according to the NLS settings. All of course are completely open to change by means of directives (except that setting LCP to be greater than what it was initialized to won't do any good). 4d2a

Watch out for the blank lines thing. This is the only directive that under usual conditions will get initialized to something other than with the old PASS4 default settings. 4d2b

4d2b1

LCP=n: Level CliPping 4d2c
L setting 4d2c1
TLN=n: Truncation to n LiNes 4d2d
T setting 4d2d1
SCR=n: Carriage Returns between Statements 4d2e
SCR is set to 1 or 2 depending on whether blank lines are on or off 4d2e1
SGF=n: SiGnature Format 4d2f
If signatures are on and blank lines are on, then SGF is set to 60; otherwise it is set to zero -- this is the same convention as in NLS. 4d2f1
MCH=n: Maximum number of printing CHaracters to a line 4d2g
MCH is set to the number of NLS/TODAS columns minus one (unless the device is Teletype, in which case MCH gets set to 65). 4d2g1
MCH is set to the number of columns minus one because Create Display has a different line break algorithm than that of the Output Processor. This way the Output Processor will almost always make the same line breaks as Create Display did. 4d2g2
SNB=1/0: Statement Numbers on/off 4d2h

statement numbers on/off 4d2h1
SNA=1/0: Statement NAmes on/off 4d2i
statement names on/off 4d2i1
IND=1/0: INDentation on/off 4d2j
indenting on/off 4d2j1
INS=n: INdent n spaces per Statement Level 4d2k
indentation amount 4d2k1
TST Tab SeTtings array 4d2l
The array TST is initialized according to the tab stops set in the NLS Viewchange Parameters. 4d2l1
4d2l1a

Not all of the above is true for Output Device QED. It does what is usually desired, so don't worry about it unless you want to do something strange. 4d2m
4d2m1

Other changes to default values: 4d3
The default setting for DTS (Delete Trailing Spaces) is now one, i.e., delete the spaces. 4d3a
MCH is set to one less than the viewset parameter for the number of columns in NLS. This is so that the Output Processor will almost always make the same line breaks as NLS's Create Display. 4d3b
Output Device Teletype has the following special default settings: 4d3c
SNF = 72 4d3c1
MCH = 64 4d3c2
NDH = 9 4d3c3
Output Device QED has a bunch of special default settings. 4d3d
4d3d1

SNF=n: Statement Number Format 4d4
This works the same as it did before except that a few bugs and shortcomings will no longer happen: 4d4a
if n > 0, print each statement's statement number right justified to column n after the last of the text of the statement has been printed. 4d4a1
The default setting is zero, except for Device Teletype where it is 72. 4d4b
The Output Processor will attempt to put the statement number in the last line of the statement. If the statement number would "overlap" the text of the statement, then it will put the number in a blank line following the statement. A blank line will be forced, if necessary, to accomodate the statement number (before the number was not printed if SCR*NBL=1 and the number "overlapped" the last line of text). 4d4c
If both SNF and SGF are set and they "overlap" each

other, then the statement number has precedence (the signature will be printed on the next line). 4d4d

Two things "overlap" if there is not at least one space between the ends of the things. 4d4d1

The statement number and signature will be printed no matter what SCR and NBL are. However the lines occupied by SGF and/or SNF are subtracted from SCR*NBL -- there won't be SCR*NBL blank lines following the statement number and signature unless they are both printed on the same line as the last line of the text of their statement. 4d4e

The statement number (and signature) will always go on the same page as the last line of its statement (unless there is a RES as the last thing in the statement). 4d4f

The bugs that occured when the line containing the statement number was supposed to be centered or the line contained nothing or nothing but but blanks will not occur. 4d4g

If the statement number is printed on a line following the statement, the directive LMS (Left Margin Set) will not be effective for that line so that it will be possible to get the statement number printed in the left margin. The amount of indentation for a statement has no affect on the placement of the number. This is a different convention than was used before. 4d4h

If n = 1, the statement number will be printed flush against the left edge of the page. 4d4h1

SNF may be used in conjunction with the directive MCH, which sets the right margin for the body of the printout. SNF is not constrained by the setting of MCH -- it can be larger. 4d4i

4d4i1

PLO=n: Paginate for each Level n statement 4d5

PLO can now be set to any number n -- which means that all statements of level n or higher will cause a page break to occur if the statement is not the head of its sublist (which I think is what is wanted). 4d5a

The default setting is still zero. 4d5b

4d5b1

PGP=n: Verticle Position of the PaGe number 4d6

n is now the number of blank lines to insert between the bottom of text body area and the line that is to contain the page number. Thus the page number will be printed in line MLN + PGP + 1 of the page, 4d6a

This will allow the changing of the text body size (MLN) without having to also change PGP. 4d6b

PGP used to be the number of lines up from the page bottom to put the page number. 4d6c

The default setting is still 5. New pages will look like old pages. 4d6d
4d6d1

WLN=n: Widow LiNes 4d7

The algorithm for estimating the number of output lines a statement will take up has been changed and (hopefully) is now much more accurate. 4d7a

The default setting is still 2. 4d7b

PST=1/0: Paginate when STatement won't all fit on page on/off 4d8

The algorithm for estimating the number of output lines a statement will take up has been changed and (hopefully) is now much more accurate. 4d8a

The default setting is still 0. 4d8b
4d8b1

SKP=1/0: SKiP on/off 4d9

Now while SKP is on, directives (except SKP) won't be executed (they used to be). 4d9a

The default setting is still 0. 4d9b

Here is how this directive now works. I think it is slightly different than it was before. 4d9c

If the SKP=1 and SKP=0 occur in the same statement then the text in between disappears on output. 4d9c1

If the SKP=1 and SKP=0 are in different statements then the front end of the SKP=1 statement and the rear end of the SKP=0 statement are "merged", i.e., appear on output as if they were in the same statement. 4d9c2

This may seem at first as if it is not what is wanted, but wait a minute. The usual use of SKP seems to be to skip entire statements. Thus if the SKP=0 is the last thing in the last statement to be skipped, then the desired thing will happen. There will be only one statement end for all the statements skipped and thus only one set of SCR*NBL blank lines. 4d9c3
4d9c3a

CAS: CASe array 4d10

The following cases are now possible: 4d10a

= 0: the character will print in any case 4d10a1

= 1: lower case only 4d10a2

= 2: upper case only 4d10a3

= 3: special film case only 4d10a4

The default settings of this array depend on the device. The array is not used for Devices Printer and Teletype so don't worry about changing this array when you use the COD directive if you are outputting to either of these devices. 4d10b
4d10b1

