FEED 7-FEB-75 10:47 31824

Test of SendmailDDelivery to MEJ at ROBERTAZZI

This is a test to see if delivery is working. Please let meeknow if you get this. If you don't I'll get someone to look into the inner reaches of the journal for you! Susan/FEED 1

FEED 7-FEB-75 10:47 31824

Test of sendmail1DDelivery to MEJ at ROBERTAZZI

(J31824) 7-FEB-75 10:47;;;; Title: Author(s): Special Jhb Feedback/FEED; Distribution: /MEJ([ACTION]) FEED([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: FEED;

JMB 7-FEB-75 12:26 31825

Shaking down the basic course: re--31817,>

I'll mail a marked-up hardcopy of the course to roetter at sri (U,S,mail). No changes serious enough to need to discuss. Incidently, how is the seccond course coming along? I can make you guys an XGP copy. 1

JMB 7-FEB-75 12:26 31825

shaking down the basic course: re--31817,>

(J31825) 7-FEB-75 12:26;;;; Title: Author(s): Jeanne M. Beck/JMB;
Distribution: /FEED([INFO-ONLY]) JHB([INFO-ONLY]) ;
Sub-Collections: SRI-ARC; Clerk: JMB;

JMB 7-FEB-75 12:41 31826

File Transfer questions--for my own purposes & for users' questions

Is FTP an efficient way to transfer NLS files between sites? 1

Can it transfer whole directories which include more than one extension type of files? Or, if not, can you do
<directory>*.txt;* and then
<directory>*.print;* etc.? 2

If the answer to any of the above is yes, can you tell me where I can find documentation to learn how to do FTP? 3

JMB 7-FEB-75 12:41 31826

File Transfer questions--for my own purposes & for users' questions

(J31826) 7-FEB-75 12:41;;;; Title: Author(s): Jeanne M. Beck/JMB;
Distribution: /FDBK([ACTION]) ; Sub-Collections: SRI-ARC FDBK;
Clerk: JMB;

Navy Lab Equipment List

Attachment A-ELF Equipment List from GS-00C-00372,

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Navy Lab Equipment List

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ATTACHMENT A-ELF EQUIPMENT LIST FROM GSA-GS-00C-00372

MODEL	DESCRIPTION	QUANTITY	PRICE	MAINTENANCE (each) 8	12	16
MINIMUM ELF CONFIGURATION						
(**PDP 11/40 CPU with 48K of core**)						
11/40-BK	11/40 CPU with 16K word parity core memory, serial LA30 DECwriter and control and cabinet	1	17650	127	144	160
MF11-UP	16K word parity core memory and control with expansion up to 32K	1	6300	27	30	33
MM11-UP	16K word Parity expander core memory	1	5600	27	30	33
KE11-E	11/40 Option for signed integer,multiply,divide and long shifts	1	1295	11	12	14

						99
KW11-L	Line Frequency Clock, When	1	270	3	3	4	100
enabled, interrupts every							101
16.67 milliseconds							102
							103
BM873-YA	Restart/Loader bootstrap	1	400	2	2	2	104
for paper tape, disks,							105
magnetic tape, DECtape,							106
and cassette							107
							108
KT11-D	Memory Management Option	1	2480	21	23	26	109
permits access to 124K							110
of core and provides							111
protection							112
							113
(**Asynchronous Multiplexor with Modem Control**)							114
							115
DH11-AD	16-Line Programmable	1	6000	25	28	30	116
Asynchronous serial Line							117
Multiplexor with full							118
Data Set Control							119
							120
BC05D-25	25 foot Modem Cable	16	75				121
							122
							123

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ATTACHMENT A-ELF EQUIPMENT LIST FROM GSA-GS-00C-00372

MODEL	DESCRIPTION	QUANTITY	PRICE
MAINTENANCE			
(each)	8 12 16		

(**Other Required Items**)

DU11-DA Full/Half Duplex Synchronous Interface for use with Bell 200 Series Modems	2	900	5	6	6	147
KG11-A Communications Arithmetic Option	1	900	6	6	6	152
TA11-AA Dual cassette transport and control unit	1	2990	38	43	48	155
DD11-B Peripheral Mounting Panel Includes UNIBUS Connector module-M920	2	185				158
BA11-FD Cabinet Converter for H960D cabinet, Provides 9 additional System Unit Space	1	2100	5	5	5	162

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ATTACHMENT A-ELF EQUIPMENT LIST FROM GSA-GS-00C-00372

MODEL	DESCRIPTION	QUANTITY	PRICE	MAINTENANCE		
(each)				8	12	16

OPTIONAL EQUIPMENT THAT SOME LABS MAY REQUIRE FOR ADDITIONAL DEVELOPMENTAL WORK OR TO MEET LOCAL REQUIREMENTS (QUANTITIES MAY VARY)

(**Optional Synchronous Interfaces**)

DQ11-DA	Synchronous Interface	1	2800	24	27	30

For NPR to 10000 BPS

DQ11-AB	LRC or CRC Error	1	1300	12		

Detection

DQ11-BB Program Character Recognition (protocol)	1	900	12			
(**Optional Storage Devices**)						
TC11-GA 1st Dual Transport and Controller for DECtape Expandable to a total of 4 TU56 dual transports	1	8700	45	51	57	
RK11-DE First Drive and controller for RK05 DECpack disks, Expandable to a total of 8 RK05 DECpack disks	1	11000	106	120	134	
PC11 300cps Paper Tape reader and 50 cps paper Tape punch	1	3900	38	43	48	

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Navy Lab equipment List

ATTACHMENT A-ELF EQUIPMENT LIST FROM GSA-GS-00C-00372

MODEL	DESCRIPTION	QUANTITY	PRICE	MAINTENANCE (each) 8	12	16
(**Optional Card Readers and Printers**)						
CR11	300CPM Card Reader	1	4860	53	60	67
LP11-FA	300LPM Printer	1	12000	74	84	93
80 col, 64 char,						
LP11-KA	300 LPM printer	1	19000	95	107	120
132 col, 96 char,						
LP11-SA	800LPM printer	1	33000	154	174	194
132 col, 96 char,						
(**Optional Asynchronous Interface for more terminals**)						

Navy Lab Equipment List

DH11-AD	16-Line Programmable	1	6000	25	28	30	291
Asynchronous Serial Line							292
Multiplexor with full							293
Data Set Control							294
							295
BC05D-25	25 foot Modem Cable	1	75				296
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Navy Lab Equipment List

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ILA 7-FEB-75 12:43 31827

Navy Lab Equipment List

(J31827) 7-FEB-75 12:43;;;; Title: (Unrecorded) Title: Author(s): I, Larry Avrunin/ILA; Distribution: /RPU([ACTION]) JAJ([ACTION]) FGB([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: ILA;

funds

roger, Here are the numbers Ipromised you. The tabs are kind of messed up but I'm hoping you or Bobbie can sort them out---bill.

The following is a breakout of the 63728f dollars as I see it. If you have any heartburn let me know. The totals are based on the numbers the peg came up with last eek, and I've added a new task as an overceiling item. It's called "interoperability technology" and will deal with developing software and techniques to make systems play with each other. I have included multisource data fusion in this project as the first task but if it doesn't go we can fold it back into 5550. I also folded requirements analysis into s/w technology.

I just found out that the peg wants us to fund the AF part of the Army's Advanced Hybrid Computer System (AHCS) out of 63728, and that's what the increases in fy77 and 78 are for.

The tasks listed beelow are as follows: 5550/1-Software technology, 5550/3-architecture, 5550/2- security, 2108- WWMCCS and "AHCS"-AHCS; "IT"-interoperability technology. The 5550 and 2108 numbers are president's budget thru fy78 and peg after that since the outyear budget figures are out of line. The AHCS numbers are an addon by the peg. The interoperability figures are mine.

proj/task	fy76	fy7t	fy77	fy78	fy79	fy80
5550/1	3.2	.8	4.7	7.5	7.5	7.5
5550/3	.5	.3	1.3	1.6	2.0	2.0
5550/2	.3	.1	0/.3	.5	1.0	1.0
5550tot	4.0	1.2	6.5	9.6	10.5	10.5
2108	0	0	0	1.0	1.5	1.5
AHCS	0/.7	0/.2	.9	.2/.1	0	0
IT	0	0	0/.5	0/1.0	0/1.5	0/1.5
totals	4/.7	1.2/.2	7.4/.8	10.8/1	12/1.5	12/1.5

Note that security comes back. That is based on an ESD requirement for the c3 lab. We'll probably havwe to sort it out later.

funds

(J31829) 10-FEB-75 10:17;;;; Title: Author(s): William W. Patterson/WWP2; Distribution: /RBP([ACTION]) ; Sub-Collections: NIC; Clerk: WWP2; Origin: < PATTERSON, FUNDS.NLS;1, >, 10-FEB-75 10:09 WWP2 ;;;;####;

FGB 10-FEB-75 12:33 31830

Tentative Agenda for KWAC Meeting

DCE, JCN, JHB : After incorporating all of the feedback I've received, here is a list of topics to be addressed and a tentative agenda. I'll wait for some additional feedback from you before sending it out. Frank 1

AGENDA Tentative Agenda for KWAC Meeting 2

Mon: holiday 2a

Tue: 2b

A.M. Introductory remarks 2b1

Doug Engelbart, Jim Norton, etc. & KWAC'ers. 2b1a

P.M. SRI News 2b2

ARC Development 2b2a

The NSW and NLS: Implications for the NLS User Community 2b2a1

ARC Applications 2b2b

Discussion of support that Applications can and is planning to provide. 2b2b1

Plans for further expansion of the user community 2b2b2

ARC User Development 2b2c

Discussion of User Development, its role, and ideas about the service that can be provided: 2b2c1

Training: review courses(?), explain the design and plan 2b2c2

User programs operation and training 2b2c3

The amount of service to be provided 2b2c4

the difference between training and user assistance 2b2c5

The Feedback service operation and how much should architects intercept, and how direct inquiries to Feedback can be coordinated with the architects. 2b2c6

ARC Marketing 2b2d

Marketing definition, plans and strategy (RLL) 2b2d1

Tentative Agenda for KWAC Meeting

Analysis, needs and possibilities 2b2d2

Special ARC involvements, such as NSF (DCE), the DPCS (DVN) 2b2e

Wed: 2c

A.M. show-tell-share session 2c1

P.M. Continue the session; Possibly begin workshops on Special Problems 2c2

Thu: 2d

A.M. Dialogue between DCE and Architects. This should be, in part, directed by the events of Wednesday. 2d1

P.M. Meeting other communities including Bill English (Xerox Parc) and potential/actual users of NLS 2d2

Fri: 2e

A.M. Visit to Xerox PARC (if feasible) 2e1

P.M. Workshops on Special Problems, Hardware demo's (if feasible), Continuing dialogue with ARC personnel, training in DNLS for those who want it 2e2

TOPICS To be addressed during the week 3

Getting Acquainted 3a

New Sites: Who/Where are they? What are they doing? When/Why are they coming on? 3a1

Old Sites: Something like the new sites plus last 6 months in review 3a2

Newsletter Revisited: Put one out as "meeting notes" so we will publish at least one issue this time around 3a3

Integrating NLS into local site operations. 3b

For those sites willing to share experiences, what does effective NLS use require in terms of people support, documentation support, hardware support (e.g., hi-quality printers, cassettes,..), etc. 3b1

Improving the Effectiveness of KWAC 3c

Tentative Agenda for KWAC Meeting

Given: The effect of KWAC on development of NLS is nearly ZERO, Pro's and Con's anyone? 3c1

Future NLS expansion & to what degree can KWAC affect this? 3c2

Potential system additions desired by KWAC collectively 3c3

Each of us are probably doing things of interest to others (e.g., writing user programs, coordinating the production of documents, etc.) Can we take another crack at establishing a better mechanism for information exchange? 3c4

There is also the old problem of establishing user idents and possibly getting them validated for one directory or another. And then, I imagine one must remove idents from time to time. Why can't the local Architect be responsible for this? 3c5

Improving the Effectiveness of Office-1 3d

How SRI-ARC might better improve communications with the community. 3d1

At any given time, one may encounter difficulty in determining what is at Office-1, what will be available , and what is going away. Suggestions ? 3d2

Documentation: status, needs, and plans 3d3

POLICY/MANAGEMENT/OPERATION of OFFICE-1 3e

Offquota login policy 3e1

usage statistics 3e2

Improved access to NLS (e.g., via a commercial net) 3e3

Is "terminal like" access enough? 3e3a

How do we get existing information into NLS? Out of NLS into existing systems? 3e3b

DEX over the Net (& how it compares to having very large buffers available in your TIP,ANTS,ELF or whatever) 3e3c

DEX through TIPS- Problems and Remedies 3e3d

Alternative pricing schemes: For example, plans for payment by usage (instead of slots) 3e4

Expansion of Office-1 facilities 3e5

For example, can a teleconferencing package be made available. 3e5a

Resolution of severe problems 3e6

ARPANET problems and potential solutions 3e7

Office-2 3e8

Miscellaneous 3f

Equipment demo - local vendors and their wares. Have vendors bring in equipment for demo, particularly printers. 3f1

Specific Problems 3g

My own involve integrating NLS into our local site operations and using NLS to cooperatively produce documents (where the cooperators are geographically dispersed and have varying degrees of expertise in NLS). If you all will send me additional topics, I'll try and work up some sessions to discuss them in. 3g1

The Applications of NLS or Beyond Text Editing 3h

Talks of specialized use of NLS by some architects 3h1

FGB 10-FEB-75 12:33 31830

Tentative Agenda for KWAC Meeting

(J31830) 10-FEB-75 12:33;;;; Title: Author(s): Frank G. Brignoli/FGB; Distribution: /DCE([ACTION]) JCN([ACTION]) JHB([ACTION]) ; Sub-Collections: NIC; Clerk: FGB;

msg-file-dec-to-feb-75

these are my sendmsgs from 1 dec 74 through 7 feb 75, 1

8-FEB-75 1219-PST DSMITH: the reason why!
Distribution: GILBERT, dsmith
Received at: 8-FEB-75 12:19:59 2

john: i have been going through vu-graphs preparing for gen deane and
i discovered the reason for out inability to produce at desired level,
here is an excerpt from 1968 growth plan for almsa*

gs-16	1
15	15
14	51
13	289
12	398
11	94
2-10	251
total	1099

that was projection for 1971, the 1973 projection only went up to 1297,
i really feel this info should be treated with utmost confidence so i'm
not putting it into any file other than jc's (gilbert that is),lux 2a

8-FEB-75 1015-PST DSMITH: not much of anything
Distribution: GILBERT, dsmith
Received at: 8-FEB-75 10:15:24 3

just thought i'd let you know how things have deteriorated, i'm in the
office on saturday afternoon - wonder what your're doing HMMMMMM?
drop me a line - expect to be around 'til about 1700, lux 3a

7-FEB-75 1420-PST FARBER at USC-ISIA: RE: PACKAGE
Distribution: GILBERT AT OFFICE-1
Received at: 7-FEB-75 14:23:02 4

JOHN,
I HAVE TAKEN THE LIBERTY OF SENDING YOU SOME
DOCUMENTS ON SOME INTERESTING STUFF THAT WE
ARE DOING AT CFG,
DAVE
P.S. THE TERMINAL STUFF IS COMING SOON 4a

7-FEB-75 1414-PST TAYLOR: "An Informal Meeting" ---from Dr. dell
Distribution: GILBERT, taylor
Received at: 7-FEB-75 14:14:19 5

msg-file-dec-to-feb-75

John,
I would like to have an 'off-the-record' and private conversation
with you, at our earliest mutual inconvience....at some appropriate
secluded spot --> "HERNANDOS HIDAWAY" ??? <-- with appropriate
'refreshments available. 5a

please call, or SNDMSG to TAYLOR@OFFICE of an appointed time to
call you. 5b

..... /s/Floyd A. Odell, [via The Sorcerer's Apprentice]
--- --- --- --- --- --- --- --- --- --- --- --
5c