CMD=n: force all alphabetic characters to specified Case 4d11

n now has the following meanings: 4d11a

= 0: don't change 4d11a1

= 1: force lower case 4d11a2

= 2: force upper case 4d11a3

The default setting is still zero. 4d11b

4d11b1

New type 4d12

Each of the following existed previously. Their meaning remains the same. Previously a user could change their value by means of a directive. That is no longer allowed. Only the Output Processor programs can change their values. The user can only query their current value, e.g. in an IF clause of another directive. 4d12a

NCH: Number of CHaracters in current line 4d12b

NLN: Number of LiNes in current page 4d12c

NIN: Number of INdentation blanks for current line (now includes LMS) 4d12d

4d12d1

List of Old Directives Replaced by New Directives 4e

4e1

The old directive names are no longer recognized by the Output Processor (see other branches for additional information). 4e2

4e2a

DPR=1/0: Directive PRint 4e3

Name changed to DIR=1/0 (DIRective print on/off) 4e3a

REL=1: page Restore at End of Line 4e4

Name changed to PEL (Paginate at End of Line). The old form was REL=1, the new form is PEL. 4e4a

FDS=n: output code for a DaSh 4e5

Name changed to DSH (output code for a DaSH -- the character that will go out when NDH (Number of DasHs to output at end of page) is greater than zero) 4e5a

4e5a1

CEN=1/0: CENter, 4e6

RTJ=1/0: RighT Justification, and 4e7

FLN=1/0: Format LiNes 4e8

Superseded by HJB (Horizontal Justification of Body): 4e8a

CEN=1 is now HJB=3 CEN=0 is now HJB=1 4e8a1

RTJ=1 is now HJB=8 RTJ=0 is now HJB=1 4e8a2

FLN=0 is now HJB=0 FLN=1 is now HJB=1 4e8a3

4e8a3a

NSW=n: page Numbering SWitch, 4e9

ROM=1/0: ROMan page numbering, and 4e10

FNC=1/0: Case of the Roman page Numbers 4e11

Combined into options of the new directives PNO (Page Numbering Option) and HJP (Horizontal Justification of Page Number): 4e11a

NSW=0 is now PNO=0 4e11a1
NSW=1 is now HJP=3 4e11a2
NSW=2 is now HJP=6 4e11a3
ROM=0 is now PNO=1 4e11a4
ROM=1, FNC=0 is now PNO=2 4e11a5
ROM=1, FNC=1 is now PNO=2 4e11a6
4e11a6a

The following have had their names changed and the meanings of their settings reversed: 4e12

DSN=1/0: Delete Statement Numbers 4e12a
Replaced by SNB=0/1 (Statement NumBer print off/on). 4e12a1
DPN=1/0: Don't Print statement Names 4e12b
Replaced by SNA=0/1 (Statement NAmes print off/on). 4e12b1
DPV=1/0: Don't Produce Vector output 4e12c
Replaced by PIC=0/1 (PICture print off/on). 4e12c1
DUB=1/0: Delete Underbars 4e12d
Replaced by UBR=0/1 (UnderbaR print off/on). The new directive applies only to 8-bit underbars. 4e12d1
DOV=1/0: Delete OVerBars 4e12e
Replaced by UVB=0/1 (OVerBar print off/on). The new directive applies only to 8-bit overbars. 4e12e1
4e12e1a

TAL=n: Tab ALgorithm, 4e13
TSP=n: Tab SPace, and 4e14
TSW=1/0: Tab SWitch 4e15

Combined into TAB (what to do with TABs) and TBD (how Device hardware handles TaBs). 4e15a

The three possible settings of TAB are: 4e15a1
= 0: delete tabs 4e15a1a
= 1: keep tabs 4e15a1b
= 2: replace tabs by a single space 4e15a1c
Don't fool with TBD. 4e15a2
4e15a2a

USW, UPR, and USP 4e16
Replaced by UBD=n (describes how the Device hardware handles UnderBar characters). Don't fool with UBD. 4e16a
OSW, POV, and SOV. 4e17
Replaced by OVD=n (describes how the Device hardware handles OVerbar characters). Don't fool with OVD. 4e17a
4e17a1

CRL: Output a CaRrriage Return and Line feed 4e18
Name changed to GCR (Generate a Carriage Return) 4e18a
TAB: Output a TAB 4e19
Name changed to GTB (Generate a TaB) 4e19a
4e19a1

There are some other name changes, but the old directives were never used and should never be used. They will disappear soon. Don't worry about the changes. 4e20
4e20a

List of Old Directives with Modified Meanings for Their Settings 4f
4f1

SKP=1/0: SKiP on/off 4f2
Now while SKP is on, directives (except SKP) won't be executed (they used to be). 4f2a
The default setting is still 0. 4f2b
Here is how this directive now works. I think it is slightly different than it was before. 4f2c
If the SKP=1 and SKP=0 occur in the same statement then the text in between disappears on output. 4f2c1
If the SKP=1 and SKP=0 are in different statements then the front end of the SKP=1 statement and the rear end of the SKP=0 statement are "merged", i.e., appear on output as if they were in the same statement. 4f2c2
This may seem at first as if it is not what is wanted, but wait a minute. The usual use of SKP seems to be to skip entire statements. Thus if the SKP=0 is the last thing in the last statement to be skipped, then the desired thing will happen. There will be only one statement end for all the statements skipped and thus only one set of SCR*NBL blank lines. 4f2c3
4f2c3a

PGP=n: verticle Position of the PaGe number 4f3
Meaning of n changed. 4f3a
n is now the number of blank lines to insert between the bottom of text body area and the line that is to contain the page number. Thus the page number will be printed in line MLN + PGP + 1 of the page, 4f3b
This will allow the changing of the text body size (MLN) without having to also change PGP. 4f3c
PGP used to be the number of lines up from the page bottom to put the page number. 4f3d
The default setting is such that new pages will look like old pages. 4f3e
4f3e1

CMD=n: force all alphabetic characters to specified Case 4f4
n now has the following meanings: 4f4a
= 0: don't change 4f4a1
= 1: force lower case 4f4a2
= 2: force upper case 4f4a3
4f4a3a

CAS: CASe array 4f5
n now has the following meanings: 4f5a
= 0: character will print in any case 4f5a1
= 1: lower case only 4f5a2
= 2: upper case only 4f5a3
= 3: special film case only 4f5a4
4f5a4a

DNM; Directive NaMe array 4f6
The order of the directives in the arrays has been changed. Thus if you used this directive, now it will change the wrong name. 4f6a

DMX; Directive MaXimum value array 4f7
The order of the directives in the arrays has been changed. Thus if you used this directive, now it will change the wrong maximum value. 4f7a
4f7a1

List of Deleted Old Directives 4g
DTY -- array directive that gives the name of the array in the the Output Processor program which contains the directive types 4g1

DVL -- array directive that gives the name of the array in the the Output Processor program which contains the directive values 4g2

IGS -- insert ignore codes in document before each character added to the output which was not in the input (page number, header, right justification, etc.) 4g3

ICR -- put ignore codes in front of generated carriage returns on output (meaningful only for dura and flex) 4g4

FIG -- output code for ignore (used to delete next character; see directive IGS (only has meaning for dura and flex) 4g5

DEV -- gives the device number for which the current document is being formatted. (dura=7, teletype=1, NLS-QED=3, flexowriter=2, printer=6, film=5, controlling teletype (QED format)=4) 4g6

TCR -- replace all carriage returns in the statement by spaces during output (normally for input from QED using the the Output Processor Subsystem) 4g7

CSW -- perform case analysis on/off 4g8

QBS -- put backslashes infront of capital letters during Output Device QED 4g9

RSW -- whether or not PASS4 was going to attempt to "right justify" the current line 4g10
4g10a

Other Changes 4h
Directives can now appear in the string given in the HED directive. They will be executed each time the running header is printed. 4h1

It is no longer possible to define new directives. This feature will reappear in the next version. 4h2

Setting SCR to zero will no longer work properly -- it never worked very well anyway. This feature may reappear in the next version. 4h3

The "non-explicit pagination" thing 4h4

A "non-explicit pagination" occurs when: 4h4a

1) the body area is full -- line MLN has been printed 4h4a1

2) because of the WLN (Widow LiNe) directive 4h4a2

3) because of the PST (Paginate when current STatement won't all go on current page) directive 4h4a3

Whenever a non-explicit pagination occurs, the Output Processor will throw away all immediately following lines that consist of only a carriage return (and are to go in the body area). Also, an "explicit pagination", i.e. due to the directives RES (REStore), PEL (Paginate at End of LINE), PES (Paginate at End of Statement), GRB (GRaB), or PLO (Paginate for each Level n statement), will be ignored if executing them would cause a blank page immediately following a non-explicit pagination or with only (thrown away) blank lines intervening. 4h4b

If there are two explicit paginations (if the user really does want a blank page) following a non-explicit pagination, then the second one will be executed. 4h4c

Blank lines following an explicit pagination are not thrown away. 4h4d

4h4d1

Bugs that won't happen anymore: 4i

It is possible to have an unlimited number of HED directives and now each new one will indeed change the running head. 4i1

Tabs on the Dura didn't work correctly. 4i2

Centering didn't always work correctly. 4i3

Page numbers weren't centered correctly. 4i4

4i4a

A bug that's still there: 4j

The Output Processor and Quickprint and TODAS and Create Display do different things with tabs. Create Display apparently has a bug. TODAS apparently uses a slightly different algorithm. The Output Processor and Quickprint do what they they think they should (I think they do the same thing). All of this may be straightened out soon. 4j1

4j1a

List of Old Directives That Are Still There and Unchanged 4k

4k1

LSP=n: Leading SPaces 4k2

If SNB=0 (don't print Statement NumBers), then print n

blanks before printing the first character of the statement text. 4k2a
Note that the n blanks are in addition to the blanks required for the LMS (Left Margin Setting) and statement indentation (IND and INS) directives. This directive is effective for the first output line of the statement only -- not subsequent ones. 4k2b
The default setting is 0. 4k2c
4k2c1

DLS=1/0: Delete Leading Spaces 4k3
DLS is effective for each output line in the body area (but the LSP spaces won't be deleted). 4k3a
If the first character(s) of a statement are blanks then they are affected by DLS. Because of the OP's line break algorithm, the only other time leading spaces will occur is when there are spaces following a carriage return in an input statement. If one is using leading spaces to produce tabular output, then be sure DLS is zero. 4k3b
The default setting is zero -- leave the spaces alone. 4k3c
4k3c1

DTS=1/0: Delete Trailing Spaces 4k4
DTS is effective for each output line in the body area. 4k4a
Because of the OP's line break algorithm, the only time this directive has any effect is when lines are being centered, set right flush, or "right justified". Any trailing spaces will then cause their lines to be positioned differently than if the trailing spaces were not there. 4k4b
The default setting is one -- delete the spaces. 4k4c
4k4c1

IND=1/0: INDentation option 4k5
If IND=1 then indent according to the statement's level (see INS) will be performed. This directive has no effect on LMS (Left Margin Setting). 4k5a
The "default setting" is set according to the NLS Viewspec. 4k5b
INS=n: amount to INdent per each Statement level 4k6
The "default setting" is set according to the NLS Viewchange Parameter. 4k6a
MIN=n: Maximum number of spaces to INdent 4k7
LMS is included when enforcing MIN. 4k7a
The default setting is 48. 4k7b
4k7b1

MSP=n: Maximum number of SPaces to put into line to do "right justification" 4k8
If more than MSP spaces would be required, the line is

set according to the "can't" option. See description of the new directive HJB. 4k8a
The default setting is 15. 4k8b
4k8b1

MCH=n: Maximum number of printing CHaracters to an output line (line length) 4k9
MCH is equally applicable to the body, running head, and page number "areas". 4k9a
The "default setting" for all devices except Teletype is determined by the NLS Viewchange Parameter. For Teletype the default setting is 64 -- to allow room for SNF=72 on narrow teletype paper. 4k9b
4k9b1

NBL=n: NumBer of Lines per generated output line (n-spacing) 4k10
The OP makes up an output line, prints it and then outputs NBL carraige returns. The default setting is one, so if you want "double-spacing" (like when you ask a typist to double space), then set NBL to 2. 4k10a
NBL is effective for the body area only. The running head gets printed as if NBL were one. 4k10b

SCR=n: number of Carriage Returns to separate Statements 4k11
After printing the last line of a statement, the OP will output SCR*NBL carriage returns. 4k11a
The "default setting" is determined by the NLS blank line Viewspec. If blank lines are on, then SCR is initialized to two. Otherwise it is initialized to one. 4k11b
Watch out for this initialization. It is the only one that under normal conditions will result in something different from the old PASS4. 4k11c
Setting SCR to zero will no longer work correctly. 4k11d
4k11d1

WLN=n: Widow LiNes 4k12
Number of lines of a statement guaranteed to be output on the next page if the statement would not all fit on the current page. 4k12a
The "guarantee" is like many guarantees these days. 4k12b
The default setting is 2. 4k12c