6-FEB-75 2040-PST TAYLOR at OFFICE-1: BRL Phone lines ----
Distribution: UHLIG AT OFFICE-1, GILBERT AT OFFICE-1, CIANFLONE AT OFFICE-1,, MITCHELL AT OFFICE-1, DSMITH AT OFFICE-1, LEISHER AT OFFICE-1, taylor
Received at: 6-FEB-75 20:40:17 6

...hey all your out there in 'network' land... we found some possible
trouble with one of our "modems", It was taken off the system Thurs
afternoon. It will be under repair tomorrow (Friday) am and returned to
service as soon as possible...
----> STAN TAYLOR--BRL 6a

6-FEB-75 2034-PST TAYLOR: Wednesday's Link to you --- copy of msg odell to uhlig
Distribution: GILBERT, taylor
Received at: 6-FEB-75 20:34:16 7

John,--
Your note to me about your experience with nls is most gratifying
to me....as you might expect. I am using it for local ammunition at
the brl, since Dr. Eichelberger is expressing anxieties .. of late. 7a

...About the extra pages in your directory... I will 'start' the wheels
rolling -- probably tomorrow. 7b

I may need some back-up from you, to get approval to attend the meeting

msg-file-dec-to-feb-75

at SRI, that Ron is going to attend... I have rather strong feelings that I should be there! Dr, Odell sent the message noted below to Ron
late today...he had read your note to me, and ron's journal article
relative to the agenda for the 'KWAC' meeting at SRI,
6-FEB-75 12:59:29,588
Date: 6 FEB 1975 1259-PST
From: TAYLOR
Subject: DR,ODEL REPLY REF: STEERING COMMITTEE
To: UHLIG
cc: TAYLOR 7c

RON,
DO NOT REQUEST AMC APPROVAL FOR MEETING. ODELL PHONING MEMBERS AGAIN, "NEW SUBJECT"
------REF: KWAC MEETING.....18 FEB, FF
"I AM SURE YOU WILL WANT TO CONSULT WITH ME EARLIST..... RELATIVE TO POLICY ISSUES AND IMPLICATIONS ALONG WITH RAMIFICATIONS, "A PROPHET'S
HONOR DEPENDS UPON HIS TIMING --- GREETINGS FROM JOHN THE BAPTIST"
------ FLOYD A ODELL, CHAIRMAN AMC STEERING COMMITTEE
----IN THE FASHION OF THE INDIANS....'UGH'
.... ---

...I hope the message is not lost in the 'humor'(?)
----------Stan 7d

6-FEB-75 1909-PST DSMITH: CLEANUP OF YOUR INITIALS FILE
Distribution: DSMITH, gilbert
Received at: 6-FEB-75 19:09:05 8

PER JOHN GILBERT'S MESSAGE OF EARLIER TODAY, I HAVE CLEANED UP YOUR INITIALS FILE. ALL YOUR JOURNAL DOCUMENTS SHOULD GO INTO THE SAME BRANCH FROM NOW ON, AND YOU SHOULD BE ABLE TO READ THEM WITH THE NLS COMMAND PJ (WHICH STANDS FOR PRINT JOURNAL) AND IS TERMINATED BY A CARRIAGE RETURN.

IN ADDITION TO STRAIGHTENING OUT THIS PROBLEM, WITH YOUR JOURNAL BRANCH, I HAVE ALSO MOVED YOUR MESSAGES TO THE BRANCH LABELED "MESSAGE". YOU HAVE 60 PAGES OF OLD MESSAGES!!!

I SUGGEST THAT YOU MAY WANT TO TRY TO DELETE A FEW OF THESE, YOU CAN VIEW JUST THE FIRST LINE OF EACH ONE (THE SUBJECT LINE) BY GIVING THE NLS COMMAND PBMESSAGEX, THEN TO SEE THE WHOLE OF A PARTICULAR MESSAGE NOTE THE NUMBER, E.G. 3H, AND DO PB3HW, TO DELETE USE THE COMMAND DB FOLLOWED BY THE MESSAGE NUMBER AND TWO CARRIAGE RETURNS.

WE ARE WORKING HARD ON RELIEF FOR YOU, I KNOW BRL IS AWFUL TO GET TO, AS LONG AS NOBODY KICKS YOU OFF, FEEL FREE TO USE THE TIP

msg-file-dec-to-feb-75

AT PATRICK AFB. THAT IS ALSO AN AUTOVON NUMBER. I USED IT TODAY AND HAD NO PROBLEM, EXCEPT THAT IT WAS VERY SLOW, BUT THAT SEEMS TO BE A GENERAL PROBLEM WITH ALMOST ALL TIPS.
RON UHLIG
P.S. THIS SHOWS AS BEING SENT TO YOU, BECAUSE I SENT FROM YOUR DIRECTORY AFER I DID THE CLEAN UP. 8a

6-FEB-75 1305-PST UHLIG: reevaluation of grade structure at the LSSA MIC
Distribution: GILBERT, cianflone, arntson, leisher, uhlig
Received at: 6-FEB-75 13:05:42 9

-- 9a

< UHLIG, TOGILBERT.NLS;3, >, 6-FEB-75 12:41 RPU ;;;;
1 hugh turman informed duke windsor and me of a potentially serious problem developing at the MIC, during the past couple of weeks, hugh has been contacted by supervisors at DCA and DCASR for evaluation of three of his people who are on referrals to those agencies. in addition, hugh has two of his employees who have been working with CSC and DA in the VTAADS area and are highly regarded by CSC personnel for their professional competence, this is a reason for VTAADS add-ons being prototyped at AMC. Delores Gresham, CSC coordinator for VTAADS, has indicated privately to Hugh that CSC grades are higher for employees doing comparable work, although PT & FD can defend their position that the grades meet the approved job standards, i believe we should ask for a survey of several other DOD agencies including USAMSAA to assure that we are competitive; otherwise, the MIC will serve as a training area for other agencies. the data center of T-7 encountered the same situation for several years.
2 expansion of HQMIS will be seriously hampered if we permit this situation to exist, and we will almost certainly lose 3 key HQMIS support people within the next month, with the other 2 going by this summer, the 3 people could probably be persuaded to stay if we at least get P&T to start a survey.
3 ron 9b

1 9c

--------- 9d

6-FEB-75 1258-PST UHLIG: REEVALUATION OF GRADE STRUCTURE AT THE LSSA MIC
Distribution: GILBERT, cianflone, leisher, uhlig, arntson
Received at: 6-FEB-75 12:58:13 10

0 10a

msg-file-dec-to-feb-75

6-FEB-75 1055-PST GILBERT: approval of financial changes
Distribution: MITCHELL, gilbert, arntson, dsmith
Received at: 6-FEB-75 10:55:52 11

i've beenmonitoring your exchange of messages with smitty about the comptroller's desire to monitor system changes in a dvance, after being here i have determined that there are ;so many things wrong with the system fro;m an adp point of view that it is amazing the field can tell as much about it as they have been able , the troscom comptroller has a very knowledgeable analysis of the problems .. i'm inclined to think we should get the adp bugs out of the system before we pay much attention
o the scr's most of which appear to deal with symptoms that will otherwise be rectified, one piece of guidance we need badly out here ;is that concerning the use of point accounts versus weapons systems ;level for commitment control. 11a

6-FEB-75 1050-PST GILBERT: smitty's initials file
Distribution: UHLIG, dsmith, gilbert
Received at: 6-FEB-75 10:50:01 12

ron, would you take a look at smitty's initials file . he is having
trouble transferring messages in using process branch msgin. i suspect he may have the whole set ;of problems with journal, etc. that the rest of us had, i'm surprised they are hanging in as tough as they are in view ;of the difficulty operating out here. 12a

6-FEB-75 0745-PST MITCHELL: approval of financial changes
Distribution: DSMITH, gilbert, arntson, mitchell
Received at: 6-FEB-75 07:45:44 13

this subjec was a matter of discussion at a meeting of mr. gilbert with gen sears, 1600 hours, 4 feb 75, the reclama of the comptroller's df
(transmitted to you as my message of 5 feb 75) will have to be made by mr. gilbert to gen sears. recommend you discuss subject with mr. gilbert during his visit this week to st. louis. 13a

6-FEB-75 0504-PST DSMITH: Approval of Financial System Changes
Distribution: MITCHELL, dsmith, arntson, gilbert
Received at: 6-FEB-75 05:04:27 14

Your message concerning the introduction of a headquarters constraint
approval to all financial system changes is not considered practical.
Current procedures require that we seek Hq guidance for those issues

which are not resolvable in St Louis. Additionally you are apprised of
of the change request load weekly. The priority of work is established
by the assignment of a change request priority. Any other administrative
requirement will only increase the lead time required to field changes
and reduce the responsibility of the ALMSA Directorate involved.
Additionally because of the travel money situation any briefings you
may desire will be conducted telephonically unless you have the s.
SMITH 14a

5-FEB-75 1306-PST GILBERT: payroll for armcom
Distribution: MITCHELL, arntson, gilbert
Received at: 5-FEB-75 13:06:36 15

since we can't seem to get approval for the badly needed payroll system
for armcom,let's get with our comptroller, botain a copy of the
csc programs and let mccune install the system himself. 15a

5-FEB-75 1225-PST MITCHELL: approval of systemchanges
Distribution: DSMITH, gilbert, arntson, mitchell
Received at: 5-FEB-75 12:25:21 16

the following messAge was received from the cheif, fin and acct
div this headquarters:

1. The current ppocedures for processing System Change Requests (SCR's) and reviewing releases do not provide the controls over priorities that appear to be needed to get the financilal programs operational. For example: only those SCRs that require functional guidance or policy decisions are forwarded to this Headquarters for approval. SCRs which involve only changes to programs within current guidance are processed at ALMSA and programming is initiated without contact with proponents at this level . While it is recognized that some of these SCRs involve technical processes, the utilization of resources to resolve these problems instead of devoting the resources to those problems identified by this Headquarters for priority efforts may be contributing to the lack of improvement.

2. Efforts were initiated to perform an advance review of releases to insure that only functionally approved changes were incorporated. Recently, for various reasons, these reviews have not been performed on a timely basis.

3. It is requested that, effective immediately, all SCRs involving financial applications be forwarded to this office for review, approval and concurrence with the priority assigned before any systems design or programming applicable thereto is initiated. In addition, it is requested that an ALMSA representative(s) brief members of this office as soon as possible on all proposed changes beginning with release 31. Briefing should be performed at this Headquarters and should be prepared in non-technical terms. After this initial "catch-up" briefing, each proposed release should be the subject of a functional briefing before programming is initiated. 16a

5-FEB-75 1210-PST UHLIG: 10 LB. TERMINAL
Distribution: GILBERT, uhlig
Received at: 5-FEB-75 12:10:01 17

JOHN, I'M SENDING THIS TO YOU ON A DIGILOG 10 LB. TERMINAL WHICH IS CURRENTLY BEING DEMONSTRATED TO US.. IT WORKS WITH ANY TV SET. COST IS $1295. I WILL HAVE IT TO TRY OUT FOR ABOUT 1 WEEK. IT REALLY IS SMALL. DIMENSIONS ARE 13"X12"X3 1/2".
RON 17a

4-FEB-75 1917-PST UHLIG: pinner Invitation
Distribution: GILBERT, uhlig
Received at: 4-FEB-75 19:17:04 18

John , can you plus one come to dinner at our home on Mon 24 Feb. Bev
said something about a Thursday at the party last Saturday, but she had forgotten that that is her day for den meetings. (She's a Cub Scout
Den Mother, among other things). Ron 18a

4-FEB-75 1351-PST UHLIG: Network Steering Committee Meeting
Distribution: GILBERT, TAYLOR, uhlig, arntson, cianflone
Received at: 4-FEB-75 13:51:08 19

Stan Taylor please pass this msg to Floyd O'Dell ASAP. I just received
a call from Jim Saum. Since he told Floyd he could come to mtg in AMC HQ on 25-26 Feb, procs have been changed at TROSCOM. TWX calling
mtg must state "AMC approved meeting". Even then,
the TROSCOM Chief of Staff calls the AMC Chief of Staff , MG Kirwin
to ask whether he has approved mtg. Question is whether we will ask
MG Kirwin to approve. Although mtg came to attn of SGS because they wanted (and got) our first mtg room, I doubt that it came to

attention of MG Kirwin. Floyd, do you want us to try, and John, do you
want to seek approval? I doubt that we'll get it. In any
case we would need the agenda. Alternative is to go without Jim Saum.
Jim also says Bob James is in hospital, and probably can't make it.
Ron 19a

4-FEB-75 1050-PST ARNTSON: g's G=gram re division priorities
Distribution: UHLIG, gilbert, arntson
Received at: 4-FEB-75 10:50:11 20

ref your 3 feb 75 1810 pst. 20a

how about adding one more, HQ MIS for IL? MG Pezdirtz wants us to move out and your boys have started action. While you are at it, have you considered livening up the WAR by writing the items in short, telegraphstyle with more information but fewer words? 20b

4-FEB-75 0716-PST CIANFLONE: Impact Statement for ALMSA and LSSA for TDY Restriction
Distribution: DSMITH, LEISHER, gilbert, arntson, mitchell, cianflone, uhlig
Received at: 4-FEB-75 07:16:08 21

1. We provided the following data to Comptroller AMC.
The impact of the TDY restriction will be especially severe at the Automated Logistics Management Systems Agency (ALMSA) and theogistic Systems Support Agency (LSSA). These two agencies design adAnd develop standard automated systems for use throughout the command. The major areas of impact are as follows:
a. Delay in installation of ALPHA. ALPHA, the first portion of AMC's standard commodity command system is scheduled to be installed at ECOM, ARMCOM, and TACOM in the 1st, 2nd, and 3rd quarters, FY 76, respectively. Personnel from ALMSA must assist the commands in preparation for the system and in its initial operation. If additional TDY funds are not provided it will be necessary to restrict the ALMSA support to ECOM at one-fourth the normal level of effort required to install the ALPHA system and in addition postpone ARMCOM and TACOM implementation. This postponement will require continued use of inefficient pre-ALPHA systems, delaying the improvement of logistic management those commands, and cause the irretrievable loss of forecasted benefits. In addition, at ARMCOM, support for the JCAP (Ammo Production Base) and SAIRS (Small Arms Inventory Reporting System) will be reduced. At TACOM, the delay will result in greatly reduced support of the Project Manager, Tank Production Acceleration Program, one of AMC's highest priority efforts. 21a

b. Reduced support of International Logistics. Both ALMSA AND lssa are heavily involved in the development of IL systems for the commodity commands, depots, and the International Logistics Center. The Army (and OSD) cannot afford to risk delay in this important aspect of its cission. The sensitivity of the International Logistics Program demands earliest possible attainment of management improvements in responsiveness to the Secretary of State and the President.

c. Delay in development of the AMC HQ Management Information System. Prototype operations of the HQ MIS have proved to be extremely valuable to the Directors and their staffs. Extension of the system to addiitional areas, including, especially, International Logistics, will have to be delayed unless LSSA assistance can be provided.

d. Delay in Selected Systems.

(1) The Installation Equipment Management System (IEMS) scheduled to be prototyped in August 1975, is one of the most cost-effective systems yet developed. Yearly savings of $30 million are forecasted. Each month of delay due to lack of LSSA support will result in loss of $2.5 million.