PST=1/0: Paginate whenever entire STatement will not fit on current page 4k13
The OP uses the same estimate of the statement's output length as for WLN, so it may not always work. 4k13a
The default setting is 0 -- off. 4k13b
4k13b1

PSW=1/0: Pagination Switch 4k14
If PSW=1 then the directives involved with page numbering (PGP, PNO, and HJP), dashes at the end of a

page (NDH and DSH), stop code at the end of a page (SSW and STP), verticle size of the page (PLN), getting to the top of the next page, spacing down from the top of the next page (NTP), and the running head (HSW, HED, HJH, and HLN) will be executed. 4k14a
The default setting is 1. 4k14b
4k14b1

NTP=n: Number of lines down from ToP of page to begin printing 4k15
The default setting is 3. 4k15a
4k15a1

HSW=1/0: Header SWitch 4k16
If HSW=0 then no header will be output at the top of each page. 4k16a
The default setting is 1. 4k16b

HED: used to set the content of the running HEaD 4k17
For example: HED="HEADING" will set the OP to output "HEADING" at the top of each page (if "HSW" is set on). 4k17a

HLN=n: number of blank LiNes to follow the Header 4k18
Effective only if HSW=1 and there has been a HED directive. 4k18a
The default setting is 3. 4k18b
4k18b1

MLN=n: Maximum number of LiNes to the bottom of the body area 4k19
This means that the last line of the body area will not fall below the nth line. Note that some of the n lines may be taken up by NTP, the running head, and HLN. 4k19a
Actually the last line of the body may be printed as far down as the MLN + 2nd line. If all three of the last line of statement text on the page, the SNF statement number, and the SGF signature overlap each other and the last line of a statement's text falls on line MLN, then the statement number will be on line MLN + 1 and the signature will be on line MLN + 2. 4k19b
The default setting is 56. 4k19c

PLN=n: number of LiNes to a Page 4k20
Includes header, body, and page number areas. 4k20a
The default setting is 66. 4k20b
4k20b1

PGN=n: current PaGe Number 4k21
The page number that would appear on the current output page. 4k21a
The default setting is such that the first output page would be number 1. 4k21b
4k21b1

NDH=n: Number of DasHes at end of page 4k22

The character output for the "dash" may be changed by means of the directive DSH. 4k22a
Not meaningful for printer or film output. 4k22b
Default setting for Teletype is 9. Its 0 for the DURA. 4k22c
4k22c1

SSW=1/0: Stop code SWitch 4k23
You can get a stop code inserted at the end of each page (for mats - normally only for flex). 4k23a
The default setting is 0 -- don't do it. 4k23b
4k23b1

RES: page REStore here 4k24
Causes a page restore (new page) at the point the directive occurs. 4k24a
It is suggested that the new directive PES (Paginate at End of Statement) will do what you really want done instead of using RES. See the description of that directive. 4k24b
4k24b1

TYP=1/0: TYPe 4k25
Do not output lines from the line which contains TYP=0 up to the line which contains TYP=1, but continue doing directive recognition and formatting. 4k25a
The OP only recognizes the directive after a "line" has been formatted and is ready for output, so both TYP=0 and TYP=1 become effective at the beginning of the output line in which they would fall. So watch out. 4k25b
The default setting is 1. 4k25c
4k25c1

TST: TabSTop array 4k26
An array directive which is used to determine where the tab stop settings are. 4k26a
This is a bit array stored in six words (144 bits). The ith bit corresponds to the ith column. The first bit in the array is consedered to be number zero. The first word in the array is also number zero. 4k26b
A one bit indicates a tab stop and setting a position to 0 will clear a tab stop. 4k26c
An example: TST[0]=04000000B and TST[2]=00002000B 4k26d
will set tabstops in the 3rd and 61st columns; clear any previously existing tabstops in columns 1, 2, 4 thru 23 inclusive, 48 thru 60 inclusive, and 62 thru 71 inclusive; and leave in their previous state columns 24 thru 47 inclusive and 72 thru 143 inclusive. 4k26d1
This array is initialized according to the NLS Viewchange Parameters. 4k26e
4k26e1

IGD=1/0: IGnore Directives 4k27

Any directives encountered between IGD=1 to IGD=0 will be ignored except that directives will be recognized in order to effect the directive DIR (DIRective print on/off). 4k27a
4k27a1

COD: CODe 4k28
By means of this directive and the directive giving the character case (see the description of CAS), it is possible to change the output code for any character in the input. 4k28a
For example: to change the output code for the number 1 from a verticle bar to a lower case l, use the following directive: COD/21B/=114B (the input code for a one is 21B and the output code for an l is 114B), If the device is Dura or Film, then one has to worry about the case too. 4k28b
4k28b1

NUL: NULl directive 4k29
NUL does nothing. 4k29a
4k29a1

TMA=n: TeMporary A 4k30
TMA is not used by the Output Processor. It for use by user -- for instance in IF clauses. 4k30a

TMB=n: TeMporary B 4k31
(same as for TMA) 4k31a

TMC=n: TeMporary C 4k32
(same as for TMA) 4k32a

TMD=n: TeMporary D 4k33
(same as for TMA) 4k33a
4k33a1

DMX: MaXimum value a Directive may assume array 4k34
The ith entry in the array contains the maximum value to which the ith directive may be set. 4k34a

DNM: Directive NaMe array 4k35
The ith entry in the array contains the name, i.e., the 3 letter mnemonic, of the ith directive. 4k35a
4k35b

(Stage Ia) 5
New Directives 5a
5a1
IPN=n: Increment Page Number 5a2
A slightly nicer way to increment the page number than the present (equivalent) method: PGN=PGN+n. 5a2a
5a2a1
NPX=n: Number PleX 5a3
The sublist (not the whole plex) that is one level below the statement in which the NPX occurs will be numbered. This number will go before the statement number (SNB) or leading spaces (LSP) at the beginning of the first output line of each of the statements in the sublist. The statements will be numbered consecutively according to the following options (setting of n): 5a3a
= 0: no numbering 5a3a1
= 1: Arabic numerals 5a3a2
= 2: Roman upper case numerals 5a3a3
= 3: Roman lower case numerals 5a3a4
= 4: lower case alphabetic characters 5a3a5
= 5: upper case alphabetic characters 5a3a6
= 6: statement number type 5a3a7
= 7: 7.11.6.4 5a3a8
= 8: outline type 5a3a9
5a3a9a
GCD: Generate Current time and Date 5a4
5a4a
HJL=n: Horizontal Justification of Line 5a5
Effective for just the output line in which it occurs (user doesn't have to say CEN=1--CEN=0 or HJB=3--HJB=1). 5a5a
Would have same options as HJB. 5a5b
5a5b1
HJS=n: Horizontal Justification of Statement 5a6
Effective for only the current output line and the remaining lines of the statement in which it occurs (user doesn't have to say HJB=3--HJB=1). 5a6a
Would have same options as HJB. 5a6b
5a6b1
Some set of directives that allow a lot of control over indentation -- immediate need is for formatting catalogues. 5a7
specify indention of nth line of each statement 5a7a
PIN=n: Paragraph INdent 5a8
Guarantees exactly n spaces (after LMS and indentation) before first line of each statement (DLS=1, LSP=n doesn't work, because DLS deletes spaces following a CR). 5a8a
PBI=n: Paragraph Body Indent 5a9