(2) AIF for Arsenals. Standardization of accounting systems at AMC Arsenals is scheduled for July 1976 to meet committments to OSD and GAO.C Heavy support by LSSA is required to meet this objective by installatioon of AIF (Army Industrial Fund) systems. LSSA personnel must assist the Arsenals, on-site and these visits must be scheduled so that all Arsenals can be operational at the beginning of the fiscal year 21b

(3) The Personnel Management Information System (PMIS). Management of Civilian personnel is one of the most sensitive and important missions of AMC. PMIS is AMC's standsard system to support this area. It is currently supporting personnel operations at depots, covering 50,000 employees, and must be extended to cover the remaining 60,000 employees of AMC as soon as possible. Advantages of the standard system are sorely needed in the current environment of declining manpower authorizations. 21c

4-FEB-75 0609-PST BRL: NLS Architects Meeting
Distribution: GILBERT, MITCHELL, ARNTSON, CIANFLONE, DSMITH, LEISHER, uhlig
Received at: 4-FEB-75 06:09:06 22

During the week of Feb 23 there will a meeting of the NLS Architects
(known as the KWAC). The NLS Architects comprise a group of about 12
persons who are not only users but, also, who are intimately aware of
the technical aspects of the NLS. Dr. Uhlig has been invited to

join
the group and will attend, from 18 to 21 February, as the AMC
representative. 22a

Some tentitive topics to be discussed are:
Talks of specialzed use of NLS by some architects.
Potental system additions desired by KWAC collectively.
Plans for further expansion of the user community. 22b

Since the AMC-MIS group is rather unique in terms of the
organization represented, Ron has been asked if he would speak on
the
nature of the "experiment" you are all taking a part in. He
expects
that we will be able to cull some of your experiences from the
ARPACOMMENTS file, but seeks to amplify these comments with some
additional. In particular, we ask that you make a specific comment
that
you feel might assist the KWAC group to strengthen the NLS and
make it
a better tool for users such as the AMC-MIS group. Bear in mind
when
offering these suggestions that you will be speaking not only for
your
group as it now exists but for the broader group of the larger AMC
community.. 22c

Send your suggestions by message to UHLIG.

Ed vonGehren 22d

3-FEB-75 2340-PST STEFFERUD at USC-ISIA: NLS AT OFFICE-1, ETC.
Distribution: GILBERT AT OFFICE-1, brl at office-1, uhlig at
office-1, farber at isi
Received at: 4-FEB-75 02:19:07 23

LAST NITE I WAS TRYING TO USE NLS AT OFFICE-1, BUT THE
LINE WAS SO SLOW THAT I ALMOST WENT TO SLEEP BETWEEN
CHARACTERS. WHAT A DRAG!!! 23a

I HAVE CONSTRUCTED A SHORT MESSAGE IN NLS FOR YOU TO READ IF
YOU WANT TO TAKE THE EFFORT. IT IS NOT TERRIBLY IMPORTANT. 23b

I AM GOING TO SNEAK A COPY OF THE PIECE OF IT THAT I GOT OUT
INTO A TENEX FILE FOR SNDMSG INTO THIS MSG USING BANANARD AT ISI. 23c

3-FEB-75 23:16:03-PST,523;000000000000
Net mail from site OFFICE-1 rcvd at 3-FEB-75 23:16:01
Date: 3 FEB 1975 2317-PST

JCG 9-FEB-75 15:52 31832

msg-file-dec-tc-feb-75

From: BRL at OFFICE-1
Subject: YOUR LINK MON NITE
To: GILBERT
cc: STEFFERUD at ISIA 23d

JOHN, 23e

3 john, were you experimenting with a small screen glass printer? i
cannot think of any other good reason why youwould make that kind of
error, you seemed to be unabale to copy text from a few lines above, 23f

THAT WAS PART OF AN NLS MESSAGE I WAS DOING
FOR YOU,RON, AND DAVE, 23g

GOT TO GO NOW, 23h

SEE YOU, STEF 23i

THAT WAS THE PEICE I SENT TO JOHN, JUST FOR THE EXERCISE. I INCLUDED IT IN THIS MESSAGE WITH A (CONTROL-B) JUST AS YOU WOULD IN SNDMSG. I PULLED IT OUT OF MY <MESSAGE,TXT;1> FILE AT ISI, 23j

THE EASON WHY I HAD TO BUG OUT FROM OFFICE WAS THAT THE SYSTEM WAS GOING DOWN FOR TH NITE AND I DIDN'T WANT TO MISS GETTING SOME THING
OUT, NO MATTER HOW TRIVIAL IT WAS, 23k

RON, I REALLY APPRECIATE YOUR REFERENCE TO THE NEW TNLS COURSE OUTLINE. TODAY I WENT OVER TO ISI TO GET IT PRINTED OUT ON THEIR PRINTER, AND GOT THEM EXCITED ABOUT GETTING A COPY FOR THEMSEVLES, AS A RESULT, THEY GOT INTO THE ACT AND WE SUCCEEDED IN GETTING THE HJOURNAL,25275,1 DOWN TO ISI FOR PRINTING. TOMORROW, I AM GOING BACK OVER TO GET SOME OTHER STUFF YOU REFERENCED OUT ON THE PRINTER. 23l

BESIDES, CHLOE HOLD, THE NSW SECRETARY, IS ALSO LEARNING NLS, SO WE
PLAN TO COMPARE NOTES. AT THIS POINT I AM ABOUT TO EARN SOME OF MY
ARPANET KEEP BY BEING USEFUL TO SOMEONE IN THE NSW PROJECT. 23m

I WILL LET YOU ALL KNOW HOW THINGS GO, 23n

BY THE WAY, IT SURE IS NICE TO BE ABLE TO TYPE AS FAST AS I WISH, AFTER THAT DRAG WITH OFFICE-1. 23o

msg-file-dec-to-feb-75

SEE YOU ALL LATER, - - - - -STEF 23p

3-FEB-75 2317-PST BRL: YOUR LINK MON NITE
Distribution: GILBERT, stefferud at isia
Received at: 3-FEB-75 23:17:12 24

JOHN, 24a

3 john, were you experimenting with a small screen glass printer? i
cannot think of any other good reason why youwould make that kind of
error, you seemed to be unabale to copy text from a few lines above, 24b

THAT WAS PART OF AN NLS MESSAGE I WAS DOING
FOR YOU,RON, AND DAVE, 24c

GOT TO GO NOW, 24d

SEE YOU, STEF 24e

3-FEB-75 1833-PST GILBERT: PRIORITIES
Distribution: UHLIG, gilbert
Received at: 3-FEB-75 18:33:30 25

RON, FINE, GIVEHELEN A COPY AND CLEAR TEAHRE MESSAGE, I'M GLAD
YOU ARE REVIEWING PRIORITIES. INCIDENTALLY, I TALKED TO BOB
DENTON, AND THINK WE SHOULD DISCUSS THIS PROBLEM. 25a

3-FEB-75 1806-PST UHLIG: Your G-Gram re Division Priorities
Distribution: GILBERT, uhlig
Received at: 3-FEB-75 18:06:53 26

John, you're right, I hadn't looked at the priorities in a few weeks,
My tentative list right now would be (in no special order) SENET
impletation, Getting TD/CMS "straightened out", the SNDMSG Experiment
and getting the MIS for Reports Management "up". Next weeks
report will reflect these priorities. Oops, I left a very high
priority out. I will go to five items, becuase the Advanced Hybrid Computer
System project is also a priority item. Is this sufficient answer
to the Gram. If so, let me know, and I will let Helen know, with
a cy of this correspondence and your reply. Sorry I got lax in
that area,
Ron 26a

msg-file-dec-to-feb-75

3-FEB-75 1802-PST MITCHELL: ccssoi vs amcr
Distribution: DSMITH, gilbert, mitchell
Received at: 3-FEB-75 18:02:58 27

please pass to mr lux 27a

reference , your messages of 27 jan, subject as above, 27b

i discussed the 20 jan 75 and the 19 apr 74 letters with dave magathan, the 19 apr 74 letter was written after the 1973 inventory seminar in which almsa participated, 27c

magathan's objective is to have all inventory information in one document, amcr is that document. para 2b of the 19 apr letterdescribes the method of producing interim hanges to the amcr to accompany your releases. such changes will enentually be published as official changes to the amcr. your problem could be one of conforming to amcr format 27d

suggest you review the 19 apr letter before submittingyour comments to the 20 jan letter . amxal-isf was on distribution. 27e

3-FEB-75 1713-PST MITCHELL: stock control fcg meeting
Distribution: GILBERT, arntson, dsmith, mitchell
Received at: 3-FEB-75 17:13:08 28

i have received almsa's memo for record of the stock control functional coordinating group meeting of 21-23 jan 75. the group reviewed the scr's received from all commodity commands relative to the stock control processe. the following is a summarization of the results: 28a

already completed 2 28b

to be implemented 17 28c

rejected 17 28d

referred to headquarters 5 28e

required verification 1 28f

the number of rejections really leads one to believe that additional functional reviews would be profitable, 28g

3-FEB-75 1113-PST ARNTSON: WEEKLY REPORT AS OF 31 JAN 75
Distribution: BRL, arntson, gilbert, dsmith, mitchell, uhlig
Received at: 3-FEB-75 11:13:41 29

msg-file-dec-to-feb-75

1. USE: 9 incoming, 1 outgoing. this is not typical since terminal is not yet installed. give me time. 29a

2. COMPLAINTS: none. 29b

3. COMP. REMARKS: info copies are proving to be valuable in keeping informed. we should check later to see if projected use by action officers has the same effect of increasing awareness. that would be a big step forward. 29c

31-JAN-75 1419-PST GILBERT: SENDMSG PROBLEM
Distribution: UHLIG, gilbert
Received at: 31-JAN-75 14:19:05 30

I KNOW JOHN CIANFLONE IS WAITING FOR VIRGINIA TO COME BACK. I'M UNDER THE IMPRESSION THAT WON'T BE TOO MUCH LONGER AND I SUGGET WE WAIT.LET'S BRING JACK'S TYPEWRITER UPSTAIRS NOW. I WAS UNDER THE IMPRESSION THE MIC NEEDED IT. LIBBY AND HELEN WILL BOTH WANT TO LEARN. I'M OF
THE FEELING THAT A LITTLE PATIENCE NOW WILL PAY OFF. I CAN SEE THE PRESSURE BUILDING UNDER THE NON USERS. 30a

31-JAN-75 1301-PST DSMITH: ccss planning briefing
Distribution: GILBERT, dsmith
Received at: 31-JAN-75 13:01:50 31

hello john, hope you're feeling better. just put master copy of the
planning briefing in the mail at 1500 st louis time. jean really did
fine job, in my opinion, ably supported by harty at the keyboard, had to recruit ruth and a few others to keep our great white father
in the east in good spirits. i think the product is very good and hope you share the feeling. as stated in jean's note the briefing narrative will be modified slightly and become the "executive summary"
of the bo
rof the brochure which we should have ready next week. certainly there
needs to be resource support to work the plan, and at any rate some
degree of adjustment will be necessary. if we get no resource - we get
almost no new systems and we get bigger paper to extend the plan out to
2001 (there's a thene from a movie we can include with that plan). have an
have a nice week end. ray lux 31a

msg-file-dec-to-feb-75

31-JAN-75 1300-PST UHLIG: Methods of Utilizing Office
Distribution: GILBERT, uhlig
Received at: 31-JAN-75 13:00:24 32

John, a small problem came up today, and I kind of don't want to be the fall guy in straightening it out. John Cianflone had given a page and a half of stuff to the MIC to put in OFFICE. Ed von Gehren heard about it and asked if we couldn't get one of John's secy's to type it in. I thought that would be easy, but when I called John he objected. Said he wanted all his secy's to learn how, but wanted to wait till Virginia came back. I offered to train his other gal to do the job. But John didn't want to do that. MIC is concerned because they really don't have people to do long typing jobs, and I think they shouldn't be providing that kind of service anyway. I solved the immediate problem by having Duke Windsor's secy do the typing for this one (he didn't like that), because I had trained her already. However, I think it's time we get the routin message handling in either the hands ofthe individual or his secy. That brings me to Jack. He told Ed von Gehren that he was just waiting 'till the terminal was "installed" in his office. I'm sure we can bring Jack's terminal upstairs, and teach Libby how to handle Jack's needs very quickly. But I don't know exactly how to broach the subject. Can you help me? Also, maybe a word from you to get the secy's trained would solve my problem with John. I have too many other things on which I need to keep his good will to push him on this. Ron 32a

31-JAN-75 0742-PST LEISHER: improvements to speedex
Distribution: GILBERT, cianflone
Received at: 31-JAN-75 07:42:33 33

reference your message 15 jan 75 relative to providing reports at remote sites: 1. remote job entry (rje) gives the depot d/mis the capability to do this now on a selected basis. saad has 4.0 master installed and as part of this package, saad personnel have been instructed to rje procedures. qualification - rje will not over-ride the hard-coded reports but will process where the site is optional. 2. rje will permit general purpose scan output at the remote terminal. general purpose scan i being redesigned to permit optional printing at remote sites.

msg-file-dec-to-feb-75

this action will be completed in march 1975. 3. we will schedule changing the application areas hard-coding to make report printing site to be optional. 33a

30-JAN-75 1342-PDT GILBERT: MISSING MESSAGES
Distribution: DSMITH, gilbert
Received at: 30-JAN-75 13:42:11 34

I GOT A CALL FROM LUX TO PICK UP A MESSAGE, BUT NONE IS THERE, PLS.
TRY AGAIN. 34a

29-JAN-75 1818-PST GILBERT: FARBER
Distribution: UHLIG, gilbert, cianflone, arntson
Received at: 29-JAN-75 18:18:37 35

I'VE RECEIVED A COUPLE OF MESSAGES FROM DAVE IN THE LAST TWO DAYS
-
ONE ASKING IF I RECEIVED HIS PROPOSAL AND A SECOND THAT I WILL SET UP AS AN NLS FILE AND RELAY TO YOU PROPOSING THE POSSIBILITY OF ALTERNATIVESTO OFFICE -1. I FEEL I MUST REPLY BY THIS WEEKEND, SO ANY IDEAS YOU HAVE WILL BE WELCOME 35a

29-JAN-75 1813-PST GILBERT: MEMO ON USE OF OFFICE
Distribution: UHLIG, cianflone, gilbert
Received at: 29-JAN-75 18:13:31 36

I AGREE WITH YOUR MEMO AND ITS MODIFICATION. WE SHOULD NOTE,HOWEVER, THAT WHETHER THE ADP CHIEFS BUY A SLOT OR NOT, I WANT ALMSA AND LSSA ONLINE. I THINK THEY WHOULD EACH PAY A FAIR SHARE. 36a

29-JAN-75 0949-PST FARBER at USC-ISI: QUERY
Distribution: GILBERT AT OFFICE-1, farber
Received at: 29-JAN-75 09:49:04 37

AFTER THINKING A LONG TIME, I HAVE BECOME CONVINCED
THAT IT IS TIME TO HYPOTHESISE A CONSISTANT
AND WELL DESIGNED SYSTEM FOR MANAGERS AND ORGANIZATIONS
IN THE AREA OF THE USE OF NETWORKS TO INHANCE COMMUNICATIONS
WITHIN ORGANIZATIONS. NEITHER NLS, FORUM OR SNDMESSAGE
FACILITIES ARE REALLY RIGHT. I INTEND TO TALK A STAB
AT THE PROBLEM SOON AND WOULD LIKE TO ASK IF YOU
WOULD BE WILLING TO ACT AS BOTH A COLLOBORATOR AND A
CRITIC. DAVE 37a

29-JAN-75 0722-PST UHLIG: An Old G-Gram
Distribution: GILBERT, uhlig
Received at: 29-JAN-75 07:22:18 38

msg-file-dec-to-feb-75

John, in cleaning up old G-Gram files, Helen asked us about one from last April which I do not ever recall seeing, It says "I promised Mel Sippy a copy of your network vugraphs showing the current net, His are
terrible, Can you help me please," You initialled it, and sent it to me 25 Mar 74, .Somebody may have acted on it in my absence, but if not do you want me to still try to do something with it? Ron 38a

29-JAN-75 0650-PST DSMITH: rpc release
Distribution: GILBERT, arntson, mitchell, dsmith
Received at: 29-JAN-75 06:50:58 39

considering avscom test during feb the best we could do would be release
33 - c/o 28 feb , installation 18 apr, that will be tight, if test 39a

looks good mid-feb and we can get documentation ready for release we'd
be in go position, otherwise release 34 would be solid commitment, but
installation date is 19 may,i'm not sure what you had in mind when you
indicated normal release support "if not too long", lux 39b

29-JAN-75 0600-PST UHLIG: My draft memo on use of OFFice next FY
Distribution: GILBERT, CIANFLONE, uhlig
Received at: 29-JAN-75 06:00:59 40

After thinking overnight I added Para 4, and 5, as follows, Para 6,
is the old Para 4, moved down but no change in wording... 40a

-- 40b

7 4, Use of mailboxes within the directoate was seen to be as follows: one mailbox for each Division Chief, one mailbox for the Director, one mailbox for the Deputy Director, and one mailbox assigned to each Division for general use by action officers within that Division, for a total of eight mailboxes, A maximum of ten mailboxes can be made available within each slot, 40c

8 5, We will also attempt to generate interest on the part of two other groups within AMC in buying separate slots, These groups are the MSC ADP Chiefs, and ten individuals from the SECC, ALMSA and LSSA would tie in with the MSC Chiefs, The cost to each individual would be between $4000 and $5000 per year, which should be possible within their budgets, Mr, Gilbert will discuss

this with the MSC ADP Chiefs when he meets with them next month, and Dr. Uhlig will discuss this with some key individuals in the SECC. 40d

9 6. Mr. Cianflone stated that he was planning on paying $10K as the AMC Headquarters share for use of the MERDC ARPA net node. However, if customers could not be found to make up the difference, AMC might have to pay the entire $52K owed for FY 76. Mr. Gilbert stated that if AMC was paying at that he level, he wanted MERDC to make sure that the ANTS System would be up 24 hours per day/7 days per week. 40e

10 Ronald P. Uhlig 40f

1 40g

Ron 40h

28-JAN-75 1926-PST UHLIG: Your draft letter to McCutchen
Distribution: GILBERT, uhlig
Received at: 28-JAN-75 19:26:55 41

John, I think your letter strikes just the right tone. My only comment is that you say that both John Cianflone and I will contact Sam "in
the near future," rather than just John Cianflone, since I'm already in it pretty deep. If that sounds like nitpicking, just disregard my remark because it's a small point. Ron 41a

28-JAN-75 1904-PST UHLIG: Record of our Meeting on 27 Jan re Office use in FY76
Distribution: GILBERT, CIANFLONE
Received at: 28-JAN-75 19:04:15 42

I have drafted up the following message re our meeting yesterday, which I will put in the journal after you check it for accuracy. Any additions/corrections? 42a

-- 42b

< UHLIG, OFFUSE.NLS;2, >, 28-JAN-75 18:58 RPU ;;;; 42c
MEMORANDUM FOR RECORD

SUBJECT: Management Information Systems Directorate Use of OFFICE-1
During FY 76 and Related Matters 42d

DATE: 29 January 1975 42e

1. On Monday, 27 January 75 an informal meeting was held between Mr. John Gilbert, Director of Management Information Systems, Mr. John Cianflone, Chief, Resources Division, and Dr. Uhlig, Chief, Scientific and Management Information Division. Mr. Gilbert made the following decisions regarding use of the OFFICE-1 facilities by this Directorate during FY76. 42f

2. Mr. Gilbert said that we would purchase a slot at OFFICE-1 for this Directorate for FY 76 and that Mr. Cianflone should budget accordingly. He also said that Mr. Cianflone should plan to obtain terminals for use within the Directorate as follows: One hardcopy terminal and two CRT terminals for each Division, and one hardcopy terminal and two CRTs for the "front office". Anticipated use of the terminals would be that the Division Secretaries would use the hardcopy terminal, the Division Chief would use a CRT and one additional CRT terminal would be available to share among the action officers within a Division. The "front office use would be that the hardcopy terminal would generally be for the two secretaries and the CRT terminals would be for the Director and the Deputy Director. The total number of terminals for the Directorate would be 8 CRTs and 4 hardcopy terminals. Generally, all of the terminals should be portable. 42g

3. In addition to budgeting $40K for purchasing a slot at OFFICE and additional funds for obtaining the terminals (the terminals currently in use are leased using the RDT&E Funds obtained for the "SNDMSG Experiment"), funds would be needed for paying an appropriate share of AMC HQ use of the ARPA node at MERDC. This would probably range between $20K to $40K, depending on whether HDL would be sharing in use of the

node during FY 76 and what the node costs during FY 76 turn out to be. 42h

4. Mr. Cianflone stated that he was planning on paying $10K as the AMC Headquarters share for use of the MERDC ARPA net node. However, if customers could not be found to make up the difference, AMC might have to pay the entire $52K owed for FY 76. Mr. Gilbert stated that if AMC was paying at that he level, he wanted MERDC to make sure that the ANTS System would be up 24 hours per day/7 days per week. 42i

Ronald P. Uhlig 42j

1 42k

Ron 42l

28-JAN-75 0505-PST DSMITH: ECOM SUPPORT PLANNING
Distribution: GILBERT, mitchell, cianflone, dsmith
Received at: 28-JAN-75 05:05:28 43

THIS IS A RETRANSMISSION OF THE "MISSING" NOTE
In accordance with your guidance I have put together 3 money plans for ECOM. At this time some of the figures are ball park. However most of it is supportable with planning charts down to the man. I will fill in the details Monday. This makes good weekend reading

THE PLANS COST AS FOLLOWS:

MINIMUM	32K	
MIDDLE	65K	
MAXIMUM	158K	WHERE ALL COSTS FOR ALL PLANS ARE ECOM ONLY

The minimum plan is that proposed to ECOM at the recent meeting
The middle plan increases functional support during familiarization
and adds the following:

a. Minimum ADP/T systems support
b. Two trips to put the hardware monitor and BOOLE&BABBAGE on the Computer of Concern
c. RVD on site support during conversion
d. Dress rehearsal support 43a

The maximum plan expands the middle plan to provide that support

estimated to do the things that ECOM is not doing well- planning, bridge definition,conversion definition,etc,
In addition to the ECOM TDY estimates provided above I have the following non-ALPHA requirements deemed essential:
DIDs 8K
TACOM/ARMCOM/MICOM 4K
ADMIN (grievance travel, Wash liason,etc) 10K 43b

My TDY upper limit is now 52,3K To meet the middle plan I need a constraint increase of 34,7K I have received new allocation guidance to be hashed out over the weekend to see how I fit with the middle plan, If were lucky we can do something with whAT we have under the arch
Have a good weekend Smitty
NOW THAT YOU HAVE ALL OF THE ABOVE
AS OF MONDAY PM IT APPEARS WE CAN DO IT WITH FUNDS AVAILABLE
IF WE GET A TDY CEILING WAIVER IT IS AN EQUIPMENT TRADE WHICH IS WITHIN YOUR GUIDANCE
A FORMAL REQUEST FOR TDY CEILING LIFT WILL BE FORTHCOMING
its raining 43c

25-JAN-75 1159-PST UHLIG: Barry Worthing-Smith
Distribution: GILBERT, uhlig
Received at: 25-JAN-75 11:59:00 44

I sent a message to Peter Kirstein at Univ of London earlier this week
suggesting that he contact Brig Worthing-Smith because of some comments
that Kirstein made to me this summer at Stockholm, I got a message today that he (Kirstein) had contacted Worthing-Smith and they were getting together on 14 Feb, You might want to send a message a day or two before to Kirstein@ISI (he keeps his mailbox there) Attention
Worthing-Smith (maybe an intro statement referencing his coming visit so Kirstein will know what to do with it). Just a suggestion, Ron 44a

23-JAN-75 0831-PST FARBER at USC-ISI: QUERY
Distribution: GILBERT AT OFFICE-1
Received at: 23-JAN-75 08:34:35 45

GREETINGS FROM LONDON, JUST CANNOT
KEEP AWAY FROM THE TERMINAL,
DID ROY AMARA OF INSTITUTE FOR THE FUTURE EVER GET IN
TOUCH WITH YOU RE THEUAIR FORUM SYSTEM,
DAVE 45a

JCG 9-FEB-75 15:52 31832

msg-file-dec-to-feb-75

(J31832) 9-FEB-75 15:52;;;; Title: Author(s): John C. Gilbert/JCG;
Distribution: /JCG([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: JCG;
Origin: < GILBERT, SENDMSGS.NLS;1, >, 9-FEB-75 15:38 JCG ;;;;####;

sendmail-msgs-dec-tofeb-75

SMT 30-JAN-75 20:19 31753
NEW INSTRUCTIONS FOR ARPACOMMENTS
Message: I have recently done some file reorganization to ARPACOMMENTS.I feel that it is an improvement over th "last in first out"scheme I had before. It will soon be back in shambles, however, if I don't pass on new directions for using the file.
The file is now structured so that each of you has a BRANCH listed under your name. This will serve to group each persons comments for easy extraction; and since each branch represents a seperate person addressing can be done by personal name rather than branch number.
The new procedure is as follows: from NLS -
*CONN BRL*ARPA cr (* denotes space)
L F ARPACOMMENTS cr
I S <your-last-name> cr
enter your comments
cr (to signify completion of yourcomments)
U F cr(IMPORTANT: if this is not done, noone else can enter comments to the file.)
CONN <your ident><your password> cr (this returns you to your own directory)
Please give it a try; you should find it interesting.
Ed vonGehren
*****Note: [ACTION] *****

1

SMT 30-JAN-75 19:36 31752
LOST ARPACOMMENTS
Message: I recieved your ARPACOMMENT entry in which you ask that I let you know if I received your comments via journal. To the best of my knowledge I have no such journal entries. If you know the journal numbers, I will try to retrieve them by linking to JOURNAL - I've never done that before but it should offer some interest for a new experience. Ed vonGehren
*****Note: [ACTION] *****

2

RPU 21-JAN-75 05:41 31671
The ANTS System at MERDC - Correction
Message: The Memorandum for the Director, Subject: The ANTS System at MERDC, Date: 17 Jan 1975, has two names mispelled in Paragraph 3. "McCutcheon should read "McCutchen". "Burrows" should read "Bero".
*****Note: [ACTION] *****

3

RPU 21-JAN-75 05:41 31671
The ANTS System at MERDC - Correction
Message: The Memorandum for the Director, Subject: The ANTS System at MERDC, Date: 17 Jan 1975, has two names mispelled in Paragraph 3. "McCutcheon should read "McCutchen". "Burrows" should read "Bero".

JCG 9-FEB-75 20:30 31833

sendmail-msgs-dec-tofeb-75

*****Note: [ACTION] *****

4

RPU 21-JAN-75 05:41 31671
The ANTS System at MERDC - Correction
Message: The Memorandum for the Director, Subject: The ANTS System at MERDC, Date: 17 Jan 1975, has two names mispelled in paragraph 3, "McCutcheon should read "McCutchen", "Burrows" should read "Bero".
*****Note: [ACTION] *****

5

SMT 20-DEC-74 06:42 31528
user names and idents
Message: i have been asked to notify all participants of the AMC SENDMAIL study of member name and idents, They are as follows:

GILBERT	JCG
ARNTSON	JAA
UHLIG	RPU
CIANFLONE	JCF
MITCHELL	HSM
DSMITH	JDS
LEISHER	AEL

Ed von Gehren
*****Note: [ACTION] *****

6

JCF 11-DEC-74 08:58 31494
test of the dof sendm sendmail to your idents
Message: this is an exampe of a message,,it and statement appear in your mailbox.
*****Note: [INFO-ONLY] *****

7

sendmail-msgs-dec-tofeb-75

(J31833) 9-FEB-75 20:30;;;; Title: Author(s): John C. Gilbert/JCG;
Distribution: /JCG([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: JCG;
Origin: < GILBERT, JOURNAL-MAIL.NLS;1, >, 9-FEB-75 16:00 JCG
;;;;####;

sampam mission assignment

to col. smith, i checked into your concern about sampam transfer from ecom to mida. it has quite a bit of validity. the problem i run into is that mida supplies most of the data that is ultimately reflected in the amp-i and for years we have been wondering what body english or holy water is applied at the nicps (they will make wondrous claims). let me see in the ensuing paragraphs if i can explain: 1

of the six sectors in the sampam file as currently constituted, the largest volume is the gross requirements file. typically this is recomputed many times per budget cycle, in my era the computation of all the data in the amp was endered consistent with this. the problem was that once the gross requirements were out of date, so was everything else. 1a

procurement and other receipts is the second sector and one that must be supplied by the nicps for contracts already in being. for the out years, however, a simulation of reasonable production buildups must be applied based on the starting level of the production base and the gross requirement yet unsatisfied. 1b

item identification and assets is the third sector. this contains a lot of cataloging information that should come directly from alpha. all of the asset data is collected at mida originally. this, of course comprises the principal volume of this file. furthermore, it differs from anything in alpha at present for the asset data is completely replaced periodically. 1c

losses must also be supplied by the nicp since they are computed by looking at the various models that wrap up to the same major item. 1d

the program cost must also be supplied by the nicps for it is dependent on production negotiations. while current costs may be in alpha for contracts in being, when one deals with major items, projections must be made five years into the future. capital equipment budgeting is a long range process and does not simply involve procurement leadtime as the stock fund does. 1e

the last sector is the oeverhaul sector. this data is already at mida as a consequence of their maintenance workloading mission. it originates in ammdex. one of the principal benefits of this approach is the ability to keep the amp-i and the amp-ii in synchronization. 1f

less than twenty percent of the file volume originates in the nicp's. while i do not think this is a crucial indicator, it adds credence to the argument that most of the data is already resident at mida. basically, hoever, the location of a home for the proponency comes down to who can make the greatest contribution, since there appears

to be little commonality between alpha and the data required by sampam except in the cataloging area, i have concluded that mida is the more logical home, 2

mida will need your help. for most of this year, they expect to be involved in the transfer from ecom to them of the existing system. i charged them to give priority to writing ccsoi's in alpha mode and for rendering the programs that still must be run at the nicps compatible with the alpha operating instructions. the dR&p is responsible for defining a minimum first increment major item system for operation in the nicps. my staff (begley's branch) is responsible for studying the relationship between alpha and the smapam files. the goal is to ultimately either drive sampam from the alpha data base or from a separate integrated major item data base. these matters will require your participation. we plan to hold an ipr in may. 3

JCG 9-FEB-75 20:43 31834

sampam mission assignment

(J31834) 9-FEB-75 20:43;;;; Title: Author(s): John C. Gilbert/JCG;
Distribution: /JDS([ACTION]) JAA([INFO-ONLY]) HSM([INFO-ONLY]
) JCF([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: JCG;
Origin: < GILBERT, SAMPAM.NLS;4, >, 31-JAN-75 14:49 JCG ;;;;####;

draft plan

PART I: AN OVERVIEW OF THE NATIONAL SOFTWARE WORKS PROJECT 2

Introduction 2a

Software production in the DoD is estimated to cost in excess of $2B per year, and dominates the schedule of development of almost all computer systems. Yet programming remains a loosely controlled manual process, with little automated assistance. There are numerous reasons for this unsatisfactory state of affairs, but probably the most important is the fact that tools which can materially aid programmers, analysts and their managers are inherently expensive to develop, and typically require computers much larger than those required to run finished programs. Since most programmers are constrained to use the same computer for both development and operations, only the simplest and widespread tools are developed for each computer, and new tool development is inhibited.