Guarantees exactly n spaces (after LMS and indentation) before all lines execpt first line of each statement. 5a9a
FLI=n: Full Line Indent 5a10
If current line was begun because the previous line overflowed rather than a cr, add n (could be negative) to indentation amount. 5a10a
5a10a1

Other Changes 5b
Make sure checks for explicit paginations come before non-explicit checks. 5b1
Fix CMD bug. 5b2
Change nnexpg algorithm to check for nvisch (number of visible characters) rather than nchar. 5b3
Change default setting of DTS to 1. 5b4
Maybe change merge thing about SKP. 5b5
Do underlines (2nd line) for itty. 5b6
Do the circular buffer thing on LINE. 5b7
Reorganize the data pages. 5b8
check where page break comes in DATA and move things around so as not to dirty second page 5b8a
look into making PASS4 shared 5b8b
psym and roman could be moved to data pages 5b8c
may as well expand size of dstr and move it to bottom of data 5b8d
Move the device dependent treatment of tabs, overbars, and underbars that now occurs in the input line routine to the output character routine where most of the other device dependence is now localized. 5b9
think about each input char generating exactly one word in LINE (or being thrown away) 5b9a
would make treatment of tabs, under-, overbars easier 5b9a1
particularly when line break and back up to wordbreak occurs 5b9a1a
would also allow line to be dmax[MCH] + dmax[MSP] cells long 5b9a2
multiple blanks (for ldblnk and space filled tabs) could be included 5b9a3
could include tabs in DTS 5b9a4
OUTLIN could calculate wdbrk and nppwbk 5b9b
then it could calulate the number of printing characters in the slop 5b9b1
Do a BUMP fndtab instead of fndtab ← on. Then if line breaking backs up over tabs, can find out if there is still a tab in the output line. 5b10
Reinstate DMX. 5b11
Make sure LMS applies to page number and header. 5b12

Change place where IBR and IST are checked so that PEL's and PES's that were seen in that statement are executed. 5b13
Change dmax/DNM/ to 100. 5b14
Change dmax/HJP/ to 7. 5b15
Maybe change syntax of PSH, SKP, DLS, and DTS to finish job of getting rid of all directives with a negative sense. 5b16
Will type 7 really work? 5b17
Put type 7 directive names in right place, 5b18
Delete TBD, UBD, and OVD. 5b19
Delete ICR, etc., but not DSH. 5b20
Find out why OP outputs a CR after each PEJT. 5b21
Find out what PASS1 expects on the front end of its file. 5b22
5b22a

(Stage II) 6
Reorganization 6a

This will be effected by putting the Directive Recognizer/Executor in an entirely new place in the control scheme. Actually the current (October 1970) Output Processor is organized as described below except that the Directive Recognizer/Executor and its input and output routines are in a very different place. 6a1

The control scheme will look like an inverted Y -- the input and output being the two arms of the Y and levels 1, 2, and 3 described below being the stem. 6a2

6a2a

In the following the highest control level is mentioned first: 6a3

6a3a

1) A routine that stores all the parameters and Viewspecs from NLS, initializes the Output Processor, and initializes the output file/device (a lot of device dependence here). 6a4

2) A routine that has a loop tha gets the next statement from NLS and invokes the level 3 routine, and finally puts the end on the output file (some device dependence). This level will eventually be the "Page Formatter". 6a5

3) A routine that is (unfortunately) both the thing that looks a bit like a page formatter and is the statement formatter. 6a6

At a nearly parallel level is a routine that handles page breaks -- including page numbers and running heads. 6a6a

(some device dependence here because different devices get to the next page in different ways). 6a6a1

At a nearly parallel level is a routine that formats pictures 6a6b

(some device dependence here because different devices do vectors in different ways). 6a6b1

Both these routines are invoked only by the "page formatter". 6a6c

Both "page formatter" and page break routines use the level 4 line input routine -- it is invoked only once to get an entire line (actually it is invoked n times to get an output line where the output line has characters from n sources). Both routines set up a separate environment (including the ultimate (level 8) input character routine) for the the line input routine. 6a7

This level will eventually (after the 10) be broken into two levels: 6a8

a higher level that is a page formatter that will replace the level 2 described above and 6a8a

a level (this one) that contains one routine for each of the "areas". Actually it should be possible to have

only one (or perhaps a second one for pictures) area routine. The Page Formatter would merely set up a different environment for this routine for each different area. 6a8b

4-Input) The line input routine. It usually uses the Directive Recognizer/Executor's output character routine (Level 5) as its input character routine. The Directive Recognizer/Executor is bypassed while inputting statement numbers, page numbers, and signatures. 6a9

4-Output) The routine that actually formats a line (centered, "right justified", etc.) and outputs the formatted line thru the output character routine. 6a10

5-Input) The usual input character routine for the level above and the output character routine for the Directive Recognizer/Executor. Thus it will have to be a co-routine. This routine is in the "compiler's" library. 6a11

6-Input) the Directive Recognizer/Executor. This will be a "compiler" generated by Tree-Meta with its own hand-written library. It always uses the same routine (Level 7) as its input character routine. 6a12

The Directive Recognizer/Executor will think it is a controlling routine. 6a12a

7-Input) The input character routine for the Directive Recognizer/Executor and the routine which knows about which Level 8 routine to invoke to get the next character. This routine is actually in the library of the Directive Recognizer/Executor compiler. 6a13

8-Input) There are at least the following routines on this level: 6a14

i) read a character from a file (used to initialize the Directive Recognizer/Executor at the Output Processor load time) 6a14a

ii) get next character from the current SDB 6a14b

iii) get next character from the buffer that holds the string from the last HED directive 6a14c

iv) get the next character of a "number" 6a14d

used for page numbers and numbering sublists 6a14d1

v) get the next character of the statement number 6a14e

vi) get the next character of the signature 6a14f

8-Output) The output-a-character-to-the-file/device routine. Almost all the device dependence (except for initialization) of the Output Processor is here. 6a15