2a1

Computer networks, and an order of magnitude decrease in the cost of on-line storage, provide an opportunity to attack the software production problem in a more complete way than ever before. In the Summer of 1973,

the Defense Advanced Research Projects Agency(ARPA) organized discussions among a number of professionals from industry, the Services and universities. The general notion emerged of a software factory implemente on a computer network, with a coherent collection of tools which would expand and become more powerful over time. 2a2

Further discussions with the Services in the Fall and Winter of 1973-74 refined the concept, and led ARPA to form a joint program with the Air Force Data Automation Agency(AFDAA) to implement the first version of a distributed software factory, to be called the National Software Works (NSW). Air Force Systems Command (AFSC) is participating in the project through its computer science research organization at Rome Air Developmen Center. Discussions are continuing with the Army and the Navy, and it seems likely that a coordinated tri-service effort will evolve. The National Software Works can potentially provide for DoD-wide utilization of capabilities which otherwise will be created ad hoc for each new software development program, or worse, not be available at all. 2a3

Background and Technical Need 2b

The Software Problem 2b1

Over the last ten years, there has been a radical shift in the balance of hardware and software costs. Because of technological advances, hardware costs have been reduced to the point where hardware designers are seeking ways to help reduce software costs. The cost of computing is clearly dominated by the cost of software. Since software is often critical component in large systems, overruns in delivery time or serious flaws in quality can have hidden costs and penalties that exceed the direct hardware and software development costs. 2b1a

Demands for software production are increasing in volume and complexity, but progress in software technology has been slow. The demands have clearly outstripped the state-of-the-art, with very costl results. Cost overruns on software development projects are legendary Software is seldom delivered on time. There is much waste in programming and computing, resulting from poor matching of software an hardware. Incompatibility between computers results in costly reprogramming or an inability to take advantage of the reduced

computing costs of new hardware. The maintenance costs for old software products may be an order of magnitude larger than production cost, due to poor original design and production. 2b1b

The high direct and indirect costs of software set an effective practical limit to the complexity and scale of realizable systems. A major reduction in software costs (including the costs resulting from bad quality) could have a great impact on the practical capability of logistic, avionic, tactical, communication, and other vital systems. 2b1c

The rapidly decreasing costs of computation resulting from new technological advances and the rapid growth in computer networks will, together and separately, cause a great expansion in the population of computer users and a great increase in the variety of applications. Th threshold of economic feasibility is dropping for many systems, and awareness of how to employ computations is spreading to many sectors where computing is not a present activity. This will result not only i more computer usage but also in the need for much more software. 2b1d

In addition, major changes are occurring in the character of computing. Batch-mode data base processing currently dominates computing, but there is a strong trend toward on-line data base computing of ever-increasing scale. The related field of communication-oriented computation is also growing, as is the need for complex real-time processing in such areas as tactical systems. The present software art is poorly matched to these modes of computation, and as these modes grow in importance, software costs will escalate. The "learning" costs incurred as the art strives to meet new kinds of demands will be high indeed. 2b1e

Great advances are needed in making computers more natural for people to use and in finding the right level and character of man-machine interaction. The present software art is only at the beginning of such capability. Some forms of man-machine communication will require major increases in software complexity, to match human sensory and intellectual power. 2b1f

Finally, as computing becomes more widespread, the problem of tracking

users' requirements will become acute. For example, on a non-computerized base, it is fairly easy to say, "The commander direct all personnel to read the new security manual and make sure their information-processing activities comply with it." If the base is automated, changing the software would be difficult and time-consuming with current software technology. Keeping up with changing requirements may already be the biggest source of DoD software costs, not only in the maintenance phase, but also during the development phase. In the future, these costs will increase as more DoD functions are partially or completely automated. 2b1g

Why So Few Tools? 2b2

The tools used to develop software do not reflect software's relative importance in determining the cost, reliability, and delivery schedule of the total system. In most billion dollar industries, a substantial investment is accumulated in supportive tools. The development of such tools is difficult for labor intensive activities like software production, where each product is somewhat unique. But the heavy

capitalization of the tool-and-die industry demonstrates that it is possible to accumulate tools which exploit similarities among custom products. 2b2a

The real barrier to the development of adequate tools to support software production has been the requirement that the tools be reimplemented for every kind of hardware. Converting development tool to run on different hardware is usually more difficult than converting an applications system. Since a prime use of software tools is to shield the applications programmers from the details of the computer hardware, the logic of the tool must embody specific knowledge of the hardware characteristics if the results are to be efficient. In the face of conversion costs, some valuable tools have been lost. For example, there were satisfactory solutions to the problems of round-off, overflow, and underflow in numerical computations for the IBM 7094. That was 1966, but the problems are still recurring in newer, and in theory more sophisticated, computer systems. 2b2b

For planning purposes, the Air Force uses six years as the economic

life of computer hardware. That means that almost all applications systems development must be completed in the first year or two after a system is installed if the development costs are to be recovered. Tools which are developed after the hardware is delivered will also come after the programming staff has finally become accustomed to the new system and developed standard procedures for using it. Since new tools will be completed too late to help with the bulk of the applications systems, and constant retraining is something operational organizations can ill afford in any case, there is little incentive fo people outside of the software R&D community to build tools. 2b2c

A related problem is the fact that machines are usually sized for thei production requirements, not their development ones. Hence, they typically do not contain enough mass storage for the files that would be required in an on-line environment, nor enough memory to support both the code being developed and the tools used during that development. Additionally, access to the system is limited by the priorities of the production work load. A little recognized fact is

that the tradeoff between manhours and machine resources is vastly different during development than during production. The CCIP-85 study (Reference) has shown that development costs increase exponentially as the machine approaches saturation. 2b2d

Despite these problems, the inventory of support software has been gradually expanding. Among the most widely used software tools are compilers, operating systems, time-sharing executives, file systems, program librarians, and interactive editors. Virtually all multi-programming operating systems have attempted to create a suitabl programming environment by providing a set of tools. Some merely provide a library from which tools can be selected one at a time by th programmer. Others, like Multics, CP-67, VS-370, and TENEX, have provided an on-line environment for program building and debugging. 2b2e

These systems have not been as productive as they could have been, because there are at present no interfacing standards which assure tha tools can be used together effectively. Non-integrated tool at a time

operation places too great a load on the programmer to specify exactly what operations are to occur. This problem is particularly acute sinc tools often have command language idiosyncracies. On the other hand, if the tools supporting a programming language are tightly integrated, then it is at present impossible to access them from other languages. For example, the APL environment is completely isolated from the rest of its host IBM 360 or 370. Thus, tools may have to be duplicated for each language supported on a hardware system, as well as for all the different kinds of hardware systems. 2b2f

Origins of the National Software Works Program 2b3

Recent technological advances make it possible to overcome the barrier which have prevented the accumulation of a collection of powerful tool to support the software development process. The costs of both processing and on-line storage are dropping rapidly, so it will soon b feasible to have all programmers working on-line. Experiments like ACTORS and the Programmer's Interface have shown that many software tools are language independent or only slightly language dependent.

Experiments using the ARPANET have shown that programs running in several machines can cooperate and appear to the user as a single system. Such cooperation is possible even if the host machines were built by different vendors and have significantly different architectures and operating systems. Finally, there are several examples of large time-sharing systems being used to support development environments for other kinds of hardware, in particular mini-computers. Thus there is strong evidence to suggest that tools running on a diverse collection of computers can be used together effectively to develop software for a variety of target machines, using a variety of languages. The key is the definition of appropriate interfacing standards. 2b3a

Recognizing the significance of the Software Problem to the DoD, and believing that these technological advances offered an opportunity to attack that problem in a much more concentrated way than ever before, ARPA/IPT held a series of meetings with software specialists from industry and government during the Summer of 197 Among the participant

were Barry Boehm(TRW), John Brown (TRW), Michael Busch(CSC), F.J. Corbito(MIT), Peter Deutsch(XEROX PARC), Jerry Feldman(Stanford), Cordell Green(Stanford), J.C.R. Licklider(MIT), Tom Lippiatt(Rand), Barbara Liskov(MIT), Richard Watson(SRI), Clark Weissman(SDC), Robert Balzer(ISI), T.E. Cheatham(Harvard), Stephen Warshall(Massachusetts Computer Associates), Stephen Crocker(ARPA/IPT), William Clark(NAVSHIPS), L/C Robert O'Keefe(USAF-ESD), Maj Harold Arthur(USAF-ESD), Norman Glick(NSA), John Mott-Smith(USAF-ESD), and Ma Zara(USAF-ESD). The result of these meetings was a report(reference) and a determination that the project should be jointly sponsored by service organization which is a major producer of operational software During the Fall 1973, all three Services were presented with the National Software idea. The strongest interest was expressed by the Ai Force Data Automation Agency. The Army Computer Systems Command also assigned an officer to participate in NSW planning sessions. The first meeting of an NSW Steering Committee was held in October 1973 and was attended by Steve Crocker(ARPA/IPT), L/C Gray Kinney(US Army Computer Systems Command), Maj Tony Baggiano and Mr Al Mayhan(Air Force Data

Systems Design Center), Maj Jim Lloyd and 1Lt Bill Carlson(Air Force Data Services Center), Bob Balzer(ISI), and Steve Warshall(Massachusetts Computer Associates). The Air Force Data System Design Center (AFDSDC) and the Air Force Data Services Center((AFDSC) are two of the three components of the AFDAA. AFDSDC is located at Gunter AFS, Alabama and is responsible for developing and maintaining standard data systems wh 2b3b

run at over 130 AF bases throughout the world. AFDSC is located in the Pentagon and supports the Headquarters Air Force and the Office of the Secretary of Defense. The third organization within AFDAA is the Federal ADPE Simulation Center in Alexandria, Virgini It provides computer performance evaluation and simulation services to all government agencies under an agreement with the General Services Administration. 2b3c

In March 1974, a plan (Reference) was published for a joint AFDAA and ARPA effort to build the National Software Works. The Army Compute Systems Command determined that it could not afford to participate. Th

Plan was briefed to Col T. ,McGovern, AFDSDC Commander, Col E.O. Wells AFDSC Commander, and to MG J.B. Robbins, the Commander of AFDAA. They approved the plan, and on May , 1974 MG Robbins and Dr S.J. Lucasik, the Director of ARPA, signed a Memorandum of Understanding to carry ou the development. 2b3d

Rome Air Development Center(RADC) joined the program during the Summer 197 RADC is the component of the Air Force Systems Command which is responsible for advanced computer science research. They are jointly funding the development, and are also serving as the ARPA Agent for NS contracts. 2b3e

National Software Works Design Concepts 2c

Overview 2c1

The National Software Works will be a software development environment on a very large scale. It will be built on a computer network to reach a wide user community, and will integrate a continually growing collection of specialized services to support the development of

software for a variety of diverse hardware. A typical terminal session will involve operations on several different machines. Consider the construction of a software system for the Burroughs B3500 using the COBOL language. Programmers may want to use the NLS editor on a PDP-10 to enter their source programs and to prepare their documentation. To reduce the cost of on-line storage, some of the files may be stored elsewhere on one of the new trillion bit storage devices like the Ampe TBM, which offers on-line storage at a cost of about a dollar per megabit per year. A Burroughs B6700 might be used for preliminary syntax checking and interactive debugging. Perhaps the best test data generator runs on an IBM 370. Finally, the software should be tested o a Burroughs B3500. The machine on which a tool runs has come to be called a Tool Bearing Host (TBH). The essence of the National Software works idea is to make the best possible tools available by decoupling the selection of Tool Bearing Host hardware from the selection of production hardware. 2c1a

Initially,the NSW will be built on the ARPANET, which interconnects

fifty computers, distributed over the United States, London, and Hawaii. An incomplete list of the operating systems at various hosts includes TENEX, ITS, and 1050 for the PDP-10, ANTS and ELF for the PDP-11, Multics for the Honeywell 6180, MCP for the Burroughs B6700, and variations of OS, VS, CMS, and TSS for IBM 360s and 370s. Its user community includes many experienced researchers working on ARPA supported projects. These researchers will provide constructive criticism, and the results of their research will become directly available to DoD personnel through the NSW. 2c1b

At present, the ARPANET is merely a communications system for interconnecting independent facilities. Each machine is owned by a different organization, the user must have registered himself in advance at each site, have established credit, and arranged to be billed for the time he uses. He must know how to log into each machine and how to transfer files among them. 2c1c

In the NSW, it must be easy for a developer to use tools on several different kinds of hosts, files must automatically move from one host

to another, and the command languages and file naming conventions must obey standard conventions wherever possible. 2c1d

A Framework is being built for the NSW which will eliminate the problems associated with the current ARPANET. It will centralize accounting and automatically perform host logins, tool-invocation, fil access, and file movement for the user. The initial Framework will ru in a single network host, but eventually the Framework will be distributed across hosts. The parallelism is needed for capacity and reliability. Rules will be defined for adding new tools to the environment. It is understood that some effort will be required to install tools in the NSW; that is the price of achieving standardization without discarding existing operating systems. There are no plans at present to have the Framework optimize the use of hardware resources. Tool installers and users will decide where files are to be stored, which hosts will support a particular tool, and whether whole files or partial files should be moved to perform a give operation. The Framework will help them make good decisions by

simplifying the implementation of the various alternatives, and by providing feedback on costs. Tools which have unique and non-standard interfaces, or tools which run on hosts which are inefficiently connected to the Network, will be allowed; they should be so much less attractive to users than tools which are tightly coupled into the environment that they will gradually disappear. 2c1e

In order to provide a more consistent interface, users will access the NSW through Front-End network access machines. The access machines will know which characters require action by the tool being used, so that input characters can be collected and transmitted in blocks. The access machine will also support some local command interpretation and user prompting, whether additional functions should take place at the user site, for example text editing, is an open issue. 2c1f

A New Capability for Project Control 2c2

A view of the NSW as a mere lash-up of tools which happen to reside on the ARPANET would be extremely short-sighted. The fact that all

programmer contact with tools passes through a common communications media with immense computing resources creates an opportunity for the study--and perhaps control--of the whole process of large program creation and maintenance. 2c2a

In the production of a large software system, numerous programmers, analysts, and managers cooperate in a venture whose end product is, in some sense, a single entity. In the course of their work toward this goal, they prepare, edit, and manipulate a very large number of pieces of "text" of various types: routines in a programming language, data descriptions, structured data objects, modules of object code produced by a compiler, assemblages of such modules linked together by a link editor, items of program documentation, and so on. 2c2b

To the degree that all of these types of text are either machine-processable or machine-producible, it is reasonable to say tha they are all either prepared (and repaired) by project members or produced by "tools" by which we mean elements of support software invoked by computer specialists to operate on pieces of text. 2c2c

The number of such pieces of text which come into existence in the course of a large project can be astronomical, and even the number in some kind of active status at a particular time is likely to be huge. It ought to be clear that any absence of control over this large and shifting inventory of material is an invitation to confusion and the almost total absence of any support software for "inventory control" might have something to do with the high and uncontrolled cost of program production (and perhaps something to do with our difficulties in figuring out what we are doing wrong). 2c2d

Suppose by contrast that the total inventory of text pieces were explicitly regarded as one logically integrated data base -- the Project File -- and that some piece of support software were charged with the responsibility of managing that data base. This piece of software - for the moment, let us call it the File Manager - would of course, keep books on the contents of the Project File. These books would include not only the character and status of each item in the Project File, but also its relationship to other items in the File

(that A is a later version of B, that C is the object code module corresponding to COBOL test D, and so on). 2c2e

It should be obvious that, if we have designed the books correctly and arranged matters so that they are always kept accurately and completely, they provide the data crucial to any serious attempt by management to explore or control what is happening in the project. 2c2f

It is, of course, essential to any interesting use of the project book that they always be complete and correct, and that there be no path of entry to the Project Files unguarded by the File Manager. This suggest strongly that an individual programmer's use of his tools -- at least when that use yields a non-transitory (Filed) result -- must always be reported to (and, perhaps, controlled by) the File Manager. 2c2g

To arrange matters so that this requirement is met is extremely difficult when the support software designer is confined to the resources of a particular local hardware: to keep the File Manager and its books effectively on line at all times may be insupportably

expensive. Indeed if a projects development work is performed on several computers with no communication among them, it may be logicall impossible to create a reasonable File Manager. Thus, it is not surprising that there has been no serious attempt to provide a facilit of the sort we have described: at least the naturalness, if not the feasibility, of the idea depends on a unification and scale of computing resource found only in gigantic machines or in networks.