6a15a

Alterred Directives 6b

6b1

PIC: PICture print 6b2

Will be superceded by the new directive FIG (FIGure). Chuck has something written about FIG. 6b2a

6b2a1

COD: CODe conversion array 6b3

By means of this directive and the directive affecting the character case, it is possible to change the output code for any character in the input. 6b3a

At least the syntax of this directive will be changed (perhaps like .COD 'a ← 'B;). Also the changing of the case will probably be done automatically (so the user doesn't have to worry about it). Eventually the directive may be deleted because its function can be performed by the new directive SUB. 6b3b

6b3b1

DNM: Directive Names 6b4

At least the syntax will change (perhaps like .DNM "DNM" ← "BUL";), but eventually the directive will disappear (not til Stage IV) because its function could be mostly accomplished by the new directive SUB. 6b4a

6b4a1

PLN: number of LiNes to a Page, 6b5
MLN: nuMber of LiNes to the bottom of the text area, 6b6
HLN: number of blank LiNes to follow the Header, 6b7
NTP: Number of lines to space down from the ToP, and 6b8
PGP: number of blank lines to insert between body area and page number areas 6b9

may all be superseded by a new set that allow positioning and size setting of the areas of the page, body, header, and page number independently of each other. 6b9a

Hopefully the above directives will not disappear until Stage III or IV. 6b9b

6b9b1

TST: Tab SeT 6b10

Parameters are a list of numbers which will be the columns in which tab stops occur -- any previous tab settings will disappear. 6b10a

This will be a new syntax for this directive. 6b10b

6b10b1

NPX = (i, j, k): Number Plex 6b11

This is an expanded syntax and an expanded capability. 6b11a

i -- levels below current statement to number 6b11b

j -- type of numbering (see above) 6b11c

k -- field size - generate enough blanks after the number to fill the field 6b11d

6b11d1

New directive type for on/off switches 6b12

Syntax will be: '. .UID '= [0/1/"ON"/"OFF"] '; 6b12a

6b12a1

6c1

Some set of directives that would ennable the verticle positioning of the body, page number, and header any place on the page and independently of each other; also included would be the minimum spacing that would be allowed between the specified "area" and any other "area". 6c2

VPB (4$4.NUM) top, bottom edge, minimum blank lines to separate above, below inner areas 6c2a

.VSB=n,m Verticle Size of Body (replace NTP and MLN) 6c2b

maybe similiar for header, page numberer, and pictures 6c2b1

also some options like VPH = bottom 6c2c

6c2c1

Some set of directives that would specify the width of the areas of the body, page number, and header independently of each other. 6c3

.HSB=n,m Horizontal Size of Body (replace LMS and MCH) 6c3a

6c3a1

One directive having to do with pictures. 6c4

See a thing written by Chuck for a full specification -- it does most everything. 6c4a

6c4a1

RDD: Restore Default-Default Directive values 6c5

(ignore NLS viewspecs) 6c5a

6c5a1

SNM=1/0 and SIG=1/0: (on/off switches for SNF and SGF) 6c6

SNM could have settings telling where you wanted the statement number -- in front of statement text (replaces SNB), after statement text (SNF), after first line of statement, etc. 6c6a

6c6a1

DSO=1/0: Directive Scan Only 6c7

Scan the specified branch for directives and execute any that are found. Otherwise treat the branch as if an IBR had occured. 6c7a

6c7a1

TBA: TaB stops Add 6c8

parameters are a list of numbers which will be the columns in which tab stops are to be added -- any previous tab settings will remain 6c8a

TBD: TaB stops Delete 6c9

parameters are a list of numbers which will be the columns in which tab stops are to be deleted 6c9a

6c9a1

IPX: Ignore Plex 6c10

6c10a

GPN: Generate current Page Number 6c11

GCD: Generate Current Date and time 6c12

(followed by a '↑ to distinguish it from the File Change Date) 6c12a
GFN: Generate File Name 6c13
(name of the input NLS file) 6c13a
GCI: Generate file Changers Initials 6c14
(initials occuring in the origin statement) 6c14a
GOI: Generate Operators Initials 6c15
(initials of the person currently logged into NLS (followed by a '↑ to distinguish it from the File Changer's Initials)) 6c15a
GFD: Generate File Date 6c16
(date the input NLS File was last changed) 6c16a 6c16a1
PBL: Paginate Before Line in which directive occurs 6c17
PBS: Paginate Before Statement in which directive occurs 6c18 6c18a
LSH: Level SHow 6c19
parameters for the directive could be a list of entities such as 5, < 9, > 2, 3-6, NOT 6 6c19a 6c19a1
PSH: Pages SHow 6c20
parameters for the directive could be a list of entities such as 5, < 9, > 2, 3-6, NOT 6 6c20a
this is a syntax change and a generalization of the new directive PSH implemented in Stage I 6c20b 6c20b1
QPH: Quick Print type Header on/off 6c21 6c21a
GCH='c/.NUM: Generate a CHaracter 6c22 6c22a

Other Changes 6d
Generalize all directives to allow them to have a scope (OP will reset them to previous value when end of scope is reached) 6d1
Possible scopes: 6d1a
line 6d1a1
statement (might want to do IRS, HJS, etc. this way) 6d1a2
plex 6d1a3
sublist 6d1a4
branch 6d1a5
page 6d1a6
level 6d1a7
set of levels coupled with above options 6d1a8
Syntax: 6d1b
MCHP=n or MCH=n,P 6d1b1
Change name NPASS4 to OUTPROC. 6d2
this is a change to NLS not the Output Processor 6d2a
Fix so header buffer never runs out of space as it did 6d3

(this can be rather easily changed when the directive recognition is changed) 6d3a
The directive recognizer/executor will make sure each time it sees a new directive that its setting to be is consistent with other current settings, e.g., the left margin could not be set beyond the right margin 6d4
also, some directive settings may become dependent on other settings, e.g., (I can't think of any right now) 6d4a
Maybe print under- and overbars on the printer 6d5
this requires some modification to Dave Hopper's :PREX 6d5a
Reinstitute ability to define new directives as a string of text. It will probably be possible include directives in the text string. 6d6
after the definition, the occurance of that directive will cause the text string to be scanned and input 6d6a
Maybe reinstitute SCR=0. 6d7
Several directives will take effect at different times than before (these should be listed and included in the new Users' Guide). 6d8
Output Device Copy Proof 6d9
same as Output Device Teletype except OUTLIN stops at lines 30 and PLN and exits to TODAS to await restart by user 6d9a
(but LNOUT must know about PSH and TYP) 6d9b
Other "device types", e.g. Journal, Network memos, Plans 6d10
Probably ought to put INST into !INCHAR and skip the loop in PREX 6d11
could put LCP, LSH, IBR, etc. there too 6d11a
could thereby handle SCR=0 quite differently 6d11b
There should be a table or whatever to tell Direct when to set the directive variable, before or after printing the directive text 6d12
Does recognizer or OUTST do checking for directive value consistency? 6d13
easiest to do in recog, but user might have just put DIR's in wrong order 6d13a
Dave Casseres says its cool to change directive values (he's even for it), as long as the change is clearly described in the User's Guide 6d13b
make a list of such things and put it in OPLAN 6d13c
Could have both dmax & dmin arrays 6d14
both could have some indication that they were relative to some other directive 6d14a
then arrays dmax, dmin, dtype, and dname should be declared in Tree-Meta and accessed in that language 6d14b
The "tables" dmax, dmin, dwhen, dtype, dvalue, and dname should be declared and accessible in the TREE-META language 6d15
TREE META 6d16

when directive recognition fails, error procedure invoked which could output the input stream up to that point the same as it does now, without the accompanying error message and without anything from the input stream that had gone out previously - thus taking care of the printing of directives problem 6d16a

How to do Directive Recognizer/Executor 6d17

directive names and type entered as .UID's and attributes at NUTILITY time 6d17a

inchar initialized to get input from file 6d17a1

need change to TREE to attach attributes to .UID at this time or with a special syntax rule 6d17a2

rewrite library routine inchar 6d17b

in parse rule, invoke subroutine to mark window place for later output 6d17c

in fail -- invoke a routine 6d17d

there exists a way of backup 6d17d1

can check window full in TREE -- do a fail 6d17d2

enter literal strings as a library pop 6d17e

enter run strings done by call on library routine from outside 6d17f

from PASS4 at run time initialization 6d17f1

Have to be able to turn substitute off for the header 6d18

may occur that want recognizer off at times 6d18a

Where do you effect the directives like DATE and DNAME and GCR and GTB and OVB and UBR 6d19

they fit logically under Substitute, but Substitute will be slow and could be turned off most of the time if it didn't have these automatic, built in substitute to worry about 6d19a

Substitute would have a problem when IGD=1 (no - could just delete that part of its tables) 6d19a1

besides if put stuff in RECOGNIZER, I don't have to write substitute immediately 6d19b

If fellow hits a double rubout during PASS4, it would be nice for NLS to go to ABORT is could be is a fixed location - say 20B 6d20

6d20a

(Stage III) 7

This stage is the rewriting of the Output Processor for the 10 languages. The only changes envisioned are the deletion of superseded directive names, some name changes, and a few directives dissappear entirely. All of these changes are discussed above. 7a
7a1

(Stage IV) 8
The following is a haphazard and very incomplete collection of various the Output Processor features that have been proposed and are unlikely to happen before the 10. 8a
8a1
Do thing about plex/branch only not being indented. 8b
Beef up save Viewchange info so can drive hardcopy too. 8c
Would be a substitute for a library of named formats. 8c1
Idea from Doug about how to do the format designer 8d
compile the format description 8d1
each choice has a syntactic thing that identifies it 8d1a
file goes thru an analyzer/reconstructor that doesn't display the syntactic identifier 8d2
then output the alterred file thru compiler, handing it only id's and their following field 8d3
the compiler changes the directive table 8d4
generalize input sources to at least a series of files (branches within them) 8e
if change dmax[MCH] + dmax[MSP], must change size of LINE and TABSTP 8f
figure out which directives are changed in the time they take effect or the scope of their effect 8g
Who scans for directives and substitute branches and how do they mark where they occured for backup purposes 8h
a Page Formatting language 8i
document = file-init $ pages file-close 8i1
page = $ header body $ pgnum 8i2
body = $1 rest-st $ statements O$1 trst-st 8i3
statement = tot-ln $ lines 1st-line O$1 stnorm 8i4
HEADER area: top edge line 7 8i5
bottom edge < bottom edge of BODY area 8i5a
top margin 2 lines 8i5b
left margin column 6 8i5c
set left flush 8i5d
OP 8j
I'll want a line formatter 8j1
it is fed a character at a time 8j1a
or a string 8j1b
or either 8j1c
anyway it will be driven by a whole bunch of directives (PASS4's line and character directives) 8j2
I don't want to pass all of those as parameters, but just a pointer to them (an array?) (it would take to much time) 8j2a
but if so the line formatting code would be hard to read 8j2b
so I want a language that allows me to refer to the elements of the array, with variable names 8j3

but the origin of the array is an actual/formal parameter 8j3a
can a compiler do it 8j3a1
also the buffer(s) that hold line(s) need to be local to the area co-routines 8j4
this could be handled by passing string names 8j4a
Instead of estimating gln, run stateent thru INLINE. 8k
what to do about directivesrecognizing/executing 8k1
later can stare the lines 8k2
special symbol definition (both the output symbol and the input string used to invoke the special symbol on output) 8l
header down a margin in a single column 8m
a means of specifying the verticle positioning of lines within the various areas -- comparable to the possible settings of the horizontal position directives 8n
(flush left compares with "flush top") 8n1
Someday the TYP directive ought to be fixed up so that it takes effect immediately -- not at the end of the current output line -- and does what is desired in general 8o
it is known where you are supposed to be on a page and could remember where you actually are when TYP set to 0; then when TYP set to 1, generate the appropriate number of blank lines, maybe a page break, some leading blanks, etc. 8o1
The following new direcives may be useful: 8p
"lin" would indicate use of left indentation relative to statement indentation for centering. This would override any other left margin directive if set "on" (i.e., lin=1). The "dsn" directive must be considered when implementing this. 8p1
"lhm" would indicate the spacing for the left-hand margin in the centering algorithm. It would not be considered if "lin" were set on. 8p2
"rhm" would indicate the spacing for the right-hand margin in the centering algorithm. It would never be set greater than the "mch" directive. 8p3
LNM: print Line NuMbers 8q
(or every nth one) 8q1
BCH: Big CHaracters 8r
something like what the Output Processor currently does on the front end of paper tapes it outputs 8r1
GRB: GRaB 8s
this would say: don't make a page break between this statement and the following n statements 8s1
SUB: SUBstute one character string for another 8t
(comparable to NLS's Substitute Branch command) 8t1
put statement id /centered/ in the statement gap 8u
put line numbers, directives, when last changed, who last

changed, and/or if changed since time T in the right hand margin (tear off part) of the printer output 8v

specially mark statements with a signature or date filling some criteria 8w

output as one document pieces from several NLS files 8x

invisible text on/off (this could be both a new NLS feature with an attendent viewspec and a new Output Processor directive) 8y

characters can be conditionally (i.e., by directive) indicated by some special group of delimiters. 8z