2c2h

A fairly powerful query system will be provided to answer questions about any filed entity: what it is, where it came from, what other entities depend on it, etc. Later we will introduce a variety of experimental tools for project control which use the File Manager's books as their primary data or use the fact of the File Manager's existence as their means of invocation (after all, the later provides single control point "awakened" every time anything interesting happens). Here are some proposed tools: 2c2i

Project Status Reporter: This relates the present status of the

files to the overall project plan (in machine-readable form), identifying bottlenecks, critical paths, etc. 2c2i1

Project Accountant: This produces reports on the frequency and cost of various patterns of activity interesting to project management. 2c2i2

Policy Enforcer: Everybody in Section A must use the same version o function X; no programmer may link up two routines until each is adjudged debugged by a section manager; no programmer may start debugging until all his code is written; no programmer may write an code for phase 2 of the project until he has written all his code for phase 1; no programmer may start writing a new routine until hi last is documented. The above list of (rather inane) policies are meant to suggest a large family of more reasonable policies which might apply to some or all programmers at various phases of a project. If a plausible way of expressing such policies in machine-readable form can be developed, it is no great trick to devise a tool which is invoked by the File Manager to verify that

the present action of some programmer is consistent with policy, so that the action may be inhibited or permitted accordingly. 2c2i3

The use of such new tools by the project would of course, be optional. In any event, the research community can make use of such tools to collect the data it needs to discover what makes program development and maintenance so expensive. 2c2j

Internal Design 2c3

The software which comprises the NSW can be divided into three major components which have been given the (hopefully suggestive) names: Work Manager, Foreman, and Front-End. Each of these these names refer to an aspect of the NSW which requires analysis and design, and whose result will be some set of programs. The programs will communicate with each other using a new Procedure Call Protocol (PCP). 2c3a

The Works Manager is the heart of the NSW. It acts somewhat like an operating system in that it accepts requests for the performance of work (requests for tool use), arranges the initiation of that work,

keeps track of work in progress, does cleanup after completion of a piece of work, manages file storage, and so on. It differs sharply fro a conventional operating system in that its primary function is not optimal resource allocation, but rather validation of the work request and protection of the integrity of the files. Here, both validation an protection are to be taken in a far wider sense than has heretofore been customary in the programming field. 2c3b

The works Manager will create and maintain an extensive catalogue of each project's inventory of filed objects. This catalogue will include both structural and historical information about each object (when was it made at whose request, by what tool, from what other filed objects; what other objects have been made using this one as data; what truths about this object have been asserted, or proved; and so on). Since the works Manager will also have access to descriptions of the characteristics of all tools within the NSW, it can be seen that validation of a work request can be unusually exhaustive: does the too exist, do the input files exist, are they of the right type and status

for this tool, are the files and the tools both of the right status to be used by this user at this time, and so on. 2c3c

In the same way, any entry of a new object into the files will be supervised by the Works Manager, which will perform all updates to the catalogue implied by the existence of the new object. Thus, the idea o file integrity is expanded to include catalogue integrity, which both permits strong validation of work requests and transforms the catalogu into a powerful data base for future tools (ranging from a simple quer system which answer questions about the contents of the project files to experimental tools in automatic programming which map a desired object into a best sequence of tool calls to create it -- given what objects are there already). 2c3d

The Foreman is that component of the NSW concerned with taking a well-defined and fully validated request for tool use and actually getting the job done. It receives an encoded message from the Works Manager which says, in effect, "At the request of user X on host Y, execute the COBOL Compiler on Host Z, using file HENRY on the

Datacomputer as input and filing the result on the Datacomputer under the name GEoRGE and, when the job is finished, send me the message W." The Foreman worries about fighting the host protocols and arranging th communication so that the requested task is in fact performed. 2c3e

While the Works Manager component clearly has as implementation some integrated family of programs resident on the NSW hosts, the structure and location of the programs which do the Foreman's job are by no mean so self-evident. A portion of the work will be centralized in the NSW host, but other portions will be handled by pieces of program implemented in each Tool-Bearing Host and in each Front-End user acces machine. There are some complex issues here, where best design may b different for "closed" tools, like compilers, on the one hand and "open" tools, like editors, on the other. The goal will be to establish a small number of standards, called "Tool Bearing Host Protocols", which all Tool Bearing Hosts and tools must obey, and leave each tool installer as much flexibility as possible to take advantage of special characteristics of his environment. 2c3f

The Front-End will normally execute in a PDP-11 mini-computer which sits between the user's terminal and the ARPANET, but the system will also run on a PDP-10 TENEX time-sharing system to support users whose terminals are connected to TIPS. 2c3g

All commands to the Works Manager or to any tool must be given through the Front-End. It will provide terminal control, aid the user in command specification, parse commands, and communicate with the appropriate resource(s). While each tool domain within the NSW may hav a vocabulary unique to its area, this vocabulary will be used within language and control structures common throughout the NSW. A user will learn to use additional functions by increasing vocabulary, not by having to learn separate "foreign" languages. When in trouble, he will invoke help or tutorial functions in a standard way. 2c3h

The Front-End will inform the Works Manager whenever the user attempts to access or create new files, save the user's commands for intervals between tool checkpoints (if the tool is capable of checkpointing its environment), allow the user to reissue old commands, allow the user t

define and use command macros (abreviations) and interact with tools (upon user request) to "undo" the effect of commands where possible.

2c3i

A Command Language Interpreter (CLI) will interact with the user to allow him to give commands to various NSW tools, the Works Manager, or other NSW facilities. The CLI must also be able to handle machine-oriented messages from NSW tools or the Works Manager and translate those messages to an appropriate man-oriented language form.

2c3j

Tool builders will be able to take advantage of the Front-End's command interpreter instead of having to develop their own user interface.

2c3k

The Command Language Interpreter is driven by two data structures, a Command Language Grammar and a User-Profile data structure. These data structures are sent to the frontend either by the Works Manager or by the tool system as needed. The command language available to the user at a point in time is represented by the union of the grammars active at that point.

2c3l

The Command Language Grammar is a data structure that describes the user interface for a tool or the NSW Works Manager. A Command Meta-Language (CML) for specifying the user interface will be developed, and a compiler will be implemented to produce command language grammar data structures from the CML. 2c311

A User-Profile will be loaded by the frontend when the user is authenticated by the Works Manager. It controls such things as how much help or prompting a user receives when using a particular tool, what commands are available, and other information tailoring the system to the user. The information in this data structure can be changed upon user request or adaptively by programs based on user behavior. Updates to the User-Profile must be reported to the Works Manager. 2c312

The Terminal Controller interfaces the Command Language Interpreter to the particular display or typewriter terminal being used. Displays can be used as typewriter terminals or as full two-dimensional devices. The Terminal Control contains primitives

for subdividing display screens into rectangular windows and for allowing the user to select text displayed on a screen as arguments in commands to tools. Because certain classes of work that the user want to do within the NSW environment involve remote job entry to batch processing systems, the frontend will be able to handle such devices as card readers and punches, line printers, and tape drives

2c313

An operating system interface module, consisting of a set of virtua operating system primitives, will be used to make the Front-End as operating system independent as possible. This will enable the Front-End to be transferred to other equipment later. The Front-En systems will be maintainable, loadable, and (symbolically) debuggable from a remote timesharing (TENEX) system. The main features needed to support remote debugging are expected to be supplied with the operating system.

2c314

Implementaton Guidelines

2d

The NSW is being built as a loose confederation of tools, with no

technical bounds on the number of tools or the number of users which can be supported. An initial system, oriented toward the construction of COBOL programs for the B3500/B4700, is scheduled to begin operating during the Summer of 1975. The initial tools will include a text editor, a COBOL compiler, and a document publication facility. Once the concept is demonstrated, hardware can be added to support more users and tools can be added to support a wider variety of software activities. 2d1

Initially the NSW will be composed of large modules with few actions identified. As such, it will operate in a largely conventional manner without much cooperation among the modules. Over time, the coordination and cooperation among the modules will be tightened through the replacement of modules and the incorporation of new ones that identify and report all their important activity to the Works Manager. 2d2

Participating Organizations 2e

Government Agencies 2e1

Air Force Data Automation Agency(AFDAA) 2e1a

Air Force Data Services Center 2e1a1

AFDSC is an operational element of the Air Force Data Automation Agency (AFDAA). Its mission is to plan, design, develop, and implement computer based management information systems, and to provide automatic data processing, computing and management science services to the Headquarters Air Force and the Office of the Secretary of Defense in the Pentagon, and other agencies as assigned. 2e1a1a

Air Force Data Systems Design Center 2e1a2

Federal ADPE Simulation Center 2e1a3

Rome Air Development Center 2e1b

Defense Advanced Research Projects Agency(ARPA) 2e1c

Contractors 2e2

The AFDSC Environment 3a1

AFDSC in the Pentagon operates three dual processor Honeywell G-635s and one (newer) H6060, all with the GCOS operating system. It also operates a dual processor Honeywell H-6180 with the Multics operating system and an IBM 360/75 running OS/MVT. One of the G-635s is unclassified; the rest of the systems are classified. The IBM 360/75 is used strictly for batch processing. Multics, which is a large interactive system and well-suited to the manipulation of on-line databases, is used for high priority operations research and budgeting models. Three of the four GCOS systems provide time-sharing partitions. GCOS time-sharing programs are typically small, and frequently supplement large batch systems (e.g. - prepare input transactions or scan output). GCOS Time-Sharing (TSS) is ill-suited t the debugging of batch programs because of core restrictions (24K word is a practical upper bound) and because the TSS monitor calls are different from the batch monitor calls. Many important batch subroutines (e.g. IDS file update) will not run under TSS, and in any

case, correct TSS execution does not guarantee a program will run in batch. 3a1a

The first G-635 was installed in May 69. The conversion effort from the old IBM 7094s involved months of parallel operation, part of it using a commercial service bureau and part of it with the new equipment installed. The development effort has now stabilized, with majority of the Center's resources devoted to production and maintenance. The IBM 360/75 was installed in . It was acquired to support an existing workload, so there was almost no conversion and development cycle. Multics was acquired during FY74, and a majority o the work on the machine can still best be classified as development. 3a1b

About 20% of the AFDSC manpower (19.9% in FY73, 23.1% in FY74, and 19.7% for the first five months of FY75) is devoted to developing new systems or making major modifications to old ones. Of the manpower devoted to development, 15.8% in FY74 and 21.4% in FY75 were for new Multics applications. Those amount to 3.6% and 4.2% respectively of

total manhours. Except for Multics, a miniscule amount of machine resources were devoted to development. Considering only GCOS and the 360/75, the numbers are 7.5% in FY73, 7.7% in FY74, and 4.8% thus far in FY75. These facts are summarized with the statistics in Table 1.

3a1c

TABLE 1: AFDSC Resources Devoted to Software Development

3a1c1

	FY73	FY74	FY75

3a1c1a

Non-Multics Development vs Total Manhrs	19.9%	19.5%	15.5%

3a1d

3a1e

3a1f

3a1g

draft plan

Multics Dev Total Manhrs	0	3.6%	4.2%

3a1h

3a1i

All Dev vs Total Manhrs	19.9%	23.1%	19.7%

3a1j

3a1k

3a1l

Computer Time For Dev vs All Computer Time	7.5%	7.7%	4.8%

3a1m

3a1n

3a1o

(360/75 and GCOS)

3a1p

It is very difficult to analyze the resources devoted to production an maintenance. The problem is to separate the simple execution of software which has been thoroughly tested and remains static for long periods of time from the making and testing of minor modifications. One indication is the abort rate for production activities, which averaged . Obviously there is more to running production than simply reexecuting a standard program against different data. A related problem is the cost of these production aborts. The average cost of each production abort on the G-635s was . Because the average waiting time in queue for batch jobs on GCOS, for example, is , and is usually much worse than average during the crucial budget update cycles, programmers faced with overnight deadlines must frequently make minor changes and run production against large data files without having tested their changes. In the present environment there is no alternative. 3a1q

The last aspect of the AFDSC environment which impacts on Center use o the NSW is the hardware acquisition and replacement schedule. The

schedule is important because major development, modification, and conversion efforts at AFDSC correspond to acquisition times of new hardware. The GCOS machines are currently being enhanced, which will extend their economic life through FY . The IBM 360/75 is programmed to be upgraded or replaced during . Multics will be upgraded durin and is scheduled to be replaced in . 3a1r

AFDSC Operated Computer Service Bureaus 3a2

In addition to providing complete management information systems, systems analysis, and computer support to Hdq USAF and OSD, AFDSC provides computer time to AF and DoD organizations which have their ow analysts and programmers. A component organization is the San Antonio Data Services Center (SADSC) in San Antonio, Texas. It offers remote access from several locations throughout the Southwestern US to an IBM 360/65 running OS/MVT. SADSC will soon be offering Burroughs B4700 service as well. A new Washington Area Data Services Center (WADSC) i scheduled to begin operation soon with either a B3500 or B4700. SADC is operated as an industrially funded activity, with usage-based

charging and full cost recovery. It is planned that WADSC also be operated on that basis. Since a goal of the NSW is to establish an econimic marketplace for software tools and computer time, the NSW's proposed approach to resource allocation is in complete agreement with AFDSC operating policies for its regional service centers. An important aspect of the NSW from the AFDSC point of view must be the possibility of providing NSW tools and services to other AF and DoD organizations. 3a2a

AFDSC Requirements For NSW 3a3

Usage Scenarios 3a3a

Table 1 classifies AFDSC development workload, and for each categor identifies the most significant problems being addressed by the NSW Tools which are required to support each category of work are also identified. Among the AFDSC requirements which are not included in the table are backup for production systems and communications among different vendors' mainframes. NSW technology is relevant to

these requirements. However, the NSW's present development efforts assume that the production machines will not be connected to the network, and hence will not be under the control of the NSW framework. Refinement and specialization of the NSW design would b required to build a suitable environment for supporting the AFDSC production workload. 3a3a1

Requirements for Tool Bearing Hosts 3a3b

Honeywell G635 or H6000 with GCOS 3a3b1

The primary requirement is for testing batch jobs . Source leve interactive debugging is required for COBOL and FORTRAN. 3a3b1a

The number of interactive programs which merely supplement batch systems indicates that transaction processing may be more efficient in the Center's environment than time-sharing. Heretofore, TSS has been used because there is no reasonable debugging environment for transaction systems. If such an

environment could be established, then much of the Center's interactive workload might shift to transaction processing. That would eliminate the problems associated with batch and time-sharing incompatibilities which have plagued AFDSC programmers. 3a3b1b

Tools are required for designing, implementing, and restructuring random, ISP, and IDS data bases. 3a3b1c

The new WWMCCS data management system (WWDMS) is purported to allow non-programmers to maintain a computer database and retrieve reports from that database. WWDMS is enough like a programming system that it will be desirable to bring WWDMS under the control of NSW project management and performance evaluation tools. 3a3b1d

That implies installing WWDMS as an NSW tool (or more likely, a set of NSW tools). A standard GCOS machine is needed for final testing of batch systems. In cases where the data is

unclassified and non-sensitive, that machine may also be used fo production work, evaluation tools. A standard GCOS is needed fo final testing. 3a3b1e

IBM 360/370 With OS 3a3b2

3a3b2a

There are requirements for FORTRAN, COBOL, and possibly PL/1 development on the 360/370. For each language, source level interactive debugging is required. 3a3b2a1

A number of vendors offer libraries of database management subroutines for the IBM 360 which can be used as building blocks for applications systems. These routines are similar in concept to ISP or IDS for Honeywell GCOS machines. It is important to include such tools in the NSW. 3a3b2a2

Several vendors also offer self-contained datamanagement systems for the IBM 360. The Informatics MARK IV system is

supported at both AFDSC and SADSC. As with WWDMS, it will probably be desirable to install MARK IV as an NSW tool, and bring the MARK IV development work load under the control of the project management and performance evaluation tools.