For example " :F,I: John Jacob Jinkelheimer Smith, Jr. :F,I: " would indicate that the text enclosed within the " :F,I: " delimiters was set to flicker and italics. 8z1

fix page numbering so that one may specify a page number prefix to be printed along with the page number. 8a

consider possibility of options to supress printing of: vowels, consonants, articles, etc. 8aa

right-justification is dumb for output to film. The capability exists to put in spacing characters between 1 and 14 raster units wide, so why not add an algorithm to insert more spacing characters, each of a smaller width. 8ab

have independent sets of directives apply to level n statements, header, etc. 8ac

The following are only reasonable when the Output Processor is changed-to/replaced-by a real page formatting routine 8ad

indirect references (via footnotes or end-of-section bibliography), the op-cit loc-cit problem, 8ad1

footnotes, 8ad2

Multi-columns, 8ad3

marginal notes, 8ad4

integrated graphics and tabular constructs, 8ad5

8ad5a

output as one document pieces from several NLS files 8ae

Table of Contents Generator 8af

KWIC generator 8ag

other index generators 8ah

invisible text on/off (this could be both a new NLS feature with an attendent viewspec and a new the Output Processor directive) 8ai

link conversion 8aj

specially mark statements with a signature or date filling some criteria 8ak

the following are from Doug's notebooks 8al

put line numbers,directives, when last changed, who last changed, and/or if changed since time T in the right hand margin (tear off part) of the printer output 8al1

1/69 p.12 8al1a

put statement id /centered/ in the statement gap 8al2

10/69 p.8

8a12a
8am

Made obscure (don't appear in the normal Users' guide) 9
(cas) cas : all "KASE" -- directive which gives the case for each character (an array, i.e. type 1, directive). If a code is changed for a character (via "cod" directive), its case should also be set to the proper case in an analogous manner 9a
most of this could be done automatically by the Directive Recognizer/Executor when it sees the directive COD 9a1
(ssw) ssw : all zero -- indicates a stop code is to be inserted at the end of each page (for mats - normally only for flex) 9b
(tsw) tsw : all 1 -- indication that tabs are to be searched for in order to execute appropriate directives 9c
(csw) csw : 1,0,0,1,1,1 -- indication that case shift analysis is to be performed for output 9d
(tma) tma : all zero -- temporary a (not used by program - for use by user) 9e
(tmb) tmb : all zero -- temporary b (same as for "TMA" above) 9f
(tmc) tmc : all zero -- temporary c (same as for "TMA" above) 9g
(tmd) tmd : all zero -- temporary d (same as for "TMA" above) 9h
(dmx) dmx : all "DMAX" -- array directive (type 1) that gives the name of the array in the the Output Processor program which contains the directive maximum values 9i
(pov) pov : all zero -- treat overbar as printing and spacing character 9j
(sov) sov : all zero -- indication that overbar causes output device to space 9k
(upr) upr : 1,0,1,1,0,0 -- treat underbar as printing and spacing character 9l
(usp) usp : 1,0,0,1,0,0 -- indication that underbar causes output device to space 9m
(tal) tal : 2,1,1,1,1,1 -- tab algorithm to be used for the output of tabular information (1=flex type, 2=dura type, 3=one space) 9n
(tsp) tsp : 1,1,0,0,1,1 -- space fill tab, i.e., insert necessary space characters in the output in order to produce proper tab spacing 9o
(fsu) fsu : 10b,0b,0b,172b,377b,53b -- output code for shift to upper case 9p
(fsd) fsd : 20b,0b,0b,174b,377b,54b -- output code for shift to lower case 9q
(fsc) fsc : 0b,0b,0b,13b,0b,0b -- output code for stop code 9r
(fcr) fcr : all 155b -- input code for a carriage return (i.e., the search code used by the statement input algorithm when looking for a carriage return) 9s
(fsp) fsp : all 0b -- input code for a space (i.e., the search code used by the statement input algorithm when looking for a space) 9t
(ftb) ftb : all 151b -- input code for a tab (i.e., the

search code used by the statement input algorithm when looking for a tab) 9u

(fub) fub : all 134b -- input code for an underbar (i.e., the search code used by the statement input algorithm when looking for an underbar) 9v

(fov) fov : all 133b -- input code for an overbar (i.e., the search code used by the statement input algorithm when looking for an overbar) 9w

(fds) fds : all 15b -- output code for a dash 9x

(fbs) fbs : 141b,0b,0b,141b,0b,141b -- output code for a back space 9y

9y1

```
PROGRAM %search estimates and take off characters%                    10
   (estim) PROCEDURE;                                                10a
     :C ↑P1 ['↓/'@]↑P2←P2  CH CH CH CH CH CH CH CH ↑P3
     SE(P1)↑P4:                                                      10a1
     IF flag THEN :C STP1 ←P1 P2, P3 P4:ENDF                         10a2
     RETURN                                                          10a3
     END.                                                            10a4
     FINISH                                                          10a5
       Test    ↓12345678901234567890123456789012345678901           10a6
                                                                     10a6a
```

```
(go)evcd% ca n%cd# c. n%fc50%%%vw/c%et:go d%                          11
   evso%%et:go ds%                                                    11a
   xb0%./d/i/r=%./d/p/r=#./p/e/1%./r/e/1=1#./h/j/b=3%./c/e/n=1%et
   :go dss%                                                           11b
   xb0%./h/j/b=1%./c/e/n=0#./h/j/b=8%./r/t/j=1#./h/j/b=1%./r/t/j=
   0%et:go dsss%                                                      11c
   xb0%./p/n/o=0%./n/s/w=0#./p/n/o=1%./r/o/m=0#./h/j/p=3%./n/s/w=
   1%et:go dssss%                                                     11d
   xb0%./h/j/p=6%./n/s/w=2#./p/n/o=2%./r/o/m=1#./p/n/o=3%./f/n/c=
   1%et:go dssssss%                                                   11e
   xb0%./s/n/b=0%./d/s/n=1#./s/n/b=1%./d/s/n=0#./s/n/a=1%./d/p/n=
   0%et:go dsssssss%                                                  11f
   xb0%./p/n/o=2%./f/n/c=0#./s/n/a=0%./d/p/n=1#./p/e/s;%./r/e/s;%
   et:go dssssssss%                                                   11g
   (last)db:go%s0%eq%                                                 11h
```

':4894', |0/2|/70 |0|6:34 MEJ ; .DPR=|; (PARSLEY):JRNL2, |0/2|/70 0955:43
BLP ; .DSN=1;.DPR=0;