There are known requirements to development and maintain transaction systems for the IBM 360. An example is the quer system for military pay records at the Air Force Accounting and Finance Center (AFAFC) in Denver, Colorado. To effectively debug such systems, which are tightly integrated with the telecommunications handler, a virtual machine environment is required so that operating system level code can be debugged. Since the machine used to run the productio transaction systems will almost never be a VM machine because the high overhead associated with VM, which would reduce overall through-put, this is a natural NSW application.

3a3b2a3

3a3b2a4

3a3b2b

A standard OS system is needed for final testing. In cases where the data is unclassified and non-sensitive, that machin may also be used for production work. 3a3b2b1

3a3b2b2

Tools which execute on e 360/370 TBH but support development for other machines will be used 3a3b2c

to validate the hypothesis that tools built for one machine can continue to run on it, but be applied to the development of software for other machines. Examples are verification an testing tools (including test data generators) and programs for restructuring COBOL and/or FORTRAN into reasonable structured variants of the ANSI standards. 3a3b2c1

An unclassified Multics is required to support development of software for other machines, and so that NSW project management and

evaluation tools can be applied to the development of Multics software. Multics seems to be the correct environment for a sophisticated debugging system for GCOS software, Janus and RDMS are database management tools for Multics. It may also be possible with Multics to supply, as a"feature" of the NSW, the ability to securely protect information and thus to guarantee privacy.

3a3b3

Requirements for Tools 3a3c

Tools for controlling and maintaining existing software systems.

3a3c1

A significant portion of AFDSC manpower is devoted to maintaining, making minor modifications and scheduling operation of production systems. For the NSW to help in the short run, ways are needed to move these production systems into the NSW environment so that superior tools can be used by maintenance programmers. Some of the means to this end follow: Source, object, and job control must be copied into the NSW file system,

The attributes of input and output files must be defined. Linkages must be established between component subroutines on th installation library and the production software. We need to pu Narrative documentation must be put on-line. Other goals would be to produce machine readable abstracts and other documentation to implement release and change control, to restructure badly structured programs, and to establish libraries of standard test data and/or results. 3a3c1a

Yellow pages 3a3c2

The NSW can be viewed as a library of development tools. A catalog, or yellow pages, is needed so that users can locate applicable tools when they start to work on a new kind of problem. The directory system could be based on keywords, or it could be a full text retrieval system which operates against the narrative descriptions of the tools. In the long-term, a hybrid of those two approaches will be needed. The directory should include information about a tool's cost, maintenance status,

reliability (including trouble reports), who maintains it, and the existence of a user community. Tool installers should be able to determine if organizations which no not at present have access to a tool should still be made aware of its existence via the directory. 3a3c2a

Software libraries. 3a3c3

There are many cases when software should not be written at all -- existing codes should be used. The NSW must provide access t software libraries to facilitate their use. Ideally it should b possible to access all existing libraries using a standard command language. In the short run we won't have them all, and we won't overcome all command language idiosyncracies. 3a3c3a

3a3c3a1

Libraries containing subroutines or components which can be used as building blocks and incorporated into the application software. 3a3c3a2

Libraries of self-contained applications systems.

3a3c3a3

These two kinds of libraries will have to be handled differently especially with regard to accounting and release (copy permission). 3a3c3b

3a3c4

The difficult cases are the libraries of subroutines or components which the user can incorporate into the software system he is building. Access control is very difficult with such tools. Three alternatives have been identified thus far: Subroutines and other components can only be used in the vendor's environment and the system will not allow you to copy a load module out without paying a stiff exit fee.

3a3c4a

The subroutine can be called across the network for debugging, and the user would again be charged a stiff exit fee. 3a3c4b

Only certified linkage tools are allowed to access the subroutine library, and the user is charged each time he builds a new object module. 3a3c4b1

3a3c4c

An effort should be made to get libraries of government-owned software installed as tools. Regardless of the rules for releasing components, a record must be kept with information about who uses the subroutine, on what machine, under what operating system and with what result. There must be a complete audit trail of all copies so that the users can be notified when the subroutine or component is modified. These release control considerations apply to self-contained systems (which the user may want to copy and run on hardware external to the NSW) as wel as to subroutines and components. 3a3c4d

Batch scheduler. 3a3c5

3a3c5a

The purpose of the batch scheduler is to maintain a complete applications system in the NSW file system. The file should include any necessary job control information as well as the source and the object for component modules. 3a3c5a1

3a3c5b

Some systems provide for run-time options. We would like the NSW to control the specialization of the standard system so that records can be kept on which options are exercised.

3a3c5b1

3a3c5c

Applications systems usually require mass storage files and/o tapes. Since many vendor supported systems do not provide fo cataloging, sequencing of new versions, etc., it seems desirable for the NSW to offer these services. They will be provided by tool(s) which (if they are developed new for NSW)

must be written in COBOL or FORTRAN for a widely available computer system(s). 3a3c5c1

3a3c5d

Once the selection of run-time parameters and the control of production datasets is made internal to the NSW, there are numerous opportunities to provide enhanced capabilities at relatively low cost. An example is a time-sensitve scheduler Criteria might be established for when the system should run (e. g., the first Tuesday of every month). The NSW scheduler would automatically identify correct data sets, run the appropriate job (on one set of target machines) and distribut the results. Time sensitive scheduling could be implemented by a MULTICS scheduler. NOTE: Many jobs scheduled this way will be run by having the operators move tapes from NSW to independent production machines. An analogy can made with second generation batch scheduling , except the NSW has

automated much if not all of the work of the production coordinators and operators. 3a3c5d1

Software conversion aids 3a3c6

b. Conversion to New Hardware 3a3c6a

Computer hardware has almost doubled in effectiveness and performance per unit cost every three years for two decades. Software conversion costs have prevented operational organizations from taking the fullest advantage of these cost reductions. 3a3c6a1

The NSW environment will help this problem in three ways: 3a3c6a2

The existence of a large pool of competing service centers will make new hardware systems available soon afte they are announced, at least on a small scale. New system development can take place on the new hardware. Where it is cost effective, old tools can be converted. There is

likely to be a substantial overlap during which remaining tools can continue to be accessed on their old hardware. 3a3c6a2a

The NSW will include a collection of tools for convertin production software to run on different (and normally newer) hardware. 3a3c6a2b

The NSW will include hardware emulators. In some cases it will be possible to build software for projected hardware through emulation. That will make it possible to delay selection of the production hardware until 1-3 years into the development cycle. The resulting savings could b as much as 50% of hardware costs. This is of course a longer term objective. 3a3c6a2c

Management Considerations 3a3d

3a3d1

3a3d1a

Cost predictions 3a3d2

Enough data should be collected to predict what a given activity will cost. There should be one or several tools to help tool installers define the characteristics of their tools and provide the users with cost predictions. The Works Manager must collect the historical data which these tools require as input.

3a3d2a

Usage Audit Trail 3a3d3

A record of when tools were used and by whom, and the operating system version they ran under, should be maintained. Users must be able to control who knows they use a tool and indicate whether they want to talk to other people about how it works. When the operating system on a Tool Bearing Host (TBH) is changed, all tools must be tested, or they must be moved to a lower maintenance category and identified as not being converted to the current operating system. When the user has a problem, he must automatically be given the option of submitting a trouble report

Access to this information is a significant issue which must be studied and a policy formulated. 3a3d3a

Maintenance Categories 3a3d4

Each tool must be assigned a maintenance category. The highest category will imply a level of support equal to or superior to that provided by any vendor today. Consultants must be availabl to assist tool users. The maximum time to respond to trouble reports and fix known bugs must be tightly constrained. Notification to users must come a year or more before a system's support is withdrawn. When a vendor stops supporting software, the source code must enter the public domain. Statistics should be kept and published on user complaints and acknowledged bugs. Lower maintenance categories will be appropriate for tools which are useful but non-essential. For example, an experimental debugging tool could be used even if there was no guarantee of its continued existence. DoD users are likely to install tools developed in-house in less than the highest maintenance category

in order to reduce their obligation to support outside organizations. 3a3d4a

Directory Information (yellow Pages)

Cost and maintenance information must be included in the director of tools.

Cost Recovery

Efficient use of NSW facilities must be encouraged by charging and reimbursement policies which reflect the true economic value of the services used. 3a3d5

Air Force Data Systems Design Center 3b

Rome Air Development Center 3c

Requirements for Advances in Software Technology 3d

Verification and Testing Tools 3d1

Tutorial Tools 3d2

The NSW should be viewed as an in-house DOD system, regardless of whether the hardware is government-owned, leased and operated by the government, or operated by private concerns. The overall system must be managed by a government organization which understands the operation of reliable, cost effective computer services. That managing organization will maintain the central accounting files, monitor performance, enforce standards, and provide general support to the system's users. If the NSW satisfies current expectations, the managing organization will probably have to be separate DOD agency, to provide balanced support to all three Services. One of the operational organizations participating in the development effort must take responsibility for the interim operation. 4a1

The AF organization tasked to operate regional service centers is the Air Force Data Services Center. It already operates a center in the Pentagon to support the Air Staff and OSD, and a center in San Antonio to support government users in the Southwestern United States. A new center is planned for the Washington area to support users outside of the Pentagon.

4a2

AFDSC is the logical choice to be interim manager of the NSW. ARPA will of course have to be involved, but AFDSC should immediately begin planning for this operation, and be ready to assume control as the development nears completion. The Washington Area Data Processing Center (WADSC) is the correct organization to assume these responsibilities. It is in the Washington area, and unlike AFDSC in the Pentagon, it is preparing to serve a diverse and open-ended customer base.

4a3

Computer hardware to support the initial operation of the NSW is an important issue. Requirements have been identified for GCOS, MULTICS, an IBM 360/370 development machines. Additional B4700 capacity is also needed. The IBM 360/370 requirement and the B4700 requirement can both b

satisfied by adding SADSC to the ARPANET. The only available GCOS machin is System C at AFDSC. It is already saturated, however, so it will be able to support NSW users only if its capacity is expanded. Backup is also needed. The best solution is to enhance AFDSC System C, and find at least one and hopefully two other GCOS machines. Likely candidates are Create at Wright-Pat AFB, the Air University H6060, and the H6060 at Hdq AFSC. They are identified because they could be attached to existing ARPANET IMPS. A more ambitious solution would be to attach the GE Mark III system to the ARPANET! The NSW Framework will be able to control access through the ARPANET to users on valid DOD business. 4a4

The RADC MULTICS is the logical choice to provide an Unclassified MULTICS development environment. MIT can be used for backup and access to specia software. 4a5

Connection of SADSC, AFDSC System C, RADC MULTICS, and one additional GCO service are provided for in the budget. 4a6

Some of the most important questions in planning for the long term

Operation of the NSW revolve around computer resources: how much capacity i needed, on what kinds of machines, located where, operated by whom, and how are scarcities to be adjudicated. There does not seem to be a "right" answe to these questions if the NSW is to be centrally controlled. The problems are greatly simplified if the equipment is rented and managed by organizations with the flexibility to change equipment quickly. An alternative is to have the using organizations take responsibility for satisfying the majority of their own hardware requirements, and only rely on other network facilities for loadsharing, backup, and limited use of specialized resources. Assuming that the hardware selection is handled in one of those ways, the important issue reduces to budgeting the correct amount of money for computer support. 4b

Two approaches have been taken to estimating required computer support budgets. 4b1

4b1a

The first technique was to assume that NSW service should be

deliverable for about the same price per connect hour as the AFDSC unclassified time-sharing system, which costs $14 per hour. 4b1b

Assuming 6 hours connect time per day while coding and testing, and that half a person's time is devoted to design and administration, one gets 3 hours per programmer per day. 4b1b1

4b1b2

4b1b3

Thus, organizations should budget 15 hrs/Wk * 50 wks/yr * $14 hr, or about $10,000 per technical person per year for computer time. Organizations which are already making heavy use of in-house time-sharing systems will probably already be budgeting this way. Organizations which are doing their development in a batch, card oriented environment will find that their computer budget is a smaller percentage of their personnel budget, and will increase whe they move to NSW technology. 4b1b4

The second technique for estimating operating costs was to analyze AFDSC accounting data for FY74 and the first five months of FY75. The machine cost per programmer hour directly chargeable to a GCOS or 360/75 software development or modification project was found to be $4.00 in FY74 and $3.70 in FY75. Those figures reflect the fact that much of the computer time for testing is on batch systems. Using 150 direct hours per year gives an estimate of between $5,500 and $7,000 for computer time for each technical person working on software development. 4b1c

It should be noted that both estimation techniques produce values which are true if all costs are to be recovered, as they would have to be if time is purchased from an outside vendor. The AFDSC accounting charges only recover the rental and maintenance charges on the computer hardware. There is no amortization of government owned equipment, nor is any charge made for floor space, operators salaries, or systems programmer salaries. 4b1d

Use of the NSW will clearly separate the charges associated with

developing them. Software developers will have a much more predictabl environment in which to work. No longer will the development effort be slowed or stopped because priority production work drives th development and maintenance programmers off the machine. 4b1e

Whether the development effort is supported by in-house rental equipment or by other computer service centers on the ARPANET does not seem crucial. The profit for contractors operating computers on the ARPANET ranges between zero (for non-profits) and 10%. Those fees are insignificant when compared with differences in efficiency among organizations. From a reliability standpoint, the important thing is that several centers operate interchangeable services. AFDSC has been attempting to lease equipment based on service actually delivered to users at terminals under the MULTICS contract. Service from vendors on the ARPANET is in complete agreement with that model. Because each vendor is a clearly defined cost center, it will be easier to compare cost and service received. Thus, for processing which does not requir a classified environment, purchase of computer resources on a

draft plan

(J31835) 10-FEB-75 18:55;;;; Title: Author(s): William E. Carlson/WEC; Distribution: /DLS([ACTION]) MAW([ACTION]) LAC([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: WEC; Origin: < CARLSON, AFDAA-5-YEAR-PLAN,NLS;14, >, 10-FEB-75 18:46 WEC ;;;;

CARLSON, AFDAA-5-YEAR-PLAN,NLS;1, >, 11-JAN-75 09:03 WEC ;;;;####;

SMT 10-FEB-75 19:38 31836

letter to mccutheon

dear sam, 1

i have been following your efforts at merdc to expand your customer base with great interest. i recently had an opportunity to discuss your service with two non-amc activities, they were cacta at fort leavenworth and caa in bethesda. cacta informed me they were no longer using your services because their requirement needed a higher speed computer than a 6600; however, they told me they had always found merdc very responsive. caa advises me they are still using your service and they also find you responsive. 2

i am also following our joint efforts to couple you with the arpa net for i feel that opens your doors to more business. we are anxious to assist you in finding business to keep your unit cost of computation down until the amc workload grows more. i am sorry the remote batch capability has been so slow arriving. i discussed the matter with john cianflone and ron uhlig recently and we still feel that we should concentrate on getting your computer into the arpa net as part of our phase one effort. john and ron will be in touch with you in the near future to discuss funding and uses for your imp until it becomes self supporting. 3

SMT 10-FEB-75 19:38 31836

letter to mccutheon

(J31836) 10-FEB-75 19:38;;;; Title: Author(s): Stan M. Taylor/SMT;
Distribution: /JCG([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: SMT;
Origin: < GILBERT, LTR-TO-SAM,NLS;3, >, 10-FEB-75 19:36 SMT ;;;;####;

My example

Happy Valentine's Day, cutie,

MLS 11-FEB-75 08:32 31838

My example

(J31838) 11-FEB-75 08:32;;;; Title: Author(s): Mary Louise Slezycki/MLS; Distribution: /JBLL([ACTION]) JBLL([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: MLS;

SGR 11-FEB-75 08:39 31839

message

Next time you go skiing why don't you take us with you? You shoulhave been here yeerd This classwas really slow, All those on Lee Hamil's terminalally pai,off, 1

SGR 11-FEB-75 08:39 31839

message

(J31839) 11-FEB-75 08:39;;;; Title: Author(s): Susan Gail Roetter/SGR; Distribution: /MLS([ACTION]) SGR([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: SGR;

party

MLS 11-FEB-75 08:41 31840

Are you going to the party at Arlington Hall on Friday? 1

party

(J31840) 11-FEB-75 08:41;;;; Title: Author(s): Mary Louise Slezycki/MLS; Distribution: /IMM2([ACTION]) IMM2([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: MLS;

JSP 11-FEB-75 08:43 31841

my message

huaarh this weekend is three days long, A one time good deal. 1

JSP 11-FEB-75 08:43 31841

my message

(J31841) 11-FEB-75 08:43;;;; Title: Author(s): John S. Perry/JSP;
Distribution: /CAM2([ACTION]) IMM2([ACTION]) EFF([INFO-ONLY]
) ; Sub-Collections: NIC; Clerk: JSP;

FEED 11-FEB-75 08:47 31842

FTP'ing NLS files

You can't use FTP for NLS files - 5ust txt files. I think there's documentation on FTP in the TENEX User's Guide. To transfer nls files theres's a program ftpmsys that can be loaded in the program subsystem. You can put Stars in fields to transfer a61 NLS files. I have to check to see if other files can be transferred with ftpmsys. I'll let you know. Only documentation would be in help or with ? when in the program. I need to learn how to use this (I've been using another old heck) so if yo] have trouble let me know and I'll try it and see what happens. Susan/FEED

1

FTP'ing NLS files

(J31842) 11-FEB-75 08:47;;;; Title: Author(s): Special Jhb Feedback/FEED; Distribution: /JMB([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: FEED;

The Systems Approach 1

Two Types of Planning 2

short-term budgets and detailed functional plans include such matters as short-range targets for salesmen, budgets for material purchases, short-term advertising plans, inventory replenishment, and employment schedules. 3

Strategic planning. Strategic planning is the process of determining the major objectives of an organization and the policies and strategies that will govern the acquisition, use, and disposition of resources to achieve those objectives. 4

(J31843) 11-FEB-75 08:47;;;; Title: Author(s): Mary Louise Slezycki/MLS; Distribution: /IMM2([ACTION]) IMM2([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: MLS; Origin: < SLEZYCKI, SMITH.NLS;1, >, 11-FEB-75 06:18 MLS ;;;;the snow is coming.####;

test message #3

4-3. COMMUNICATIONS SHOP. The communications shop will maintain aircraft communications systems and components, including assigned test equipment which is not maintained by the PMEL or avionics AGE activity. Special responsibilities include maintenance of direction finder equipment that is an integral part of airborne readios, crash position indicating systems, secure voice systems, and radio life support equipment. The shop chief will insure that his personnel do not make unauthorized or false transmissions on international distress frequencies by requiring strict adherence to procedures outlined in TO 12-1-38. 1

RBTM 11-FEB-75 08:51 31844

test message #3

(J31844) 11-FEB-75 08:51;;;; Title: Author(s): Robert E. Mortenson/RBTM; Distribution: /CAM2([ACTION]) ; Sub-Collections: NIC; Clerk: RBTM;

JSP 11-FEB-75 08:52 31845

part of my file

This is the third paragraph and I am not indenting . This is the next and I hope the final sentence.This sentence is to be appended to the end of statement 3. 1

part of my file

(J31845) 11-FEB-75 08:52;;;; Title: Author(s): John S. Perry/JSP;
Distribution: /EFF([ACTION]) MLS([INFO-ONLY]) ; Sub-Collections:
NIC; Clerk: JSP;

RBTM 11-FEB-75 08:59 31846

DOCUMENTATION REQUEST

PLEASE SEND ME 4 HARD COPIES OF THE COMMAND SUMMARIES. THIS IS DONE AT JEANNE BECK'S SUGGESTION. 1

RBTM 11-FEB-75 08:59 31846

DOCUMENTATION REQUEST

(J31846) 11-FEB-75 08:59;;;; Title: Author(s): Robert E. Mortenson/RBTM; Distribution: /FEEDBACK([ACTION]) RBTM([INFO-ONLY]) EFF([INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK; Clerk: RBTM;

FEED 11-FEB-75 09:27 31847

Status of request for dirs (31780,)

With the new accounting brought up this weekend - the new dirs are in the ARPA-NSW group - separate from the ARPA group.

FEED 11-FEB-75 09:27 31847

Status of request for dirs (31780,)

The directories you requested have been completed. Susan/FEED 1

FEED 11-FEB-75 09:27 31847

Status of request for dirs (31780,)

(J31847) 11-FEB-75 09:27;;;; Title: Author(s): Special Jhb Feedback/FEED; Distribution: /LAC([INFO-ONLY]) CKM([INFO-ONLY]) AAB([INFO-ONLY]) ; Sub-Collections: SRI-ARC; Clerk: FEED;

DAP 11-FEB-75 09:34 31848

the sendmail subsystem

another way to send messages

DAP 11-FEB-75 09:34 31848

the sendmail subsystem

This is your verry first JOURNAL MAIL!!! Aren't you excited?
To send messages through the journal system, you first GOTO SENDMAIL OK: (here don't forget a carriage return). Then type I (for INTERROGATE). The system will then prompt you for the information it needs; Distribute for action to [IDENT], TITLE (anything you want), Distribute for information-only to [IDENT], Type of source (which for the moment is message; type "m", then type in your message...DON'T type a carriage return until you're completely finished with your message, it will screw up the works), Show status ("type y for yes if you want to see what you've done), Send the mail now? type yes to send it. Then type "Q" (for quit) to get back to BASE C: and business as usual).

DAP 11-FEB-75 09:34 31848

the sendmail subsystem

(J31848) 11-FEB-75 09:34;;;; Title: Author(s): David A. Potter/DAP;
Distribution: /AMH([ACTION]) ; Sub-Collections: NIC; Clerk: DAP;

MAP2 11-FEB-75 13:10 31850

Packet Radio Project Directories on Office-1

Any action on this request yet?

Packet Radio Project Directories on Office-1

3-FEB-75 1023-PST *PLACKO: OFFICE-1 Directories for Packet Radio Project
Distribution: NORTON, placko, fralick at sri-ai
Received at: 3-FEB-75 10:23:35 1

Jim,
As a result of discussions with with Bob Kahn I'd like to request the
following two directories on Office-1 for the Packet Radio Project,
They would be allocated from Carlson's NSW slots. 1a

Directory name: FRALICK
IDENT: SCF
Account:
Password: SCF
Disk pages: 300
Allocation group: ?
Default protection: 770000
Person's name: Fralick, Stanley C.
Address: SRI
Phone: 326-6200 x3279
Organization: SRI/PRWG
Function: Project Leader of Packet Radio Project at SRI

Directory name: PRSETD
IDENT: PRSETD
Account:
Password: PRSETD
Disk pages: 300
Allocation group: ?
Default protection: 770000
Person's name: Allan, Daniel S.
Address: SRI
Phone: 326-6200 x3636
Organization: SRI/PRWG
Function: Packet Radio Project Systems Engineer and Technical Director

-- Mike 1b

MAP2 11-FEB-75 13:10 31850

Packet Radio Project Directories on Office-1

(J31850) 11-FEB-75 13:10;;;; Title: Author(s): Michael A. Plack/MAP2; Distribution: /JCN([ACTION]) ; Sub-Collections: NIC; Clerk: MAP2;

DLS 11-FEB-75 13:58 31851

Most Useless Command Contest

Ref (25313,)...There was no specific exclusion of commands outside NLS. The 'system' from our view point has to include the network, an unfortunate circumstance the past few weeks!!

DLS 11-FEB-75 13:58 31851

Most Useless Command Contest

With lost characters, 10 minute echo lags, and 5 suspended connections per hour; my candidate for most useless command is: @ 1 43,,,In 3 weeks y'all will 'preciate this more. 1

DLS 11-FEB-75 13:58 31851

Most Useless Command Contest

(J31851) 11-FEB-75 13:58;;;; Title: Author(s): Duane L. Stone/DLS;
Distribution: /DVN([ACTION]) POOH([ACTION]) EJK([INFO-ONLY])
RJC([INFO-ONLY]) ELF([INFO-ONLY]) JPC([INFO-ONLY]) RBP([
INFO-ONLY]) DFB([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: DLS;

FEED 11-FEB-75 15:34 31852

Request for Command Summaries

Your command summaries are in the mail per (31846,). 1

FEED 11-FEB-75 15:34 31852

Request for Command Summaries

(J31852) 11-FEB-75 15:34;;;; Title: Author(s): Special Jhb
Feedback/FEED; Distribution: /RBTM([INFO-ONLY]) JMB([INFO-ONLY])
; Sub-Collections: SRI-ARC; Clerk: FEED;

MIKE 12-FEB-75 07:47 31853

this is a test of the sendmail system

PF 16-OCT-74 06:35 31172
some thoughts on Comp. Augmented Comm.
Location: (MJOURNAL, 31172, 1:w)
*****Note: Author Copy*****

1

PF 16-OCT-74 06:22 31171
t
Location: (MJOURNAL, 31171, 1:w)
*****Note: Author Copy*****

2

PF 15-OCT-74 08:21 31168
Costs of Engelbart
Location: (MJOURNAL, 31168, 1:w)
*****Note: Author Copy*****

3

PF 15-OCT-74 05:26 31167
Scenario rationales previously written
Location: (MJOURNAL, 31167, 1:w)
*****Note: Author Copy*****

4

PF 13-SEP-74 12:56 31051
Review letter
Location: (MJOURNAL, 31051, 1:w)
*****Note: Author Copy*****

5

PF 3-SEP-74 10:06 31032
AT&T
Location: (MJOURNAL, 31032, 1:w)
*****Note: Author Copy*****

6

PF 3-SEP-74 10:04 31031
AT&T
Location: (MJOURNAL, 31031, 1:w)
*****Note: Author Copy*****

7

PF 9-JUL-74 11:27 30923
Cross Impact
Location: (MJOURNAL, 30923, 1:w)
*****Note: Author Copy*****

8

PF 11-APR-74 14:32 30456

MIKE 12-FEB-75 07:47 31853

this is a test of the sendmail system

final letter to G.H. Mellen
Location: (JJOURNAL, 30456, 1:W)
*****Note: Author Copy*****

9

PF 11-APR-74 11:42 30453
Letter to Mellen
Location: (JJOURNAL, 30453, 1:W)
*****Note: Author Copy*****

10

PF 5-APR-74 14:41 30420
incasting
Location: (JJOURNAL, 30420, 1:W)
*****Note: Author Copy*****

11

PF 3-APR-74 12:24 30398
incasting
Location: (JJOURNAL, 30398, 1:W)
*****Note: Author Copy*****

12

PF 3-APR-74 11:42 30397

Location: (JJOURNAL, 30397, 1:W)
*****Note: Author Copy*****

13

PF 12-MAR-74 15:14 30218
Vacation carry-over
Location: (HJOURNAL, 30218, 1:W)
*****Note: Author Copy*****

14

PF 12-MAR-74 08:07 30212
Questionnaire Response
Location: (HJOURNAL, 30212, 1:W)
*****Note: Author Copy*****

15

MIKE 12-FEB-75 07:47 31853

this is a test of the sendmail system

(J31853) 12-FEB-75 07:47;;;; Title: Author(s): Michael T. Bedford/MIKE; Distribution: /MIKE([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: MIKE;

FGB 12-FEB-75 18:58 31854

Costs for COM & Hard Copy Printing

Pete, I am sending you the following costs for your information,
Frank

Costs for COM & Hard Copy Printing

Computer Output Microfilm (COM) 1

There is approximately a five day turnaround for receiving Xeroxed proofs. Imitation line printer font offers no problem. A report may be proofed on a terminal and then sent to COM to obtain printing masters. Any complicated formats (e.g., columnnation, many changes of fonts,etc.) will probably require a minimum of three iterations. Forethought, in preparing a complicated report, is required. For example, inserting special characters to indicate changes of font (these characters are then replaced with Output Processor commands using Substitute Text in Plex). Duane Stone of RADC has experience in this area which he is more than willing to share. They prepared a JOVIAL manual using the COM system. 1a

The costs are as follows: 1b

- $2.00 per page for microfilm if there are NO font changes; $2.10 per page otherwise 1b1
- $0.10 per page for Xeroxed proofs from microfilm 1b2
- $0.30 per page for camera ready copy 1b3

So, for example, the cost of a 100 page report would be approximately as follows: 1c

- imitation line printer 1c1

  one past at $2.00 x 100= $200.00 1c1a

  Xerox proof at .10 x 100 = $ 10.00 1c1b

  camera ready copy at .30 x 100 = $ 30.00 1c1c

  total $240.00 1c1d

- complex report 1c2

  min. 3 passes $2.00 x100 = $600.00 1c2a

  3 Xerox prrofs .10 x 100 = $ 30.00 1c2b

  1 Camera ready copy at .30 x 100 = $ 30.00 1c2c

  Total $660.00 1c2d

Doug Englebart's latest report is a good example of a complex report requiring multiple passes. 1d

Costs for COM & Hard Copy Printing

Cost for Hard Copy Printing after COM 2

After you add quality control, overhead, etc., printing at SRI costs about $.75 a page for ITEK Masters (good for about 1000 copies) and about 2 cents per impression (impression = copies X pages) for printing in the range of 100-500 copies. 2a

Cost per impression goes down as you make more copies. Other possible costs are $1-5 per page that includes line drawing or halftone illustrations, and various costs for various types of covers and binding. Typical inexpensive cover and binding is $.45 per copy. 2b

That means 100 copies of a typical 100-page report without artwork but with covers would cost about $225.00. 2c

I will mail you a sheet with more detailed costs. 2d

Offset printing is a genuine open marketplace. That means costs vary with geographical location, whom you talk with, what he thinks he can stick you for, and the leverage and skill of the person who negotiates with the vendor. In general SRI, for accounting reasons, is a moderately expensive place to print. In general the Bay Area is high cost. I suppose NSRD has a large enough volume to have some leverage with local printers and has some one who is experienced in negotiating with them. Maybe not if you are required to go through the Government Printing Office. 2e

For the future. As you may recall we are negotiating with George Lithograph for COM service (link). Unlike DDSI, George is a printer and wants to do the printing themselves. My guess is their prices will be moderately lower than SRI's. 2f

FGB 12-FEB-75 18:58 31854

Costs for COM & Hard Copy Printing

(J31854) 12-FEB-75 18:58;;;; Title: (Unrecorded) Title: Author(s):
Frank G. Brignoli/FGB; Distribution: /PRB([INFO-ONLY]) ;
Sub-Collections: NIC; Clerk: FGB;